GOVERNMENT OF INDIA

PRADHAN MANTIRI KRISHI SINCHAYEE YOJANA

(PMKSY)

DISTRICT IRRIGATION PLAN

OF CHATRA

(2016-2020)

PREPARED & SUBMITTED BY

CHATRA DISTRICT ADMINISTRATION

JUNE 2016

Introduction

Hon'ble President in his address to the joint Session of the Parliament of 16th Lok Sabha observed, "Each drop of water is precious. The operational guidelines set the objectives loud and clear by mentioning that; "Government is committed to giving high priority to water security. It will complete the long pending irrigation projects on priority and launch the 'Pradhan MantriKrishiSinchayeeYojana' with the motto of '*HarKhetKoPaani'*. By harnessing rainwater through '*Jal Sanchay'* and '*Jal Sinchan'*, we will nurture water conservation and ground water recharge. Micro irrigation will be popularised to ensure 'Per drop-More crop'. Out of about 141 m.Ha of net area sown in the country, about 65 million hectare (or 45%) is presently covered under irrigation. Substantial dependency on rainfall makes cultivation in unirrigated areas a high risk, less productive profession. Empirical evidences suggest that assured or protective irrigation encourages farmers to invest more in farming technology and inputs leading to productivity enhancement and increased farm income. The overreaching vision of *Pradhan MantriKrishiSinchayeeYojana* (PMKSY) will be to ensure access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity".

Objectives

1. Achieve convergence of investments in irrigation at the field level (preparation of district level and, if required, sub district level water use plans).

2. Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (HarKhetkopani).

3. Integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices.

4. Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and extent.

5. Enhance the adoption of precision-irrigation and other water saving technologies (Per Drop More Crop).

6. Enhance recharge of aquifers and introduce sustainable water conservation practices

7. Ensure the integrated development of rainfed areas using the watershed approach towards soil and water conservation, regeneration of ground water, arresting runoff, providing livelihood options and other NRM activities.

8. Promote extension activities relating to water harvesting, water management and crop alignment for farmers and grass root level field functionaries.

9. Explore the feasibility of reusing treated municipal wastewater for periurban agriculture.

10. Attract greater private investments in irrigation. This will in turn increase agricultural production and productivity and enhance farm income.

To achieve above objectives, PMKSY has to strategize by focusing on end-to end solution in irrigation supply chain, viz. water sources, distribution network, efficient farm level applications, extension services on new technologies & information etc.

Vision

1. Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary & micro storage, and groundwater development, enhancing potentials of traditional water bodies at village level.

2. Developing/augmenting distribution network where irrigation sources (both assured and protective) are available or created.

3. Promotion of scientific moisture conservation and run off control measures to improve ground water recharge so as to create opportunities for farmer to access recharged water through shallow tube/dug wells;

4. Promoting efficient water conveyance and field application devices within the farm viz, underground piping system, Drip & Sprinklers, pivots, rain-guns and other application devices etc.

5. Encouraging community irrigation through registered user groups/farmer producers' organizations/NGOs.

6. Farmer oriented activities like capacity building, training and exposure visits, demonstrations, farm schools, skill development in efficient water and crop management practices (crop alignment) including large scale awareness on per drop more crop of water through mass media campaign, exhibitions, field days, and extension activities through short animation films etc.

Background/ Strategy/ Approach

More than 90% of the population of Chatra district reside in rural areas and more than 75% of the workers are associated with agriculture directly either as cultivators or agricultural labourers. Thus any significant improvement in agriculture has a tremendous impact on the lives of people here. Despite agriculture as mainstay, only 18.47% of total geographical area is cultivated. Further, only 26.7% of net sown area has assured irrigation against the national average of 45%. That is, nearly 73% of cropping area is rainfed or dependent on unassured irrigation. All these facts point towards the relatively poor health of irrigation facilities in the district.

The District Irrigation Plan (DIP) is a concerted effort of the district administration to address the above issue by increasing the net irrigated area of the district in a sustainable manner and thereby effect a significant change in the livelihoods of the farmers of the district. This DIP is prepared based on the objectives, principles, operational guidelines, templates, formats and directions provided under Pradhan MantriKrishiSinchayeeYojana (PMKSY).

Aspects such as demographics, topography, climate, soil properties, drainage patterns, land-use pattern, water availability etc are vital inputs while preparing an irrigation plan. It ensures that the plan is in coherence with local conditions ensuring its sustainability. Chapter I of the DIP covers these aspects while giving a brief introduction to the district.

Agricultural aspects such as cropping pattern, variation of productivity across areas play the most important role in devising an irrigation plan. While irrigation not only enables an additional season of cropping, it also improves the productivity of crops significantly. Chapter II provides details of cropping pattern in 12 blocks of the district and also attempts to evaluate variation of yield with irrigation.

Water, rightly called the life-liquid,is an essential aspect of life. Its sustainable & holistic management plays a key role in improving the lives and livelihoods of people. Chapter III assesses availability of water from groundwater and surface water resources that can be used sustainably. Chapter IV assesses the water requirement/demand for not just agricultural needs but also domestic, livestock, industry and power generation purposes. This ensures that diversion of water for agriculture needs doesn't affect other vital aspects that are heavily dependent on water. Chapter III & IV together assesses overall water demand-supply gap.

In Chapter V lies the crux of the DIP. This chapter is built on the groundwork of previous chapters. It consists of block-wise Strategic Action Plans for the planning period – 2016-2020. In this chapter, various schemes have been proposed along with details - location, budget, period of completion. Various types of schemes include – creation of water harvesting structures, structures to improve moisture retention, drought-proofing structures, creation of a water resource through construction of wells, ponds, renovating existing structures to improve their

efficacy, afforestation activities etc. Further, these schemes are placed under five different components based on the implementing agency, budget, command area, type - 'Accelerated Irrigation Benefit Programme', 'Har Khet Ko Pani', 'Per Drop More Crop', 'PMKSY Watershed', and 'MGNREGA Convergence'.

The expenditure for the plan is Rs.1192.05 Cr for five years. Out of this, Rs. 342.86 Cr is expected to come from works taken up under MGNREGA, Rs. 264.86 Cr by Minor Irrigation department for taking up its core activities such as construction of large check dams, Rs. 304.23 Cr is expected to be spent by the Soil Conservation and agriculture department and Rs. 74 Cr is expected to be spent for major and medium irrigation works. And the rest Rs. 158 Cr on groundwater recharge structures.

Overall, the plan proposes achieve the stated objectives of increasing net sown area and net irrigated area. Net Sown Area is expected to increase from 69,394 ha to 91,951 ha – a substantial increase from 67% to 89% of cultivable land. Further, net irrigated area is expected to increase from 18,801 ha to 72,195 ha – bringing 78% of net sown area under assured irrigation from current 27%. Gross Cropped area is expected to increase by more than 50%.

Rational / Justification Statement

With enhanced irrigation facilities, farmers would opt for remunerative crops such as Wheat during winter in place of oilseeds or pulses. This may have positive impact on cropping pattern of the district. Also, productivity of crops would increase by no less than 15%. Overall, such a tremendous increase in irrigation potential would bring prosperity to majority of lives in Chatra and transform it into a food-surplus district.

CHAPTER – I

GENERAL INFORMATION ABOUT THE DISTRICT

1.1 DISTRICT PROFILE:

Chatra, as a district was created through bifurcation from Hazaribag district in 1991. It falls in the Western part of Northern Chotanagpur division of Jharkhand State. Spread over an area of 3718 sq. km, it is bounded between 23°38´34´´ - 24°27´48´´ North latitudes and 84°26´50´´ - 85°23´41´´ East longitudes. It is bordered by Gaya district of Bihar State in the North, Palamu district in the West, Hazaribag and Koderma in the East and Latehar in South West and Ranchi in the South.

Chatra is situated within lush green area with 60.4% of geographical area under forest. It is primarily a rural district with 93.4% of population residing in rural areas. The settlement pattern of district is scattered with a very low population density at 275 persons per sq. km. Chatra's economy is primarily agrarian based with more than 75% of workers engaged in agriculture either as cultivators or agricultural labourers. Thus, any significant improvement in agriculture has a tremendous impact on the populace of Chatra.

Historically, Chatra had been administrative headquarters of Chotanagpur region for 53 years from 1780 till 1883. Raja Ram Mohan Roy, the great social reformer and herald of modern India had worked as a Deputy Registrar from the year 1805-06 A.D at Chatra. It became sub-division of Hazaribag district later in 1914 and formed as a separate district in 1991.

Currently, the district has two sub-divisions – Chatra and Simaria; and 12 blocks viz.Hunterganj (also called ShaligramNarayanpur), Pratappur, Kunda, Lawalong, Chatra, Kanhachatti, Itkhori, Mayurhand, Gidhour, Pathalgada, Simaria, Tandwa (blocks throughout the DIP are ordered based on Census data). The location of blocks can be seen in Fig. 1.1.

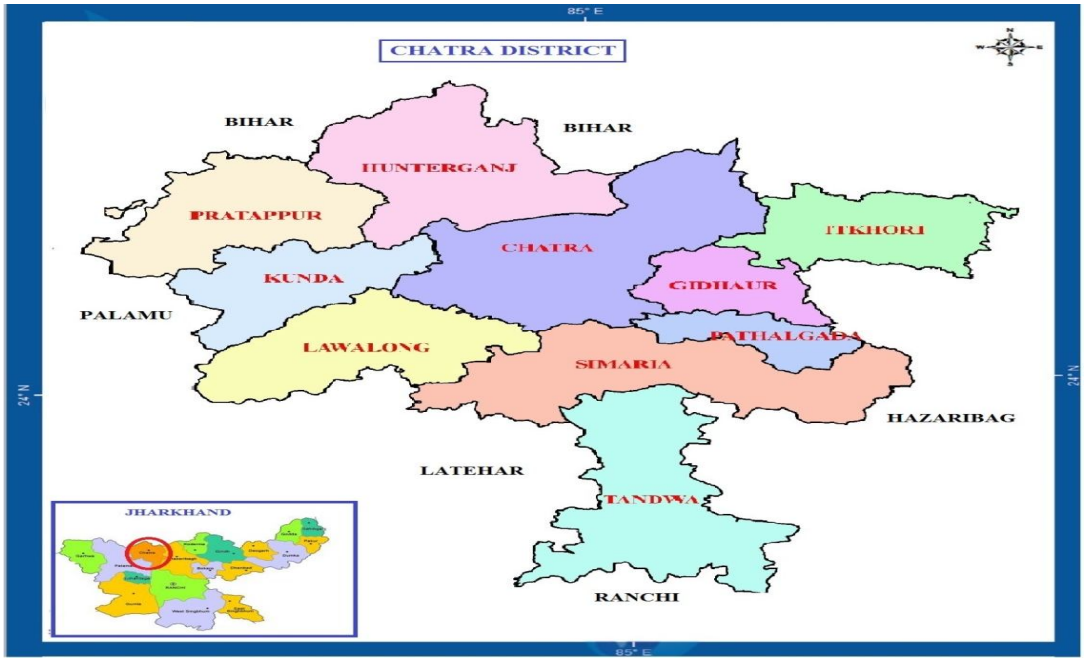
There are two Census Towns in Chatra district – Bachra of Tandwa and Chatra town. Chatra town, the headquarters of the district is a Nagar Parishad with a population of 49,985. Table 1.1 reveals an overview of the district.

The district has seen tremendous growth in recent years. Further, the commissioning of a 1860 MW NTPC power plant in Tandwa Block and an Integrated Steel Plant by NMDC in Kanhachatti augurs well for the much higher growth for district in near future.

Table 1.1 - Overview of Chatra District		
(Source: Census 2011)		
Area (sq. km)	3,760	4.71% of Jharkhand's area
Forest Area (sq. km)	2,268	60.4% of district's area
Number of sub-divisions	2	Chatra &Simaria
Number of Blocks	12	
Number of Gram Panchayats	154	
Number of Villages	1471	
Population (in Lakhs)	10.43	3.16% of Jharkhand's population
Number of Households (in Lakhs)	1.823	Average household size is 5.3
Population Density (/km^2)	275	414 in Jharkhand
Rural Population (in Lakhs)	9.79	93.4% of district's population
Urban Population (in Lakhs)	0.63	Only 6.6% of population
SC Population	3.4	32.5% of population
ST Population	0.45	4.3% of population
Literacy Rate	60.20%	66.4% in Jharkhand and 74% in India
Decadal Growth Rate of Population (2001-11)	28.98%	22.3% in Jharkhand and 17.6% in India
Number of Main Workers	184098	
Cultivators	75717	

Argicultural Labourers	63773	
Workers directly involved in agriculture	139490	75.77% of main workers

Fig. 1.1 Political Map of Chatra



1.2 DEMOGRAPHICS

Chatra with a population of 10,42,886 ranks15thamong 24 districts inJharkhand. Population density of 280 persons per sq. km makes it a very sparsely populated district ranking 19th in the State. As mentioned before, 93.4% of population resides in rural areas as shown in Fig. 1

Males constitute 51.2% and females 48.8% of the population amounting to a sex ratio of 953. Child Sex Ratio of the district is 967 that is significantly higher than Jharkhand's 948. Overall literacy rate of the district is 60.2% with male literacy of 69.9% and female literacy of 49.9% indicating huge gender gap in literacy. Further, overall literacy rate is significantly lower than of national average of 74%. Infant Mortality Rate of the district stands at 42 that is higher than Jharkhand's 40. These indicate relatively low education and health status of the Chatra district. Further, it can be observed from the Table 1.1 that northern blocks have relatively low literacy rates.

Unlike other districts of Jharkhand, Chatra has a significantly higher SC population relative to ST population. SCs constitute 32.65% of districts population, that is, almost one in three persons in the district belong to SC category. While only 4.37% of population belongto STs. Chatra is also home to some of the Particularly Vulnerable Tribal Groups (PVTGs) such as Birhor, Baiga and Parhiya.

Fig: 1.1 Charts showing Proportion of Rural-Urban and Category-wise Population

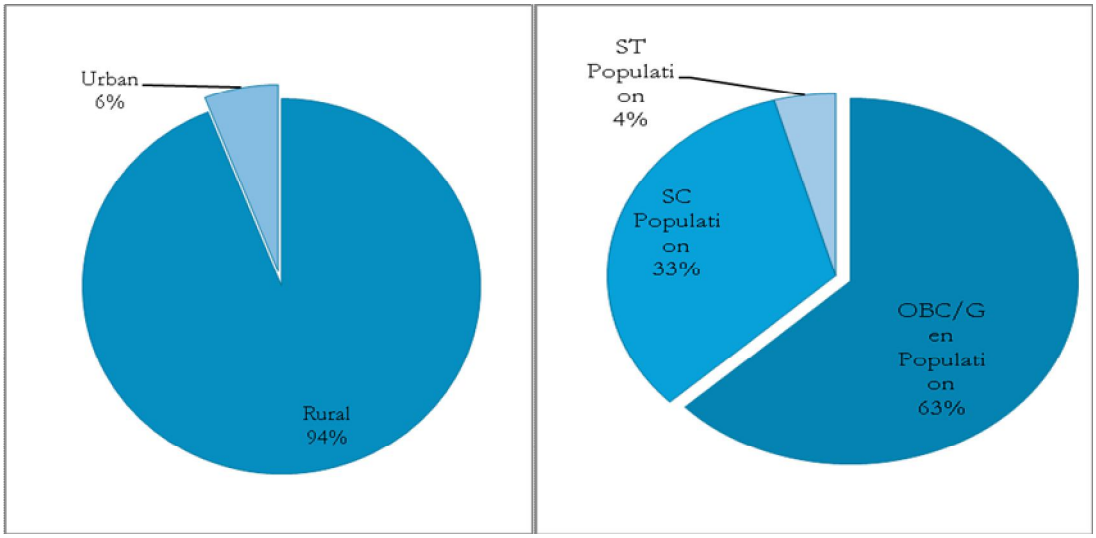


Table 1.2 Demography of Chatra – Block-Wise details												
(Source: Census 2011)												
S.No	Block	Area (ha)	Total HH	Population	Population density	Rural	Urban	Male	Female	SC Population	ST Population	Literacy Rate
1	Shaligram - Hunterganj	51318	31534	187590	366	187590	0	96328	91262	69944	628	54.83%
2	Pratappur	38579	21055	120221	312	120221	0	61780	58441	43636	1350	53.19%
3	Kunda	28508	5782	30018	105	30018	0	15427	14591	19081	1155	44.84%
4	Lawalong	39386	9233	50553	128	50553	0	25651	24902	28926	2690	49.02%
5	Chatra	40021	25797	150999	377	101014	49985	78513	72486	44967	4216	63.93%
6	Kanhachatti	22749	10756	63012	277	63012	0	32112	30900	20308	2016	62.88%
7	Itkhori	16060	12373	74929	467	74929	0	37869	37060	17882	338	68.02%
8	Mayurhand	13327	10235	58925	442	58925	0	29482	29443	15448	212	64.41%
9	Gidhour	17419	6930	40919	235	40919	0	20910	20009	9834	704	68.08%
10	Pathalgadda	13321	5701	31530	237	31530	0	15867	15663	7927	3163	67.39%
11	Simaria	51247	19556	107871	210	107871	0	54855	53016	32496	8761	63.40%
12	Tandwa	45521	23319	126319	277	113350	12969	65141	61178	30104	20330	62.62%
Total		**377456**	**182271**	**1042886**	276	**979932**	**62954**	**533935**	**508951**	**340553**	**45563**	**60.2**

As it can be observed from **Table 1.3**, total more than 75% of workers are directly involved in agriculture. In blocks with good irrigation facilities such as Hunterganj, Mayurhand, Pathalgada, Gidhour, proportion of workers involved in agriculture are significantly higher compared to others. Further, in Tandwa, where mining is also a major activity, very less proportion of workers involved in agriculture can be observed.

Table 1.3 Agriculture-Related Workers Statistics

(Source: Census 2011)

S.No	Block	Population	Main Workers	Cultivators	Agricultural Labourers	% of workers directly dependent on agriculture
1	Shaligram - Hunterganj	187590	42539	16176	18367	81.20%
2	Pratappur	120221	19054	5242	10273	81.43%
3	Kunda	30018	5697	2206	2701	86.13%
4	Lawalong	50553	7225	1689	3487	71.64%
5	Chatra	150999	21507	9486	6437	74.04%
6	Kanhachatti	63012	5282	2241	1528	71.36%
7	Itkhori	74929	13346	5349	3716	67.92%
8	Mayurhand	58925	11654	5675	3722	80.63%
9	Gidhour	40919	8801	4039	3302	83.41%
10	Pathalgadda	31530	8861	5669	1549	81.46%
11	Simaria	107871	20286	10148	5333	76.31%
12	Tandwa	126319	19846	7797	3358	56.21%
Total		**1042886**	**184098**	**75717**	**63773**	**75.77%**

1.3 LAND HOLDING PATTERN

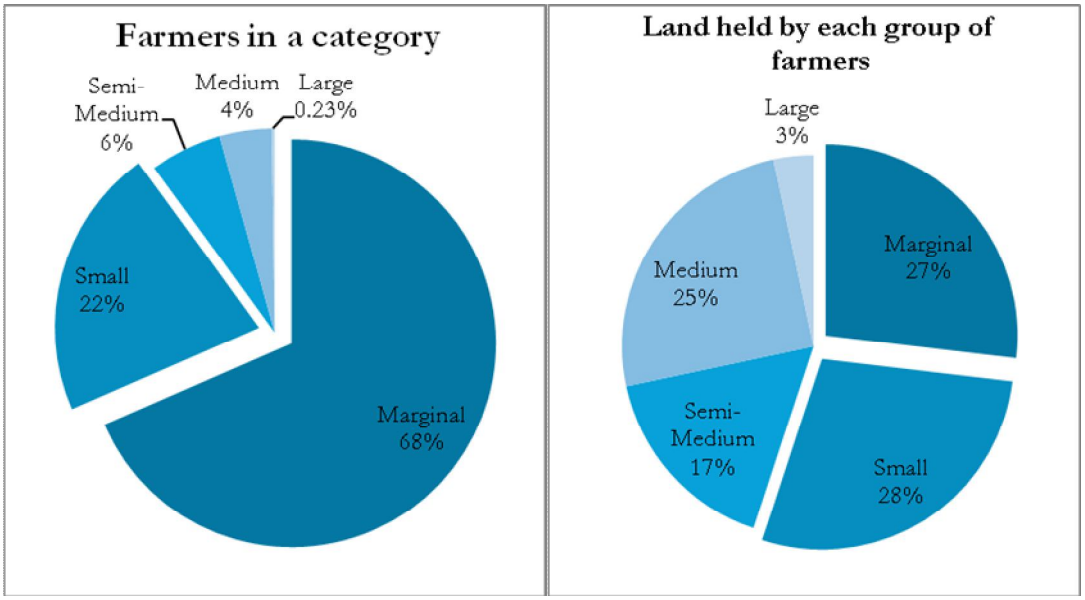
Marginal & small farmers together constitute nearly 90% of all farmers having operational land holdings. That is, 90% of farmers hold less than 2 hectares of land and 68% hold less than one hectare.

Table 1.4 Charateristics of Land Holdings in Chatra
(Source: Agricultural Census, 2010-11)

S.No	Size of holdings	No. of farmers	Farmers in this category	Area (ha)	% of Land held
1	Marginal Farmer (< 1 ha)	84187	68.44%	31389	26.88%
2	Small Farmer (1 - 2 ha)	26451	21.50%	32932	28.20%
3	Semi-Medium Farmer (2. - 4 ha)	6997	5.69%	19324	16.55%
4	Medium Farmer (4 - 10 ha)	5089	4.14%	29176	24.99%
5	Large Farmer (> 10 ha)	283	0.23%	3941	3.38%
	All Groups	123007		116762	

Most importantly, average land holding of a marginal farmer is 0.37 hectares which is less than an acre. It points to uneconomic land-holdings by farmers indicating a less-productive agricultural system and subsistence type of agriculture.

Fig. 1.2 Charts representing characteristics of land holding by farmers



1.4 FLORA & FAUNA

Being centrally located in forest, it has everything that a nature lover would want to have and is a home of wide variety of flora and fauna. Rich in biodiversity, one can see infinite variety of wild-life and greenery here. Wide variety of flora including medicinal plants, Tendu leaves, bamboo, Sal, Teak are found here. The district hosts a wild life sanctuary in Lawalong, where one can find tigers, leopards, elephants, bear, neelgai, sambhar, peacock, wild boar and deer together with variety of snakes and birds

1.4 Agro Ecology, Climate, Hydrology and Topography **Source: IMD, regional ICAR centre(s), SAUs, KVKs etc.**

Name of the State:

Name of the District:

Name of the Block*:

S. No.	Agro Ecological Zone Type	Type of Terrain	Block Area (ha)	Normal Annual Rainfall (mm)	Average Monthly Rainfall (mm)	No of Rainy Days (No)	Maximum Rainfall Intensity(mm)			Average Weekly Temperature (°C)									Potential Evapo-Transpiration (PET)				Elevation		
										Period									Period						
										Summer (April-May)			Winter (Oct.-Mar.)			Rainy (June-Sept.)									
							Up to 15 Min	Beyond 15 but up to 30 Min	Beyond 30 but up to 60 Min	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Summer	Winter	Rainy Season	Cumulative Total	Min.	Max.	Mean
1	VI(Sub Zone-5)	Western Plateaue	375794	1174	97.83	59	4 mm	10 mm	20 mm	19.1	40.1	28.04	6	33.3	28.17	167.1	310.8	249.27	7-8	1-4	1-2	2-5 mm	-	-	-

1.5 LIVESTOCK

As Chatra is an agrarian-based economy, livestock plays an important role in complementing the livelihoods of several households. Poultry farming (broiler) is one of the main allied activities in Chatra. Though dairy farming is moderately prevalent, there is a huge scope for improvement regarding the same. Due to high SC population, pig rearing is also very common in Chatra. Table 1.3 shows population of various livestock.

Table. 1.3: Livestock Population
(Source: Livestock Census 2012)

Cattle	Sheep & Goats	Pigs	Poultry Farm (Broiler)	Backyard Poultry	Poultry Population	**Total Livestock Population**
487419	242339	63447	1824	34109	2617450	**3410655**

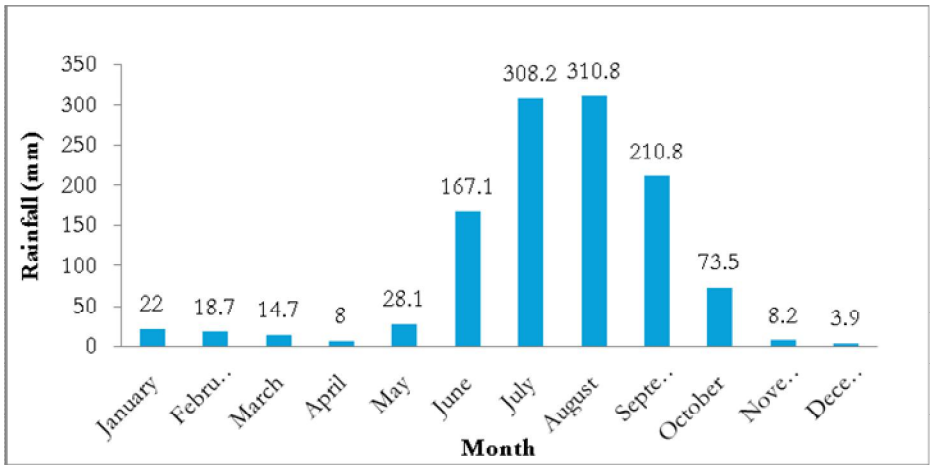
1.6 CLIMATE – TEMPERATURE & RAINFALL

The climate of Chatra ranges from dry semi-humid to humid semi-arid type. The district receives an average annual rainfall of about 1174 mm. Of this, 80% is received during monsoon months from June till September that arrives in Chatra in the third week of June.The average number of rainy days is 59, of which 47 days are during monsoon months. Rainfall during winter months is unpredictable discouraging many farmers from going for a double crop.

Table 1.4 Rainfall Pattern in Chatra
(Source: Department of Agriculture)

Month	January	February	March	April	May	June	July	August	September	October	November	December	Overall
Normal Rainfall (mm)	22.0	18.7	14.7	8.0	28.1	167.1	308.2	310.8	210.8	73.5	8.2	3.9	**1174.0**
Average Rainfall (mm)	2.6	10.5	3.4	7.1	25.9	177.9	256.2	260.9	158.7	41.3	4.4	0.3	**949.2**
No. of rainfall days	1	2	0	1	3	7	15	17	8	4	1	0	**59**

Fig 1.3: Bar Chart showing Rainfall pattern in Chatra across the year

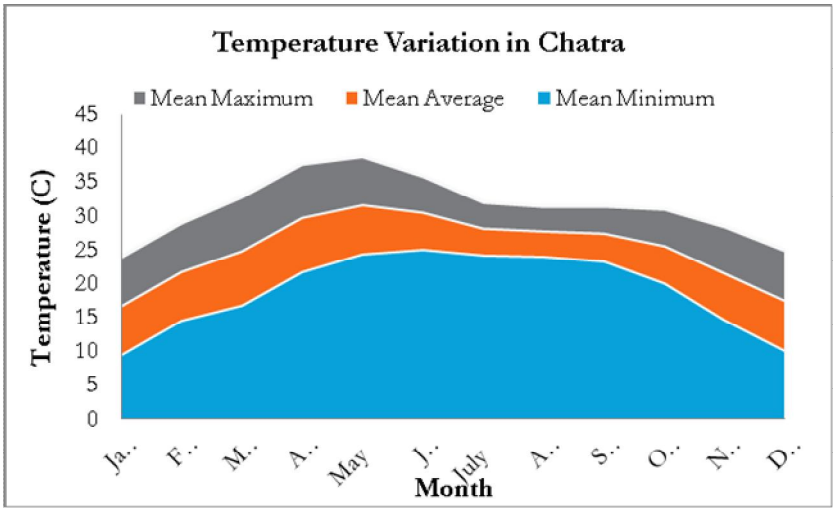


The mean annual temperature remains about 25°C. Mean maximum of 38.6°C is observed in May and a mean minimum of 10.1°C is observed during December. Further, the peak temperature in summer sometimes reaches to 46°C and in winter, it comes down to as low as 2 - 3°C. These facts point towards a rather high range of temperature.

Table 1.5 Temperature Profile of Chatra (based on 1969-2004 data)
(Source: WRIS-India)

S.No	Month	Mean Maximum (°C)	Mean Minimum (°C)	Mean Average (°C)
1	January	23.77	9.48	16.63
2	February	28.8	14.58	21.68
3	March	32.64	16.81	24.72
4	April	37.49	21.78	29.64
5	May	38.59	24.42	31.5
6	June	35.71	25.09	30.4
7	July	31.86	24.25	28.05
8	August	31.26	24.04	27.65
9	September	31.28	23.35	27.32
10	October	30.85	20.1	25.47
11	November	28.25	14.63	21.44
12	December	24.76	10.07	17.4

Fig 1.4: Bar Chart showing Temperature Variation in Chatra across the year



Further, SAMETI (State Agricultural Management and Extension Training Institute) of Jharkhand classifies Chatra under Sub-Zone VI – humid to sub-tropical monsoon. Salient features of this sub-zone are: Uneven distribution of rainfall, Low water-holding capacity and Eroded soils & Poor soil fertility. Also, the potential evapo-transpiration losses are high for the district given its severe summer. Hence, all surface water bodies are dried up during summer leaving out meagre perennial sources.

1.7 PHYSIOGRAPHY, DRAINAGE PATTERN & GEOLOGY

Chatra has a rolling topography marked by isolated hills and valleys. The general slope of the district is from North to South with an average elevation of 450 m. Since the district consists of part of Upper & Lower Hazaribag plateau and northern scarp, it presents diverse physiographic features.

The northern most part of the district bordering Bihar is a low-lying area and most suitable for agriculture. Just to the south of this plain region is Kalua and Lahabar hills that forms the higher elevations of the district. These hills fall in northern blocks namely Hunterganj, Pratappur, Kunda and Lawalong. They are covered by dense forests and are hot-bed for Left wing Extremist activities. The middle and southern regions of the district are a part of Chotanagpur plateau. These regions have an undulating terrain with a mix of up, medium and low lands. The scarp landforms of the district gave rise to scenic waterfalls. TamasinWaterfalls in Kanhachatti block is a famous tourist spot that has been formed due to scarp landform.

There are as many as 40 rivers that flow in or through Chatra covering a length of 561.37 km overall. Of these, the major rivers include Lilanjan in Hunterganj (69 km), Mohani in Itkhori (50 km) Hiru (32 km) in Chatra and Chako (23 km) in Lawalong. None of these rivers is perennial. The general trend of the drainage is from SENW. The structural features particularly the foliation and joints exert profound impact upon the drainage and control the drainage pattern of the district.

Geologically, the area is comprised with Archean granites and gneisses. In southern part of the district, Gondwana rock formations occur in patches. Overall, the geological formations of Chatra can be have been grouped under three main categories:

1. The gneissic complex in the southern and the central part
2. The Rajmahal traps in the eastern and southeastern part
3. Gondwanas overlain by thin mantle of alluvial cover in the northern and central part.

1.8 LAND UTILIZATION PATTERN

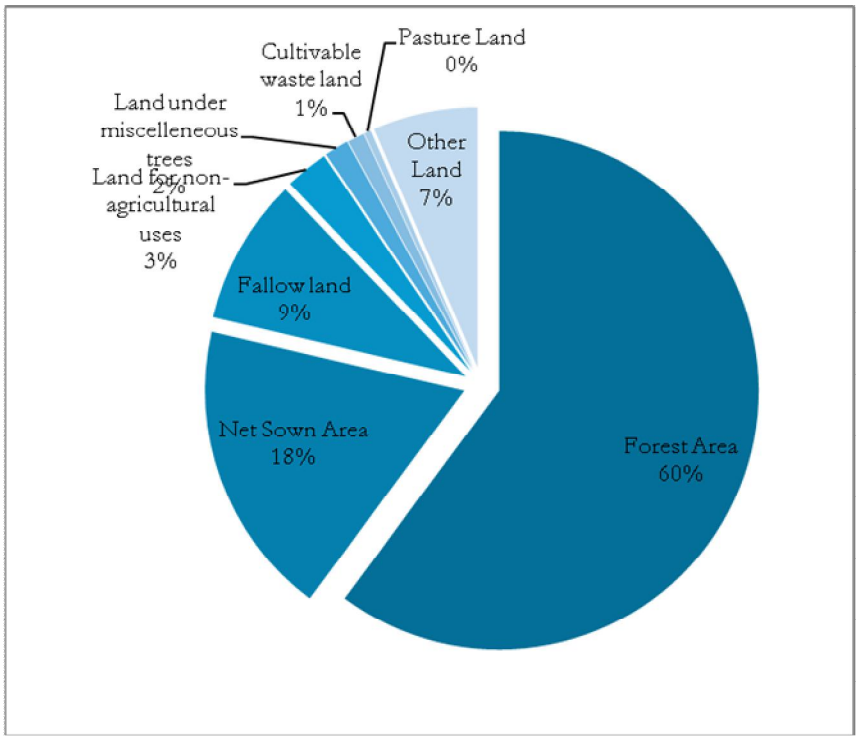
60% of the total geographical area is covered by forest. And being a plateau region with intermittent hills – less amount of land is available for agriculture. Hence, the net sown area is only 69394 hectares (18.47%) despite being an agrarian economy.

Table 1.6 Land Utilisation Pattern of Chatra

(Source: Census, Agricultural Census, Forest Department)

S.No	Type of land	Area (ha)	% of TGA
1	Total Geographical Area	375794	
2	Forest Area	226117	60.17%
3	Net Sown Area	69394	18.47%
4	Fallow land	34330	9.14%
5	Land for non-agricultural uses	10150	2.70%
6	Land under miscelleneous trees	5690	1.51%
7	Cultivable waste land	3950	1.05%
8	Pasture Land	1620	0.43%
9	Other Land	24543	6.53%

Fig 1.6: Chart showing Land Use Pattern in Chatra



1.9 SOIL PROFILE:

Soil type and nature depend on various physical factors such as parent rock, natural vegetation, climate, topography. These factors affect the texture, porosity, permeability, organic matter, nutrients etc that help determine cropping pattern and fertility. National Bureau of Soil Sampling and Land Use Planning's (NBSSLUP) report reveals in-depth analysis of soil profile of the district. Broadly, soils are classified into Entisols, Inceptisols and Alfisols. Of these three soil orders,Alfisols were observed in Chatra district Alfisols were the dominant soils covering 52.2 percent of TGA followed by Entisols (33.9 %) and then Inceptisols (13.0). Following tables and maps give an idea of Chatra's soil profile in detail.

Properties of a soil at a particular location anywhere in the district can be mapped using **Table 1.8 and Fig. 1.8.** First column of table – map unit can be co-related with the location on the map provided in figure and vice-versa

1.5 Soil Profile **Source: SLUSI, NBSS, Indian Institute of Soil Science, Department of Land Resources**					
Name of the State: Jharkhand					
Name of District: Chatra					
Name of the Block: Chatra, Kanhachatti, Itkhori, Mayurhund, Giddhor, Pathalgada, Simariya, Tandwa, Lawalong, Kunda, Pratappur, Huntergunj					
Soil Type		Land Slope			
Major Soil Classes	Area (ha)	0-3% (ha)	3-8% (ha)	8-25% (ha)	>25% (ha)
Inceptisy	375794	145377	118720	76419	35278

Table 1.8 Soils of the district and their extent			
(Source: NBSSLUP)			
Map Unit	**Taxonomy**	**Area ('00 ha)**	**% of TGA**
16	Fine, mixed, hyperthermic, TypicHaplustalfs Loamy, mixed, hyperthermic,LithicUstorthents	191	5.15%
19	Loamy-skeletal, mixed, hyperthermic,LithicUstorthents Fine loamy, mixed, hyperthermic, TypicHaplustepts	41	1.11%
23	Fine-loamy, mixed, hyperthermic, TypicHaplustepts Fine-loamy, mixed, hyperthermic, TypicHaplustalfs	228	6.15%
25	Fine, mixed, hyperthermic, TypicPaleustalfs Fine, mixed, hyperthermic, RhodicPaleustalfs	33	0.89%
30	Loamy-skeletal, mixed, TypicHaplustepts Fine-loamy, mixed, hyperthermic, Haplustalfs	71	1.92%
35	Loamy-skeletal, mixed, hyperthermic, Lithic Ustorthents Fine-loamy, mixed, hyperthermic, TypicHaplustalfs	1127	30.41%
36	Fine, mixed, hyperthermic, TypicPaleustalfs Fine loamy, mixed, hyperthermic, TypicRhodustalfs	441	11.90%

Table 1.8 Soils of the district and their extent			
(Source: NBSSLUP)			
38	Fine loamy, mixed, hyperthermicTypicPaleustalfs Fine loamy, mixed, hyperthermicTypicHaplustepts	38	1.03%
40	Fine loamy, mixed, hyperthermicTypicHaplustepts Fine loamy, mixed, hyperthermicTypicHaplustalfs	191	5.15%
41	Coarse loamy, mixed, hyperthermicTypicUstorthents Fine loamy, mixed, hyperthermicTypicPaleustalfs	229	6.18%
42	Fine, mixed, hyperthermicTypicRhodustalfs Fine loamy, mixed, hyperthermicTypicUstorthents	161	4.34%
43	Coarse loamy, mixed, hyperthermicTypicUstorthents Fine loamy, mixed, hyperthermicTypicHaplustepts	82	2.21%
44	Fine, mixed, hyperthermicAericEndoaquepts Fine, mixed, hyperthermicTypicHaplustepts	44	1.19%
46	Fine, mixed, hyperthermicAericEndoaqualfs Fine, mixed, hyperthermicTypicEndoaqualfs	57	1.54%
48	Loamy-skeletal, mixed, hyperthermic Lithic Ustorthents Fine, mixed, hyperthermicTypicRhodustalfs	63	1.70%
57	Fine, mixed, hyperthermicTypicHaplustepts Fine loamy, mixed, hyperthermicAericEndoaqualfs	59	1.59%
67	Coarse loamy, mixed, hyperthermicTypicUstorthents Fine, mixed, hyperthermicTypicHaplustalfs	205	5.53%
70	Fine, mixed, hyperthermic, TypicHaplustalfs Loamy, mixed, hyperthermic,LithicUstorthents	56	1.51%
79	Fine, mixed, hyperthermicTypicRhodustalfs Loamy, mixed, hyperthermic Lithic Ustorthents	143	3.86%
81	Fine-loamy, mixed, hyperthermicTypicHaplustalfs Fine, mixed, hyperthermicTypicPaleustalfs	40	1.08%
85	Fine, mixed, hyperthermicTypicRhodustalfs Coarse loamy, mixed, hyperthermicTypicUstorthents	29	0.78%
Miscelleneous		32	0.86%
Total		**3706**	**100.00%**

Table 1.9 Soils under different reaction classes			
(Source: NBSSLUP)			
Soil Reaction	**Area ('00 ha)**	**Area (%)**	**Observation**
Very Strongly Acidic (pH 4.5-5)	147	3.97%	Soil pH is an important soil property,

Strongly Acidic (pH 5.1-5.5)	584	15.76%	which affects the availability of several plant nutrients. It is a measure of acidity and alkalinity and reflects the status of base saturation. Data reveals that majority of the area is acidic (66.2 % of TGA). Use of acid-tolerant species, efficient use of fertilizers, suitable crop rotations and crop diversification, using lime are some methods to keep acidity to desired levels.
Moderately Acidic (pH 5.6-6)	1016	27.42%	
Slightly Acidic (pH 6.1-6.5)	704	19.00%	
Neutral (pH 6.6 - 7.3)	654	17.65%	
Slightly Alkaline (pH 7.4-7.8)	375	10.12%	
Moderately Alkaline (pH 7.9-8.4)	194	5.23%	
Miscellaneous	32	0.86%	
Total	**3706**		

Table 1.10 Organic Carbon Status

(Source: NBSSLUP)

Organic Carbon (%)	Area ('00 ha)	Area (%)	Observation
Low (<0.5%)	971	26.20%	Soil organic matter plays a vital role in supplying plant nutrients, cation exchange capacity, improving soil aggregation and hence water retention and soil biological activity. High & medium carbon content indicates that soils in Chatra are not deficient in organic matter.
Medium (0.5 - 0.75%)	1326	35.78%	
High (> 0.75%)	1377	37.16%	
Miscellaneous	32	0.86%	
Total	3706	100.00%	

Table 1.11Availability of Macronutrients (Nitrogen,Phosphrous,Potassium,Sulphur)							
(Source: NBSS, LUP)							
Avaialble Nitrogen (kg/ha)	**% of TGA**	**Avaialble Phosphorous (kg/ha)**	**% of TGA**	**Avaialble Potassium (kg/ha)**	**% of TGA**	**Avaialble Sulphur (mg/kg)**	**% of TGA**
Low (<280)	20.7%	**Low (< 10)**	**78.3%**	Low (<108)	7.3%	Low (<10)	28.1%
Medium (280-560)	63.1%	Medium (10 - 25)	20.5%	Medium (108-280)	49.6%	Medium (10-20)	38.3%
High (> 560)	15.3%	High (> 25)	0.3%	High (> 280)	42.2%	High (> 20)	32.7%
Miscellaneous	0.9%	Miscellaneous	0.9%	Miscellaneous	0.9%	Miscellaneous	0.9%
TGA is Total Geographical Area i.e. 3706 sq. km. 32 sq. km of land (0.9% of TGA) is not classified.							

Table 1.12 Availability of Micronutrients (Iron, Manganese, Zinc, Boron)									
(Source: NBSS, LUP)									
Avaialble Iron (mg/kg)	**% of TGA**	**Avaialble Manganese (mg/kg)**	**% of TGA**	**Avaialble Zinc (mg/kg)**	**% of TGA**	**Avaialble Copper (mg/kg)**	**% of TGA**	**Avaialble Boron (mg/kg)**	**% of TGA**
<15	8.3%	<15	1.1%	<0.5	7.2%	<0.2	1.5%	<0.25	11.3%
15-25	24.6%	15-25	13.6%	0.5-1	25.4%	0.2 - 0.5	4.1%	0.25 - 0.5	24.1%
25-50	52.3%	25-50	76.1%	1.0 - 2.0	54.0%	0.5 - 0.1	16.4%	0.5 - 0.75	31.8%
50-100	13.9%	50-100	8.3%	2.0 - 3.0	10.3%	1.0 - 2.0	30.7%	>0.75	31.9%
				3.0 - 5.0	2.2%	2.0 - 6.0	46.4%		
TGA is Total Geographical Area i.e. 3706 sq. km. 32 sq. km of land (0.9% of TGA) is not classified. Highlighted Columns indicate deficiency.									

1.8.1 Macronutirents:

Nutrients like nitrogen (N), phosphorus (P) and potassium (K) and sulphur (S) are considered as macronutrients as soil requires them in large quantities. These nutrients help in proper growth, development and yield differentiation of plants and are generally required by plants in large quantity.

Nitrogen is an integral component of many compounds including chlorophyll and enzyme essential for plant growth. It is an essential constituent for amino acids which is building blocks for plant tissue,cell nuclei and protoplasm. It encourage aboveground vegetative growth and deep green colour to leaves. Deficiency of nitrogen decreases rate and extent of protein synthesis and result into stunted growthand develop chlorosis.

Phosphorus is important component ofadenosine di-phosphate (ADP) and adenosine tri-phosphate (ATP),which involves in energy transformation in plant. It is essential component ofdeoxyribonucleic acid (DNA), the seat of genetic inheritance in plant and animal. Phosphorous take part in important functions like photosynthesis, nitrogen fixation, crop maturation, root development, strengthening straw in cereal crops etc.The availability of phosphorous is restricted under acidic and alkaline soil reaction mainly due to P-fixation. In acidic condition it get fixed with aluminum and iron and in alkaline condition with calcium

Potassium is an activator of various enzymes responsible for plant processes like energy metabolism, starch synthesis, nitrate reduction and sugar degradation. It is extremely mobile in plant and help to regulate opening and closing of stomata in the leaves and uptakeof water by root cells. It is important in grain formation and tuber development and encourages crop resistance for certain fungal and bacterial diseases.

Sulphur is essential in synthesis of sulphur containing amino acids (cystine, cysteine and methionine), chlorophyll and metabolites including coenzyme A, biotin, thiamine, or vitamin B1 and glutathione. It activates many proteolytic enzymes, increase root growth and nodule formation and stimulate seed formation.

Table 1.indicates that soils in Chatra are abundant in Nitrogen and Potassium, moderately deficient in Sulphur andhighly deficient in phosphorous. Presence of acidic soils is considered as one of the causes for deficiency. Due to deficiency of Phosphorous, the productivity of cereal crops in Chatra is low.

1.8.1 Micronutirents:

Proper understanding of micronutrients availability in soils and extent of their deficiencies is the pre-requisite for efficient management of micronutrient fertilizer to sustain crop productivity. Therefore, it is essential to know the micronutrients status of soil before introducing any type of land use. Iron, Manganese, Zinc, Copper are some of the micronutrients.

Iron is constituent of cytochromes,haems and nonhaem enzymes. It is capable of acting as electron carrier inmany enzyme systems that bring about oxidation-reduction reactions in plants. It promotes starch formation and seed maturation.

Manganese is essential in photosynthesis and nitrogen transformations in plants. It activates decarboxylase, dehydrogenase, and oxidase enzymes.

Zinc plays role in protein synthesis, reproductive process of certain plants and in the formation starch and some growth hormones. It promotes seed maturation and production.

Copper involves in photosynthesis, respiration, protein and carbohydrate metabolism and in the use of iron. It stimulates lignifications of all the plant cell wall and is capable of acting as electron carrier in many enzyme systems that bring about oxidation-reduction reactions in plants.

Boron increases solubility and mobility ofcalcium in the plant and it act as regulator of K/Ca ratio inthe plant. It is required for development of new meristematic tissue and also necessary for proper pollination, fruit and seed setting and translocation of sugar, starchand phosphorous etc. It has role in synthesis of amino acid and protein and regulates carbohydrate metabolism.

The highlighted portion in **Table 1.9**indicates that low proportion of soils is deficient in micronutrients. Boron can be said to be the only micronutrient whose availability is less than permissible limit. More than 35% of the soils in Chatra have boron less than permissible limit.

To get a detailed picture of area-wise availability of nutrients both macro and micro – maps can be referred to that are put in **Appendix.**Further, soil slope, soil erosion maps can be referred to from **Appendix.**

CHAPTER – II

DISTRICT WATER PROFILE

2.1 AGRICULTURE & CROPPING PATTERN:

Agriculture is the main source of livelihood for more than 75% of the population in the district. Agriculture practiced in this region can be characterised as rainfed monocrop subsistence type cultivation mainly due to lack of agricultural development, lack of irrigation facilities and a rolling terrain. Paddy and Makai (Maize) are the two main crops grown in the district. Other major crops include wheat, pulses, oilseeds. Among pulses, tur/arhar, gram (chana), lentil are widely grown. Among oilseeds, mustard is most widely grown crop. However, the district is deficient in food grain production.

Due to proximity to major towns such as Hazaribag and Gaya, vegetables and fruits are widely cultivated – especially in areas where irrigation facilties are available. For instance, Simaria, Gidhour and Pathalgadda blocks cultivate tomato, potato, cabbage, cauliflower, capsicum, chillies, sweet potato to cater to needs of Hazaribag. The fine texture of soil here further makes it favorable for vegetable cultivation. Similarly, Hunterganj cultivates brinjal and bottle guard to cater to needs of Gaya. Panchayats surrounding Chatra town are also known for vegetable cultivation. Table 2.1 reveals cropping pattern of Chatra district.

Table 2.1 Cropping Pattern in Chatra district

(Source: Department of Agriculture)

Crop	Season	Grown in
Paddy	Most widely grown crop in Chatra. Grown during Kharif Season	All Blocks.
Maize	Kharif	All Blocks
Pulses	Arhar, Urad are gorwn during Kharif. And Gram, Lentil, Pea during Rabi	All Blocks
Wheat	Rabi	In areas with irrigation facilites during winter
Oilseeds	Predomiantly during Rabi as they less moisture. Mustard & Linseed are grown during Rabi. Groundnut &Seasum during Kharif.	All blocks
Vegetables	All three seasons	In irrigated parts of Hunterganj, Chatra, Pathalgada, Gidhour, Simaria, Itkhori
Fruits	All three seasons	Itkhori, Mayurhand, Hunterganj.
Sugarcane	Kharif	Itkhori, Gidhour

2.1 Area-wise, Crop-wise Irrigation Status													**Source: Department of Agriculture, Agriculture Statistic of State, Agristat**		
Name of the State:															
Name of the District :															
Name of the Block:															
Crop Type	Kharif (Area in ha)			Rabi (Area in ha)			Summer Crop (Area in ha)			Total (Area in ha)			Horticulture & Plantation Crops (Area in ha)		
	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total	Irrigated	Rainfed	Total
A) Cereals	3612	10280	13892	23	0	23	-	-	-	3635	10280	13915			
B) Coarse Cereals	78	220	298	-	-	-	-	-	-	78	220	298			
C) Pulses	3085	9250	12335	4754	10101	14855	534	-	534	8373	19351	27724			
D) Oil Seeds	205	592	797	3143	8082	11225	405	195	600	3753	8869	12622			
E) Fibre	-	-	-	--	-	-	-	-	-	-	-	-			
F) Any other crops (paddy)	9363	26647	36010	-	-	-	-	-	-	9363	26647	36010			

Table 2.2 Area-wise, Crop-wise, Block-wise Irrigation Status for Chatra district													
(Source: Department of Agriculture) (All units in ha)													
Block	**Hunterganj**	**Pratappur**	**Kunda**	**Lawalong**	**Chatra**	**Kanhachati**	**Itkhori**	**Mayurhand**	**Gidhour**	**Pathalgada**	**Simaria**	**Tandwa**	**Total**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
Total Area (Census)	51318	38579	28508	39386	40021	22749	16060	13327	17419	13321	51247	43859	375794
Kharif Season	**10632**	**7392**	**2412**	**3220**	**6074**	**3990**	**4865**	**3752**	**3365**	**2522**	**7129**	**7732**	63085
a. Irrigated	2126	1178	482	644	1215	798	973	750	673	504	1426	1546	12317
b. Rainfed	8506	6214	1930	2576	4859	3192	3892	3002	2692	2018	5703	6186	50768
m. Rice	6569	4235	1188	1721	3612	2232	2835	2146	1973	1211	4041	4407	36170
n. Maize	1738	1648	779	816	1119	913	1001	766	867	860	1648	1738	13893
o. Pulses	2213	1424	401	630	1267	801	972	797	478	401	1359	1505	12248
p. oilseeds	112	85	44	53	76	44	57	43	47	50	81	82	774
Rabi Season	6292	4580	2182	2300	3332	2930	3273	3006	2987	2356	4518	3912	41668
a. Irrigated	2495	1254	557	957	2003	1204	1253	1053	1773	1573	2386	2053	18561
m. Wheat	1505	1104	557	557	803	704	803	703	753	553	1106	903	10051
n. Pulses	2438	1831	857	825	1312	1136	1296	1245	1155	885	1768	1600	16348
o. Oilseeds	2349	1645	768	918	1217	1090	1174	1058	1079	918	1644	1409	15269
Horticulture	1370	200	40	440	1440	500	680	570	1170	1020	1430	1150	10010
a. Fruits	380	50	40	40	240	0	230	220	150	0	150	0	1500
b. Vegetables	990	150	0	400	1200	500	450	350	1020	1020	1280	1150	8510
Sugarcane	0	0	0	0	0	0	60	0	30	60	0	0	150
Net Sown Area	11695	8131	2653	3542	6681	4389	5352	4127	3702	2774	7842	8505	**69394**
Gross Cropped Area	16924	11972	4594	5520	9406	6920	8138	6758	6352	4878	11647	11644	**104753**
Net Irrigated Area	2495	1254	557	957	2003	1204	1253	1053	1773	1573	2386	2053	**18561**

Crops	Area				Production				Yield			
	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
Rice	36010	0	0	**36010**	36802	0	0	**36802**	1022	0	0	0
Wheat	0	8415	0	**8415**	0	17167	0	**17167**	0	2040	0	0
Jowar	40	0	0	**40**	19	0	0	**19**	475	0	0	0
Bajra	8	0	0	**8**	4	0	0	**4**	470	0	0	0
Maize	13892	23	0	**13915**	15420	24	0	**15444**	1110	1050	0	0
Ragi	250	0	0	**250**	263	0	0	**263**	1050	0	0	0
Small Millets	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Barley	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Coarse Cereals	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Tur	8110	0	0	**8110**	9083	0	0	**9083**	1120	0	0	0
Kulthi	560	0	0	**560**	403	0	0	**403**	720	0	0	0
Urad	1460	0	0	**1460**	14	0	0	**14**	9.60	0	0	0
Moong	815	0	0	**815**	611	0	0	**611**	750	0	0	0
Other Kharif Pulses (Seperately for each crop)	1390	0	0	**1390**	695	0	0	**695**	500	0	0	0
Gram	0	8970	0	**8970**	0	7535	0	**7535**	0	840	0	0
Other Rabi Pulses (Seperately for each crop)	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Lentil	0	3470	0	**3470**	0	2776	0	**2776**	0	800	0	0
Pea	0	1940	0	**1940**	0	2367	0	**2367**	0	1220	0	0
Other		475	0		0	475	0	**475**	0	1000	0	0
Total pulses	**12335**	**14855**	**0**	**27190**	**10807**	**13153**	**0**	**23959**	**0**	**0**	**0**	0
Total Foodgrains	**62535**	**23293**	**0**	**85828**	**63314**	**30343**	**0**	**93658**	**0**	**0**	**0**	0
Groundnut	425	0	0	**425**	404	0	0	**404**	950	0	0	0
Castorseed	25	0	0	**25**	26	0	0	**26**	1020	0	0	0
Seamum	342	0	0	**342**	109	0	0	**109**	320	0	0	0

Crops	Area				Production				Yield			
	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total	Kharif	Rabi	Summer	Total
Nigerseed	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Soyabean	5	0	0	**5**	4	0	0	**4**	850	0	0	0
Sunflower	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Rapeseed & Mustard	0	10250	0	**10250**	0	5535	0	**5535**	0	540	0	0
Linseed	0	975	0	**975**	0	751	0	**751**	0	770	0	0
Safflower	0	0	0	0	0	0	0	**0**	0	0	0	0
Total Oilseed	**797**	**11225**	**0**	**12022**	**543**	**6286**	**0**	**6829**	**0**	**0**	**0**	0
Cotton @	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Jute @	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Mesta @@	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Jute & Mesta @@	0	0	0	**0**	0	0	0	**0**	0	0	0	0
Sugarcane	0	0	0	**0**	0	0	0	**0**	0	0	0	0

SCALE OF FINANCE

(YEAR 2015-16)

Sl No.	Name of Crops	Scale of Finance per Acre
1	Tomato	48000
2	Ground nut	26000
3	Paddy (Hybrid)	20000
4	Maize	12000
5	Cabbage (Rainy Season)	37000
6	Potato	54000
7	Lentil	13000
8	Paddy (HYV)	23000
9	Wheat	24000
10	Mustard	11000
11	B. Gram	18000
12	Chilli	72500
13	Arhar	14500
14	Moong Summer	31000
15	Brinjal	72500

Table 2.3. Crop-wise - Area Production & Productivity					
(Source: Department of Agriculture)					
Season	Type of Crop	Crop	Area Sown (ha)	Production (quintal/year)	Productivity (kg/ha)
Kharif	Cereals	Paddy	36170	108510	3000
		Maize	9450	42119	4457
	Pulses	Arhar/Tur	7850	8855	1128
		Kulthi	775	550	710
		Urad	1450	1218	840
		Moong	792	610	770
	Oilseeds	Groundnut	410	394	960
		Seasum	335	104	310
Rabi	Cereals	Wheat	10051	26132	2600
	Pulses	Gram/Chana	10060	10784	1072
		Lentil	3547	3093	872
		Pea	2215	3477	1570
		Others	526	631	1200
	Oilseeds	Mustard	14053	7729	550
		Linseed	1217	913	750
Horticulture	Vegetables	Tomato	3000	48000	1600
		Potato	1450	23200	1600
		Onion	3800	60800	1600
		Chilly	300	4500	1500
	Fruits	Mango	950	3650	3842
		Guava	200	1400	700
		Jackfruit	200	1900	950

2.3 Irrigation based Classification platform		**Source: Agriculture Statistic, Irrigation Statistic of CWC, Indian Statistic, Open Government Data**	
Name of the State:			
Name of the District :			
Name of the Block:			
Irrigated (Area in ha)		Rainfed (Area in ha)	
		Partially Irrigated/Protective Irrigation	Un-Irrigated or Totally Rainfed
Gross Irrigated Area	Net Irrigated Area		
27968	11967	16001	79600

Table 2.4 Agricultural Land Use of Chatra									
(Source: District Agriculture Office)									
Block	**Total Geographical Area (ha)**	**Forest Area**	**% Forest Area**	**Cultivable Area**	**Net Sown Area (ha)**	**Net Sown Area (% of TGA)**	**Gross Cropped Area (ha)**	**Net Irrigated Area (ha)**	**Net Irrigated Area (% of Net Sown)**
Shaligram - Hunterganj	51318	29944	58%	17501	11695	22.79%	16924	2495	21.33%
Pratappur	38579	23106	60%	9948	8131	21.08%	11972	1254	15.42%
Kunda	28508	22562	79%	4169	2653	9.31%	4594	557	20.99%
Lawalong	39386	28342	72%	5926	3542	8.99%	5520	957	27.02%
Chatra	40021	24602	61%	11757	6681	16.69%	9406	2003	29.98%
Kanhachatti	22749	14030	62%	7949	4389	19.29%	6920	1204	27.43%
Itkhori	16060	6322	39%	8349	5352	33.32%	8138	1253	23.41%
Mayurhand	13327	5518	41%	5566	4127	30.97%	6758	1053	25.51%
Gidhour	17419	11311	65%	5629	3702	21.25%	6352	1773	47.90%
Pathalgadda	13321	9162	69%	2880	2774	20.83%	4878	1573	56.70%
Simaria	51247	31357	61%	10944	7842	15.30%	11647	2386	30.43%
Tandwa	45521	19861	44%	12960	8505	18.68%	11644	2053	24.14%
Total	**377456**	226117	60%	**103578**	**69394**	**18.38%**	**104753**	**18561**	**26.75%**

CHAPTER - III

WATER AVAILABILITY

3.1 STATUS OF SURFACE WATER:

As mentioned earlier, the major rivers in Chatra areLilanjan in Hunterganj (69 km), Mahane in Itkhori (50 km) Hiru (32 km) in Chatra and Chako (23 km) in Lawalong. Dams and weirs are built across these rivers to provide for irrigation through canals. Table 3.2 has details about each of such system and Figure 3.1 show location of the assets on map.

Table 3.1 Water Resource Assets in Chatra
(Source: WRIS Website, Water Resource Department)

Type of Asset	Name of the Asset	River	Command Area (ha)	Area Irrigated (ha)	
				Kharif	Rabi
Dam	Buksa Dam	Buksa	3100	1500	300
	Dulki Dam	Lilanjan	2201	520	100
	Hiru Dam	Hiru	1800	500	100
Weir	Golai Weir	Lilanjan	1902	1200	0
	Chako Weir	Chako	2500	900	200
Total			**11503**	**4620**	**700**

It can be noted that the command area of the assets are much higher than the area they are irrigating. Most importantly, none of the schemes provide any substantial irrigation during Rabi mainly because of the non-perennial nature of these rivers. Even the irrigation potential during Kharif is also not achieved due to lack of maintenance of canal pathways. One of the priorities of the DIP is to ensure that net culturable area of each asset be improved.

The mean maximum of Chatra during May month is 38.6^{o}C and peak temperatures of 46^{o} C are also observed at times. Thus, these assets do not provide any kind of irrigation during summer months. Further, the rainfall in winter months is unpredictable leaving these valuable assets to vagaries of the nature.

However, the total availability of surface water for the district is estimated to be 0.65 BCM, of which 0.3 BCM can be made available using major & medium irrigation structures such as canals, dams, BWA structures on rivers & streams. While the rest 0.35 BCM can be made available through minor irrigation structures such as Talabs, Farm Ponds, check dams etc.

3.2 STATUS OF GROUND WATER:

Hydrogeology

Ground water in Chatra occurs mostly under phreatic condition in all the lithological units within the shallow aquifers and locally under semiconfined and confined condition in deeper aquifers. Hydro-Geolocical map is shown **in Annexure-I.**

Usage:

Due to poor development of surface water schemes, majority of the water needs of Chatra are met by ground water sources. In the rural areas the entire water supply is dependent on ground water. Ground water development is mainly carried out in the district through dug wells and Hand pumps. Dug wells are generally of 2 m diameter and depth ranges between 8-15 m depending upon

- Thickness of weathered zone
- Tapping the shallow aquifer
- Uppermost slice of basement

Large number of dug wells used for drinking water. But the government in recent years has started drilling Mark II/ Mark III hand pumps in large numbers to extract ground water for drinking purposes. Compared to dug wells, these hand pumps have the following major advantages

i) Less susceptible to contamination from surface sources and
ii) Tap fractures between 20-60m depth which have been found to be less affected by seasonal water level fluctuation and thus have lesser chances of failure even during extreme summer.
iii) And these are not dried up easily like dug wells.

The total number of hand pumps in Chatra district is 16904 of which 13609 are inworking condition. There are more than 10,000 dug wells that are under regular use.

Ground Water Quality

Chatra district has 5 groundwater monitoring stations with three of them in Simaria at Tutilawa, Simaria and Bagra and the remaining two in Chatra and Itkhori. Quality of groundwater for

drinking purposes has been assessed based on the samples collected from these monitoring stations in May 2011. The results of the tests are provided under **Table.**

Table 3.2 Chemical Concentrations of Ground WaterSamples (May 2011) of Chatra district
(Source: CGWB Report)

Block	Location	Electrical Conductance	pH	CO_3	HCO_3	Cl	Ca	Mg	TH as $CaCO_3$	Na	K
Units		Siemens/cm		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
SIMARIA	Tutilawa	690	7.57	ND	110.7	70.9	48	30.37	245	32.48	4.88
CHATRA	Chatra	1440	7.41	ND	446	147	62	49	355	127	30
ITKHORI	Itkhori	657	7.56	ND	344.4	17.72	38	27.94	210	38.9	5.07
SIMARIA	Simaria	249	7.4	ND	110.7	17.72	26	7.29	95	14.59	1.86
SIMARIA	Bagra	1399	7.41	ND	110.7	215.52	76	57.1	425	81.94	17.02

According to pollution control department (PCD) standards, TH as $CaCO_3$ should not cross 300. But, higher values in Chatra and Bagra indicate more than permissible limit for hardness of water. Apart from this, other parameters such as pH, Cl, Ca are in the permissible limits.

Table 3.3 Status of Groundwater in Chatra										
(Source: CGWB Groundwater Report on Chatra) (Units in ha-m)										
Block	Total Ground water Recharge	Natural Discharge during Monsoon	Net Annual Ground Water Availability	Groundwater Draft / Use			Projected Demand for domestic & industrial uses upto 2025	Ground Water Availability for future irrigation (3-5-7)	Stage of ground water development	Status as per CGWB Notification
				Domestic & industrial use	Irrigation	Total				
	1	2	3	4	5	6	7	8	8	9
Hunterganj	3837.56	383.76	3453.8	241.79	1300.02	1541.81	410.11	1743.67	44.64	Safe
Pratappur	2636.61	263.66	2372.95	149.66	798.94	948.6	253.85	1320.16	39.98	Safe
Kunda	1769.72	176.97	1592.75	38.05	104.4	142.45	64.54	1423.81	8.94	Safe
Lawalaung	2737.01	273.7	2463.31	65.44	343.82	409.26	110.99	2008.5	16.61	Safe
Chatra	2762.65	276.27	2486.39	168.30	1080.00	1248.30112	281.19	1125.20	50.21	Safe
Kanhachatti	1360.71	136.07	1224.64	82.90	531.94	614.83488	138.49	554.21	50.21	Safe
Itkhori	1438.39	143.84	1294.55	106.69	675.68	782.37	180.97	437.91	60.44	Safe
Mayurhand	958.924	95.892	863.032	71.128	450.452	521.58	120.644	291.94	60.44	Safe
Gidhaur	1225.24	122.52	1102.71	52.04	356.35	408.39	88.27	658.09	37.04	Safe
Pathalgora	1014.63	101.46	913.17	43.31	169.82	213.13	73.45	669.89	23.34	Safe
Simaira	4041.82	202.09	3839.73	143.13	860.56	1003.69	242.77	2736.41	26.14	Safe
Tandwa	3506.26	350.63	3155.63	136.92	690.9	827.82	232.23	2232.5	26.23	Safe
Total	**27289.52**	**2526.86**	**24762.66**	**1299.35**	**7362.88**	8662.23	**2197.49**	**15202.29**	**34.98**	Safe

3.3 Status of Command Area **CADA, CGWB**									**Source:**
Name of the State: Jharkhand									
Name of the District: Chatra									
Name of the Block: Itkhoir, Huntergunj, Chatra and Lawalong									
									Area in Ha
S.No.	Name of the Village	Information of Canal Command			Information on the other Services Command			Total Area	
		Total Area	Developed Area	Undeveloped Area	Total Area	Developed Area	Undeveloped Area	Developed Command	Undeveloped Command
1	2	3	4	5	6	7	8	4+7	5+8
1	Baksa (Itkhori)	3100	1500	1600	0.00	0.00	0.00	1500	1600
2	Dulki (Huntergunj)	2201	520	1681	0.00	0.00	0.00	520	1681
3	Heru (Chatra)	1800	500	1300	0.00	0.00	0.00	500	1300
4	Golai (Huntergunj)	1902	1200	702	0.00	0.00	0.00	1200	702
5	Chako (Lawalong)	2500	900	1600	0.00	0.00	0.00	900	1600
Total		**11503**	**4620**	**6883**	**0**	**0**	**0**	**4620**	**6883**

3.3 TOTAL WATER AVAILABILITY

Table 3.4 Total Water Availability in Chatra district

(Source: CGWB, Minor Irrigation department)

S.No	Source	Water Availability in BCM
1	Rivers, Canals & Dams	0.30
2	Ponds, Checkdams, Talabs	0.35
Total Surface Water Availability		0.65
3	Ground Water	0.25
Total Water Available		**0.9**

3.4 Existing type of Irrigation																	**Source: NWDA, CGG**
Name of the State: Jharkhand																	
Name of the District : Chatra																	
Name of the Block: All 12 Blocks																	
Source of Irrigation	Surface Irrigation (1)					Ground Water (2)						Other Sources Including Traditional WHS (3)	Treated effluent discharged from STP	Water extraction devices / Lift			Total	
	Canal Based		Tanks / Ponds / Reservoirs			Tube wells		Open wells		Bore well				Electricity pump (4)	Diesel pump (5)	Others (6)	Irrigation sources (1+2+3)	Water extracting units (4+5+6)
	Govt. Canal	Community/Pvt. Canal	Community Ponds Including Small	Individual / Pvt. Ponds	Govt. Reservoir/ Dams	Govt.	Pvt.	Community/ Govt.	Pvt.	Govt.	Pvt.							
No	5		3868	683	5	15552	1036758	150	670		670			1086	28571	62	31301	29719
Command Area (ha)	4620		7737	1365	4620	7776	5184		335					712	39458	186	27092	

CHAPTER - IV

WATER BUDGET

4.1 WATER DEMAND

The previous chapter revealed the total available water resources in addition to amount of water resources being used currently for the district. This chapter estimates the water requirement for domestic needs, livestock needs and agricultural needs – both presently and till 2020. Based on the requirement/demand and availability, water budget is calculated. As any major industry or power plant is absent in Chatra, they are not taken into consideration while calculating the water budget.

4.1.1 For Domestic Purposes:

As per the Central Public Health and Environmental Engineering Organization (CPHEEO), average domestic consumption of water use for domestic purpose is 135 litres per person per day (LPCD) in Urban areas and 80 LPCD in rural areas. Population for 2015 and 2020 are estimated based on the decadal population growth from 2001-2011 Census. Table 4.1 shows domestic water requirement based on above assumptions:

Table 4.1 Domestic Water Requirement

(Source: Census 2011)

S.No	Block	Estimated Population by 2015	Estimated Population by 2020	Water Requirement for 2015 in BCM	Water Requirement for 2020 in BCM
1	Shaligram - Hunterganj	215729	243867	0.006299272	0.007120916
2	Pratappur	138254	156287	0.004037021	0.004563589
3	Kunda	34521	39023	0.001008004	0.001139483
4	Lawalong	58136	65719	0.00169757	0.001918992
5	Chatra	116166	131318	0.00339205	0.003834491
6	Kanhachatti	72464	81916	0.002115943	0.002391936
7	Itkhori	86168	97408	0.002516116	0.002844305
8	Mayurhand	67764	76603	0.001978702	0.002236793
9	Gidhour	47057	53195	0.00137406	0.001553285
10	Pathalgadda	36260	40989	0.001058777	0.001196879
11	Simaria	124052	140232	0.003622308	0.004094783
12	Tandwa	145267	164215	0.004241792	0.004795069
13	Nagar parishad	57483	64981	0.002832463	0.003201914
Total		**1199319**	**1355752**	**0.036174078**	**0.040892436**

Water requiement is calculated based assuming **80 lpcd for rural and 135 lpcd for urban** population

4.1.2 For Livestock Requirement:

Numbers related to livestock of the district are taken from 19th Livestock Census conducted in 2012. Water requirement for each is estimated based on the Table 4.2. Livestock population for 2015 and 2020 are estimated based on the principle that livestock growth per 5 years is 15%. Based on these, the values in Table 4.3 care calculated.

Table 4.2 Water Requirement for each livestock

(Source: Brahmanand, Scientist, Institute of Water Management)

S.No.	Name of livestock	Water requirement (litres/day)	Total water demand (litres) / livestock
1	Cattle / Cow / Buffalo (365 days)	30	10950
2	Sheep (270 days)	3	810
3	Hen (Broiler) (42 days)	0.2	8.4
4	Hen (layer) (365 days)	0.2	73
5	Pig (365 days)	4.5	1643
6	Goat (270 days)	3	810

Table 4.3 Livestock Water Requirement

Source: Livestock Census 2011

S.No	Block	Total Livestock	Water Requirement in BCM	Water Reuirement by 2020 in BCM
1	Shaligram - Hunterganj	554532	0.001055953	0.001214346
2	Pratappur	443978	0.000708494	0.000814769
3	Kunda	109996	0.000275968	0.000317363
4	Lawalong	149695	0.000428132	0.000492352
5	Chatra	962830	0.000690312	0.000793859
6	Kanhachatti	285516	0.000319804	0.000367775
7	Itkhori	70846	0.000292849	0.000336777
8	Mayurhand	130142	0.000453126	0.000521095
9	Gidhour	95172	0.000201509	0.000231736
10	Pathalgadda	56321	0.000144486	0.000166159
11	Simaria	291244	0.000761882	0.000876165
12	Tandwa	253087	0.000519899	0.000597883
13	Nagar parishad	7298	4.96481E-05	5.70953E-05
Total		**3410656**	**0.005902064**	**0.006787374**

4.1.3 For Agriculture:

Water consumption for agricultural purposes is the highest comprising more than 88% of the total water consumption for the district. And being an agrarian district, the future requirement of water for agriculture is also high. The current water consumption has been arrived at based on the current acreage multiplied by water requirement for different crops.

Table 4.2 Water Requirement for each crop
(Source: Brahmanand, Scientist, Institute of Water Management)

S.No.	Crop	Water requirement (mm)
1	Rice	1100
2	Wheat	350
3	Barley	350
4	Oats	400
5	Sugarcane	2000
6	Maize	500
7	Sorghum	450
8	Pearlmillet	450
9	Ragi	400
10	Blackgram	400
11	Greengram/Horsegram/Cowpea	350
12	Pea	350
13	Bengalgram	350
14	Redgram	450
15	Lentil	450
16	Beans	450
17	Soybean	450
18	Groundnut	400
19	Rapeseed / Mustard	350
20	Sunflower	350
21	Saffflower	300
22	Sesamum	400
23	Castor	350
24	Linseed	400
25	Jute	500
26	Cotton	550
27	Tobacco	600
28	Mirchi	600
29	Potato	550
30	Tomato	600
31	Onion	550
32	Cabbage	450
33	Other vegetables	550

Further, it has been assumed that only 20% of the water requirement for Kharif crops is met by irrigation, while the rest by monsoon rains. Crop water demand for 2020 is arrived at based on Planning Commission's estimate of 13.65% growth rate for five years.

Table 4.4 Crop Water Requirement
Source: Department of Agriculture

S.No	Block	Crop Water Demand in BCM	Crop Water Demand by 2020 in BCM
1	Shaligram - Hunterganj	0.0478646	0.054398118
2	Pratappur	0.0300842	0.034190693
3	Kunda	0.0119297	0.013558104
4	Lawalong	0.0159258	0.018099672
5	Chatra	0.0297702	0.033833832
6	Kanhachatti	0.020068	0.022807282
7	Itkhori	0.024524	0.027871526
8	Mayurhand	0.0198834	0.022597484
9	Gidhour	0.0233149	0.026497384
10	Pathalgadda	0.0193785	0.022023665

Table 4.4 Crop Water Requirement			
Source: Department of Agriculture			
S.No	Block	Crop Water Demand in BCM	Crop Water Demand by 2020 in BCM
11	Simaria	0.0358691	0.040765232
12	Tandwa	0.0335118	0.038086161
Total crop water demand		**0.3121242**	**0.354729153**

4.1.4 Total Water Demand

Table 4.5 Total Water Demand of the district for Various sectors (All units in bcm)									
S.No	Block	Domestic Water Demand		Livestock Water Demand		Crop Water Demand		Total Water Demand	
		Present	Projected (2020)	Present	Projected (2020)	Present	Projected (2020)	Present	Projected (2020)
1	Shaligram - Hunterganj	0.00630	0.00712	0.00106	0.00121	0.04786	0.05440	0.05522	0.06273
2	Pratappur	0.00404	0.00456	0.00071	0.00081	0.03008	0.03419	0.03483	0.03957
3	Kunda	0.00101	0.00114	0.00028	0.00032	0.01193	0.01356	0.01321	0.01501
4	Lawalong	0.00170	0.00192	0.00043	0.00049	0.01593	0.01810	0.01805	0.02051
5	Chatra	0.00339	0.00383	0.00069	0.00079	0.02977	0.03383	0.03385	0.03846
6	Kanhachatti	0.00212	0.00239	0.00032	0.00037	0.02007	0.02281	0.02250	0.02557
7	Itkhori	0.00252	0.00284	0.00029	0.00034	0.02452	0.02787	0.02733	0.03105
8	Mayurhand	0.00198	0.00224	0.00045	0.00052	0.01988	0.02260	0.02232	0.02536
9	Gidhour	0.00137	0.00155	0.00020	0.00023	0.02331	0.02650	0.02489	0.02828
10	Pathalgadda	0.00106	0.00120	0.00014	0.00017	0.01938	0.02202	0.02058	0.02339
11	Simaria	0.00362	0.00409	0.00076	0.00088	0.03587	0.04077	0.04025	0.04574
12	Tandwa	0.00424	0.00480	0.00052	0.00060	0.03351	0.03809	0.03827	0.04348
13	Nagar parishad	0.00283	0.00320	0.00005	0.00006	0.00000	0.00000	0.00288	0.00326
Total		**0.03617**	**0.04089**	**0.00590**	**0.00679**	**0.31212**	**0.35473**	**0.35420**	**0.40241**

4.2 WATER BUDGET OF CHATRA DISTRICT:

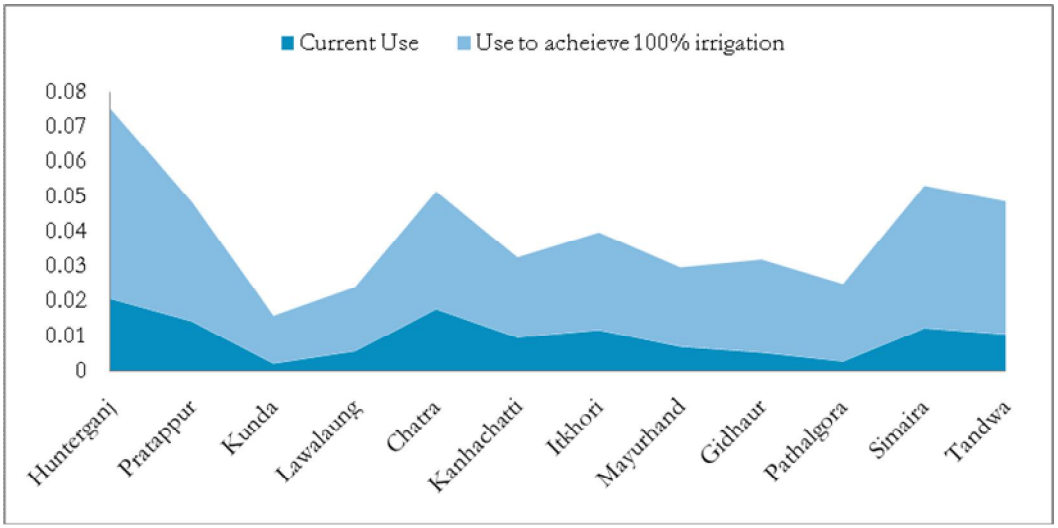
4.6 Water Budget (units in bcm)									
Total Water Available for sustainable use			Existing Water Availability / Usage			Water Demand		Water Gap	
Surface Water	Ground Water	Total	Surface Water	Ground Water	Total	Present	Projected (2020)	Present	Projected (2020)
0.65	0.25	0.9	0.0326	0.10394	0.13654	0.3542	0.40241	0.21766	0.26587
Values as percentage of Total Water Available					15.17%	39.36%	44.71%	24.18%	29.54%

4.3 WATER BUDGET FOR IRRIGATION – BLOCK-WISE

Table 4.7 Irrigation Potential Estimated to be created to achieve 100% irrigation								
Block	**Total Water available for sustainable use**		**Existing Water Usage for irrigation**		**Water required for irrigation (by 2020)**	**Gap**	**Additional Potential that should be created**	
	GW	**SW**	**GW**	**SW**			**GW**	**SW**
Hunterganj	0.0345	0.0900	0.0156	0.0051	0.0544	0.0337	0.0087	0.0250
Pratappur	0.0237	0.0500	0.0096	0.0047	0.0342	0.0199	0.0066	0.0133
Kunda	0.0159	0.0250	0.0013	0.0010	0.0136	0.0113	0.0071	0.0042
Lawalaung	0.0246	0.0300	0.0041	0.0017	0.0181	0.0123	0.0100	0.0022
Chatra	0.0249	0.0600	0.0130	0.0048	0.0338	0.0161	0.0056	0.0105
Kanhachatti	0.0122	0.0400	0.0064	0.0034	0.0228	0.0130	0.0028	0.0103
Itkhori	0.0129	0.0700	0.0081	0.0038	0.0279	0.0160	0.0022	0.0138
Mayurhand	0.0086	0.0600	0.0054	0.0017	0.0226	0.0155	0.0015	0.0140
Gidhaur	0.0110	0.0400	0.0043	0.0012	0.0265	0.0211	0.0033	0.0178
Pathalgora	0.0091	0.0350	0.0020	0.0008	0.0220	0.0191	0.0033	0.0158
Simaria	0.0384	0.0450	0.0103	0.0021	0.0408	0.0283	0.0137	0.0147
Tandwa	0.0316	0.0550	0.0083	0.0024	0.0381	0.0274	0.0112	0.0163
Total	**0.2476**	**0.6000**	**0.0884**	**0.0327**	**0.3547**	0.2337	**0.0760**	**0.1577**
GW - Ground Water, SW - Surface Water								

Graph below shows water gap – difference between water used for irrigation and water to be used to achieve 100% irrigation. It can be observed that Hunterganj, Chatra, Simaria, Gidhour, Pathalgada have higher water gaps.

Fig.4.1. Graph depicting Water Gap to achieve 100% irrigation



CHAPTER - V

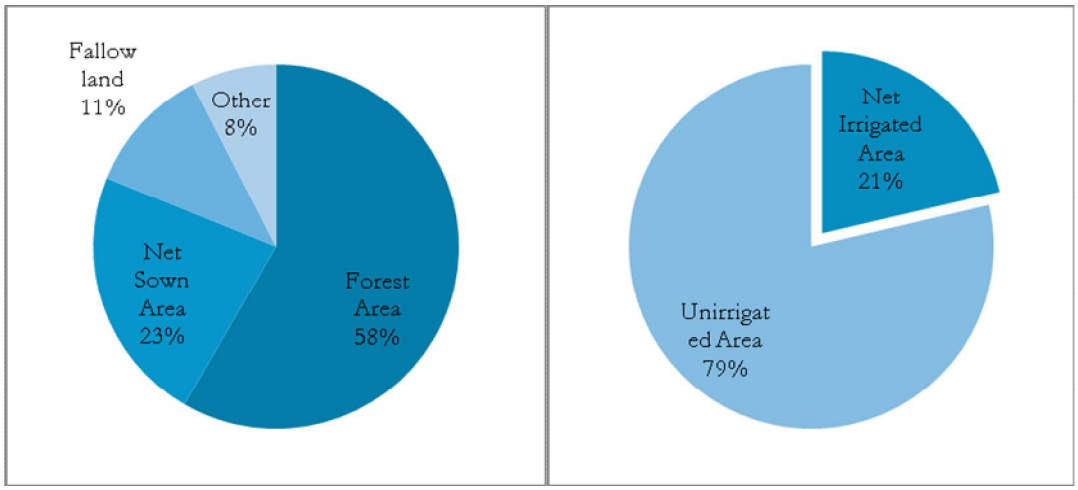
STRATEGIC ACTION PLAN FOR EACH BLOCK AND CHATRA DISTRICT

5.1 HUNTERGANJ BLOCK:

Hunterganj is the largest of all 12 blocks in Chatra both in area and population. It is situated in the northern part of Chatra district sharing border with Gaya district of Bihar. Following table reveal overall picture of the block. Village-wise map of the block can be seen in **Appendix**.

Table 5.1.1 Hunterganj Block Profile	
Number of Panchayats	28
Number of Villages	270
Demographics	
Total Number of Households	31534
Total Population	187590
SC Population	69944
ST Population	628
Literacy Rate	54.83%
Main Workers	42539
Cultivators	16176
Agricultural Labourers	18367
Workers directly invovled in agriculture	34543
Land Utilization Pattern (units in ha)	
Total Geographical Area	51318
Cultivable Area	17501
Forest Area	29944
Net Sown Area	11695
Fallow land	5806
Other	3873
Net Irrigated Area	2495
Unirrigated Area	9200
Gross Cropped Area	**40891**

Fig. 5.1.1 Charts showing land utilization and irrigated area against TGA & Net Sown Area



5.1.1 Cropping Pattern, Production & Productivity:

Vegetables and fruits are widely grown in the block due to its proximity to Gaya. The soils of the district are rich in macro and micro nutrients barring Phosphorous, which is deficient in all blocks of Chatra.

Table 5.1.2 Crop-wise - Area Production & Productivity of Hunterganj
(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	6569	2126	146357	2228	3000
	Maize	1738	0	75255	4330	4457
	Pulses	2213	0	18368	830	1128
Rabi	Wheat	1505	1505	24682	1640	2600
	Pulses	2438	300	25111	1030	1072
	Oilseeds	2349	100	7987	340	550
Horticulture	Tomato	100	100	1600	1600	1600
	Potato	600	600	9600	1600	1600
	Onion	200	200	3200	1600	1600
	Chilly	90	90	1350	1500	1500
	Mango	280	0	10758	3842	3842
	Guava	100	0	700	700	700
Total		**18182**	**5021**	**324968**	NA	NA

5.1.3Status of Irrigation:

Despite the presence of Lilajanriver, Dulki Dam &Golai Weir, area irrigated during Rabi is mainly through groundwater bodies than any. Further, there is a need to generate irrigation sources double the existing potential to achieve 100% irrigation in the block.

Table 5.1.3 Existing Irrigation Status of Hunterganj Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
3818	1909	1127.2	594	1188	594	1020	600	4117	2321.2	110.5	6648.7

Table 5.1.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Required Water Usage for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.03454	0.09000	0.01560	0.00506	0.05440	0.03374	0.00872	0.02502
GW - Ground Water, SW - Surface Water							

5.1.4 Strategic Action Plan for Hunterganj Block

Table 5.1.5 Strategic Action plan for Irrigation in Hunterganj Block of Chatra district under PMKSY

Concerned Ministry/ Department	Component	Activity	Total Number	Command Area / Irrigation Potential(Ha)	Period of Implementation	Estimated cost (in Lakhs)
MoWR	AIBP	Major & Medium Irrigation	2	1800	3 y	110
		Check Dams (Minor Irrigation)	31	1685	5 y	2270
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	20	NA	5 y	20
MoWR		RRR of Water Bodies (Minor Irrigation)	44	1095	5 y	1228
MoA&FW		Dobhas / Farm Ponds	6600	NA	2 y	990
		Deep Boring	850	850	5 y	2975
		Percolation Tank	60	120	5 y	270
		Check Dams	28	140	5 y	420
MoWR		Un lined Field Channels	24	600	5 y	240
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	510	242	5 y	210

Table 5.1.5 Strategic Action plan for Irrigation in Hunterganj Block of Chatra district under PMKSY						
Concerned Ministry / Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
DoLR-MoRD	PMKSY (Watershed)	0	0	0	0	0
	Convergence with MNREGA	Construction of Wells	1653	661	5 y	3306
		Dobhas/ Farm Ponds	5400	NA	2 y	810
		New Talab Construction	348	696	3 y	696
		Renovation of Talabs	254	508	3 y	381
Irrigation Potential Created (ha)				**8397**	**Total Cost (in Lakhs)**	**13926**

5.1.5Expected Outcome of the Plan:

Table 5.1.6 Result of successful implementation of the plan in Hunterganj Block		
	Present	**Projected in 5 years**
Cultivable Area	17501	17501
Net Sown Area (in ha)	11695	14034
Net Irrigated Area (in ha)	2495	10892 (78%)
Unirrigated Area	9200	3252
Gross Cropped Area	**40891**	**45679**

If the plan is implemented, then the irrigated area of block would increase by 7140 ha from 2495 hectares currently to 9635 hectares. This brings net irrigated area of the block to 75%.

As the canal systems of block are dysfunctional, renovating channel ways would help generate larger irrigation potential per unit investment. This project would be taken up by water resources department. On the other hand, minor irrigation department plans to build 31 check dams and renovate 44 existing schemes with an outlay of Rs. 35 Cr.

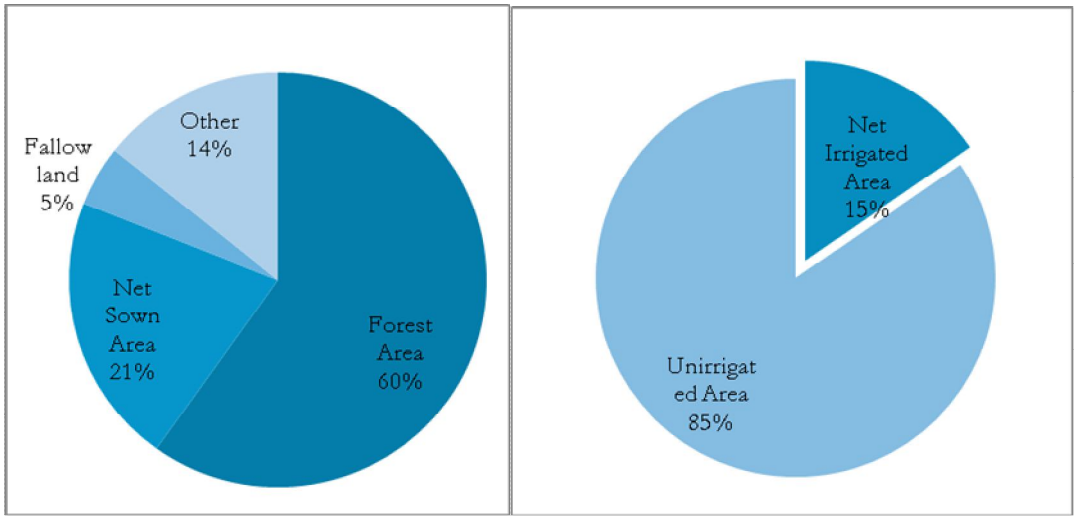
More than Rs. 50 cr is expected to be spent under NREGA in the coming 5 years mainly for construction of farm ponds & wells. Soil conservation has very few projects in this block.

5.2 PRATAPPUR BLOCK:

Pratappur is situated just to the West of Hunterganj and shares border with Bihar. Parts of the block are heavily forested with no connectivity whatsoever. Like Hunterganj, Pratappur also performs poor on several human development indicators.

Table 5.2.1 Pratappur Block Profile	
Number of Panchayats	18
Number of Villages	176
Demographics	
Total Number of Households	21055
Total Population	120221
SC Population	43636
ST Population	1350
Literacy Rate	53.19%
Main Workers	19054
Cultivators	5242
Agricultural Labourers	10273
Workers directly involved in agriculture	15515
Land Utilization Pattern (units in ha)	
Total Geographical Area	38579
Cultivable Area	9948
Forest Area	23106
Net Sown Area	8131
Fallow land	1817
Other	5525
Net Irrigated Area	1254
Unirrigated Area	6877
Gross Cropped Area	**26210**

Fig. 5.2.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



Cropping Pattern, Production & Productivity:

Due to poor connectivity of the block with National Highway leading to Gaya, the farmers of the block do not cultivate fruits or vegetables. However, the block is known for production of oilseeds and pulses because of high moisture content in soil despite poor irrigation facilities.

Table 5.2.2 Crop-wise - Area Production & Productivity of Pratappur

(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	4235	1178	166223.75	3925	3000
	Maize	1648	0	70040	4250	4457
	Pulses	1424	0	20790.4	1460	1128
Rabi	Wheat	1104	1104	18768	1700	2600
	Pulses	1831	0	13366.3	730	1072
	Oilseeds	1645	0	13818	840	550
	Potato	150	150	2400	1600	1600
	Amla	50	0	475	950	950
Total		**12087**	**2432**	**305881**	NA	NA

Status of Irrigation:

No major or medium irrigation projects are in this block. Deep boring and wells are considered to be major irrigation sources for the block due to its undulating topography.

Table 5.2.3 Existing Irrigation Status of Hunterganj Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1769	884.5	707.6	421	841	420.5	0	0	1725.5	1128.1	414	3267.6

Table 5.2.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Required Water Usage for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.02373	0.05000	0.00959	0.00475	0.03419	0.01986	0.00660	0.01325

GW - Ground Water, SW - Surface Water

5.1.3 Strategic Action Plan of Pratappur Block

Table 5.2.5 Strategic Action plan for Irrigation in Pratappur Block of Chatra district under PMKSY						
Concerned Ministry/ Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	0	0	0	0
		Check Dams (Minor Irrigation)	20	1011	5 yr	1461
MoWR	Har khet ko pani	Lift Irrigation (Minor Irrigation)	8	NA	5 yr	8
		RRR (Minor Irrigation)	15	355	5 yr	430
MoA&FW		Dobhas / Farm Ponds	2870	NA	2 yr	431
		Deep Boring	1280	1280	5 yr	4480
		Percolation Tank	32	96	5 yr	144
		Check Dams	16	80	5 yr	240
MoWR		Un lined Field Channels	5	50	5 yr	50
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/mini Sprinkler	400	105	5 yr	110
DoRD-MoRD	PMKSY (Watershed)	0	0	0	0	0
	Convergence with NREGA	Construction of Wells	1762	705	5 y	3524
		Dobhas/ Farm Ponds	3520	NA	2 y	528
		New Talab Construction	837	1674	3 y	1674
		Renovation of Talabs	142	284	3 y	213
Irrigation Potential Created (ha)				**5640**	**Total Cost (in Lakhs)**	**13293**

5.1.4 Expected Outcome of the Plan

Table 5.2.6 Result of successful implementation of the plan in Pratappur Block		
	Present	**Projected in 5 years**
Cultivable Area	9948	9948
Net Sown Area (in ha)	8131	8944
Net Irrigated Area (in ha)	1254	6894 (77%)
Unirrigated Area	6877	1761
Gross Cropped Area	**26210**	**27547**

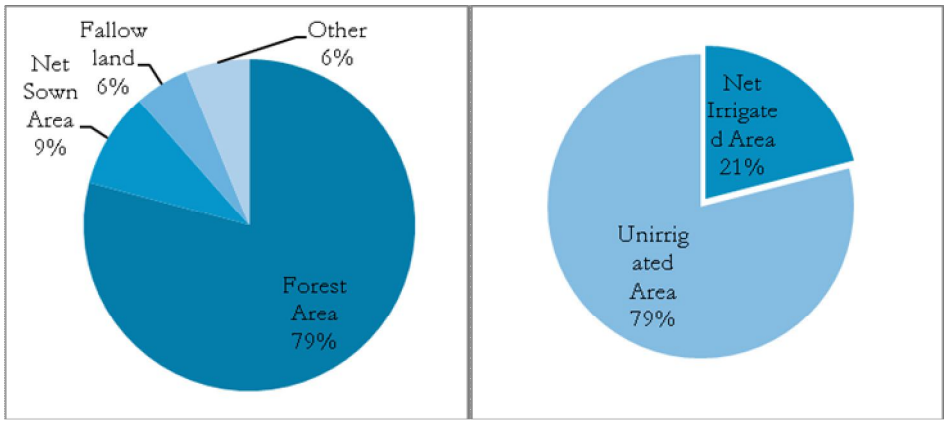
If the plan is implemented, then the irrigated area of block would increase by 5013 ha from 1254 hectares currently to 6267 hectares. This brings net irrigated area of the block to 70%. Further, the net sown area would increase by 10% and gross cropped area by 33%.

5.3 KUNDA BLOCK

79% of the area in Kunda is covered by forest and net sown area is just 9% of the TGA. Kunda&Lawalong are severely affected blocks by left-wing extremism. As a part of Kunda-Lawalong Action Plan to give boost to development activities, district administration has special emphasis on these two blocks.

Table 5.3.1 Kunda Block Profile	
Total Number of Households	5782
Total Population	30018
Number of Panchayats	5
Number of Villages	78
Demographics	
Total Number of Households	5782
Total Population	30018
SC Population	19081
ST Population	1155
Literacy Rate	44.84%
Main Workers	5697
Cultivators	2206
Agricultural Labourers	2701
Workers directly invovled in agriculture	4907
Land Utilization Pattern (units in ha)	
Total Geographical Area	28508
Cultivable Area	4169
Forest Area	22562
Net Sown Area	2653
Fallow land	1516
Other	1777
Net Irrigated Area	557
Unirrigated Area	2096
Gross Cropped Area	**9475**

Fig. 5.3.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.3.1 Cropping Pattern, Production and Productivity:

Due to inadequate irrigation facilities, pulses and oilseeds are predominantly sown during Rabi. Vegetables and fruits are produced for subsistence and not for marketing.

Table 5.3.2 Crop-wise - Area Production & Productivity of Kunda
(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	1188	482	34713.36	2922	3000
	Maize	779	0	41520.7	5330	4457
	Pulses	401	0	3448.6	860	1128
Rabi	Wheat	557	557	15373.2	2760	2600
	Pulses	857	0	11569.5	1350	1072
	Oilseeds	768	0	1843.2	240	550
Total		**4550**	**1039**	**108469**	NA	NA

5.3.2 Status of Irrigation:

Area irrigated during Kharif is very low at 557 ha. There is a huge scope for improving irrigation facilities and bringing additional land under net sown area.

Table 5.3.3. Existing Irrigation Status of KundaBlock

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1116	558	246.4	440	880.6	310.3	0	0	1438.6	557	0	2325.3

Table 5.3.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)							
Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.01593	0.02500	0.00125	0.00103	0.01356	0.01128	0.00712	0.00416
GW - Ground Water, SW - Surface Water							

5.3.3 Strategic Action Plan of Kunda Block

Table5.3.5 Strategic Action plan for Irrigation in Kunda Block of Chatra district under PMKSY						
Concerned Ministry/ Department	Component	Activity	Total Number	Command Area / Irrigation Potential(Ha)	Period of Implementation	Estimated cost (in Lakhs)
MoWR	AIBP	Major & Medium Irrigation	0	0	0	0
		Check Dams (Minor Irrigation)	19	540	5 yr	1329
MoWR	Har khet ko pani	Lift Irrigation (Minor Irrigation)	6	NA	5 yr	6
		RRR (Minor Irrigation)	22	459	5 yr	428
MOA &FW		Dobhas / Farm Ponds	1420	NA	5 yr	213
		Deep Boring	520	520	5 yr	1820
		Percolation Tank	10	30	5 yr	45
		Check Dams	5	25	5 yr	75
MoWR		Un lined Field Channels	2	20	2 yr	16
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/mini Sprinkler	100	50	5 yr	55
DoRD-MoRD	PMKSY (Watershed)		0	0	0	0
	Convergence with NREGA	Construction of Wells	536	214	5 y	1072
		Dobhas/ Farm Ponds	1560	NA	2 y	234
		New Talab Construction	318	636	5 y	636
		Renovation of Talabs	90	180	5 y	135
Irrigation Potential Created (ha)				**2674**	**Total Cost (in Lakhs)**	**6064**

5.3.4 Expected Outcome of the Plan

Table 5.3.6 Result of successful implementation of the plan in Kunda Block

	Present	Projected in 5 years
Cultivable Area	4169	4169
Net Sown Area (in ha)	2653	3980
Net Irrigated Area (in ha)	557	3231 (81%)
Unirrigated Area	2096	534
Gross Cropped Area	**9475**	**11914**

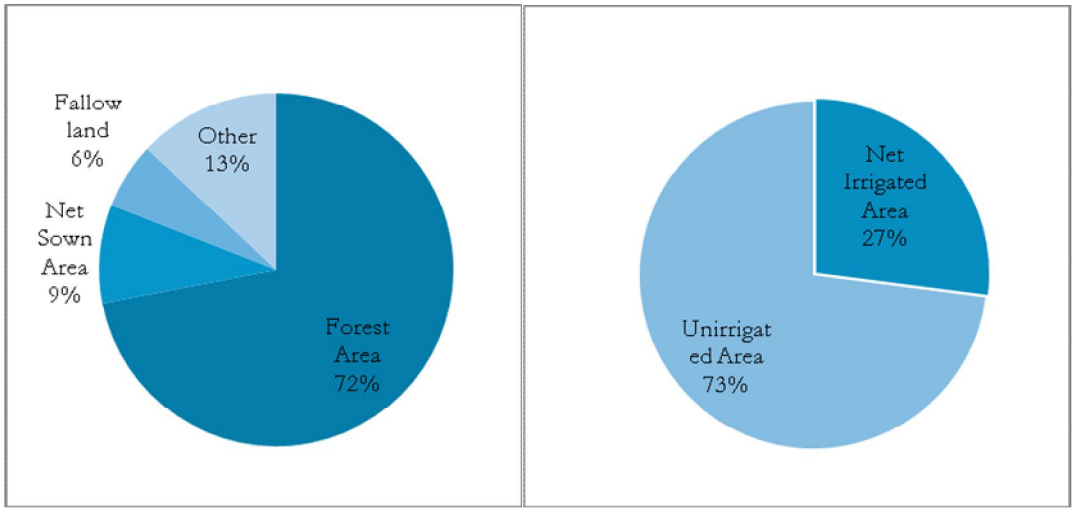
Successful implementation of the plan increases net irrigated area by 2190 ha bringing 94% of area under assured irrigation. This encourages more farmers to sow wheat during Rabi, which is more remunerative compared to Oilseeds and Pulses.

5.4 LAWALONG BLOCK:

Lawalong, like Kunda is heavily forested covering 72% of the total area. As a part of Kunda-Lawalong Action plan, development programmes in this block are expedited.

Table 5.4.1 Lawalong Block Profile	
Number of Panchayats	8
Number of Villages	103
Demographics	
Total Number of Households	9233
Total Population	50553
SC Population	28926
ST Population	2690
Literacy Rate	49.02%
Main Workers	7225
Cultivators	1689
Agricultural Labourers	3487
Workers directly invovled in agriculture	5176
Land Utilization Pattern (units in ha)	
Total Geographical Area	39386
Cultivable Area	5926
Forest Area	28342
Net Sown Area	3542
Fallow land	2384
Other	5118
Net Irrigated Area	957
Unirrigated Area	2585
Gross Cropped Area	**13010**

Fig. 5.4.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.4.1 Cropping Pattern, Production & Productivity:

High quality Tomatoesare grown in this block that are exported to other States including West-Bengal.

Table 5.4.2 Crop-wise - Area Production & Productivity of Lawalong (Source: Department of Agriculture)						
Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	1721	644	35039.56	2036	3000
	Maize	816	0	39494.4	4840	4457
	Pulses	630	0	4914	780	1128
Rabi	Wheat	957	957	15150.4	2720	2600
	Pulses	825	0	10395	1260	1072
	Oilseeds	918	0	2937.6	320	550
Horticulture	Tomato	400	400	6400	1600	1600
	Amla	40	0	380	950	950
Total		**5907**	**2001**	**114711**	NA	NA

5.4.2 Status of Irrigation:

Table 5.4.3 Existing Irrigation Status of Lawalong Block											
Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1541	770.5	616.4	303	606	303	0	0	1376.5	919.4	200.5	2496.4

Table 5.4.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)							
Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.02463	0.03000	0.00413	0.00169	0.01810	0.01228	0.01004	0.00224
GW - Ground Water, SW - Surface Water							

5.4.3 Strategic Action Plan of Lawalong Block

Table 5.4.5 Strategic Action plan for Irrigation in Lawalong Block of Chatra district under PMKSY

Concerned Ministry/ Department	Component	Activity	Total Number	Command Area / Irrigation Potential(Ha)	Period of Implementation	Estimated cost (in Lakhs)
MoWR	AIBP	Major & Medium Irrigation	2	2000	7 yr	2000
		Check Dams (Minor Irrigation)	28	840	5 yr	2057
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	9	NA	5 yr	9
		RRR (Minor Irrigation)	14	322	5 yr	208
MOA &FW		Dobhas / Farm Ponds	1570	NA	5 yr	236
		Deep Boring	19	19	5 yr	66.5
		Percolation Tank	32	96	5 yr	144
		Check Dams	18	90	5 yr	270
MoWR		Un lined Field Channels	2	20	5 yr	20
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	210	115	5 yr	75
DoRD-MoRD	Convergence with NREGA	PMKSY (Watershed)	0	0	0	0
		Construction of Wells	91	36	5 y	182
		New Talab Construction	285	570	3 y	570
		Renovation of Talabs	25	50	3 y	38
Irrigation Potential Created (ha)				**4158**	**Total Cost (in Lakhs)**	**5875.5**

5.4.4 Expected Outcome of the Plan

Table 5.4.6 Result of successful implementation of the plan in Lawalong Block

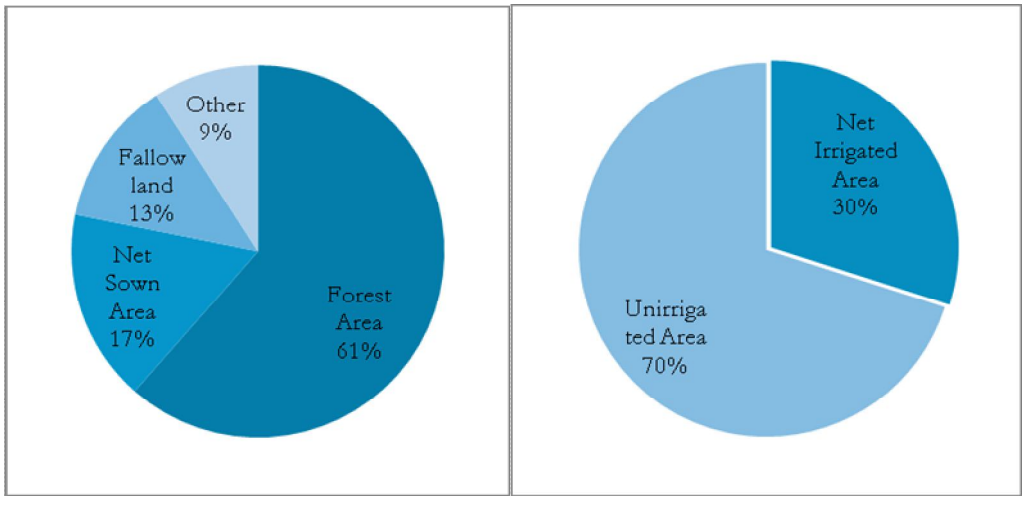
	Present	Projected in 5 years
Cultivable Area	5926	5926
Net Sown Area	3542	5313
Net Irrigated Area	957	4267 (80%)
Unirrigated Area	2585	89
Gross Cropped Area	**13010**	**15595**

5.5 CHATRA BLOCK

Forest area of Chatra is at 61% and net sown area is only 17% of the total area. Chatra block also has high proportion of fallow land.

Table 5.5.1 Chatra Block Profile	
Number of Panchayats	16
Number of Villages	182
Demographics	
Total Number of Households	25797
Total Population	150999
SC Population	44967
ST Population	4216
Literacy Rate	63.93%
Main Workers	21507
Cultivators	9486
Agricultural Labourers	6437
Workers directly involved in agriculture	15923
Land Utilization Pattern (units in ha)	
Total Geographical Area	40021
Cultivable Area	11757
Forest Area	24602
Net Sown Area	6681
Fallow land	5076
Other	3662
Net Irrigated Area	2003
Unirrigated Area	4678
Gross Cropped Area	**25119**

Fig. 5.5.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.5.1 Cropping Pattern, Production & Productivity:

Due to its proximity, block plays an important role in supplying to the needs of Chatra town, especially vegetables.

Table 5.5.2 Crop-wise - Area Production & Productivity of Chatra Block
(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	3612	1215	140506.8	3890	3000
	Maize	1119	0	60985.5	5450	4457
	Pulses	1267	0	11783.1	930	1128
Rabi	Wheat	803	803	18147.8	2260	2600
	Pulses	1312	0	18630.4	1420	1072
	Oilseeds	1217	0	4868	400	550
Horticulture	Tomato	500	500	8000	1600	1600
	Potato	500	500	8000	1600	1600
	Onion	200	200	3200	1600	1600
	Mango	140	0	5378.8	3842	3842
	Guava	80	0	560	700	700
	Amla	20	0	190	950	950
Total		**10770**	**3218**	**280250**	NA	NA

5.5.2 Status of Irrigation:

Table 5.5.3 Existing Irrigation Status of Huntergan j Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
2086	1043	834.4	371	741	370.5	0	0	1784	1204.9	604	3592.9

Table 5.5.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.02486	0.06000	0.01296	0.00480	0.03383	0.01608	0.00563	0.01045

GW - Ground Water, SW - Surface Water

5.4.3 Strategic Action Plan of Chatra Block:

Table 5.5.5 Strategic Action plan for Irrigation in Chatra Block of Chatra district under PMKSY						
Concerned Ministry/ Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	3	2500	7 yr	2100
		Check Dams (Minor Irrigation)	31	930	5 yr	2197
MoWR	Har khet ko pani	Lift Irrigation (Minor Irrigation)	15	NA	5 yr	15
		RRR (Minor Irrigation)	53	554	5 yr	1708
MOA &FW		Dobhas / Farm Ponds	2230	NA	5 yr	335
		Deep Boring	84	84	5 yr	294
		Percolation Tank	80	240	5 yr	360
		Check Dams	32	160	5 yr	480
MoWR		Un line Field Channels	26	230	5 yr	260
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	520	244	3 yr	366
DoRD-MoRD	PMKSY (Watershed)		0	0	0	0
	Convergence with NREGA	Construction of Wells	1967	787	5 y	3934
		Dobhas/ Farm Ponds	3660	NA	2 y	549
		New Talab Construction	180	360	5 y	360
		Renovation of Talabs	233	466	5 y	350
Irrigation Potential Created (ha)				**6555**	**Total Cost (in Lakhs)**	**13308**

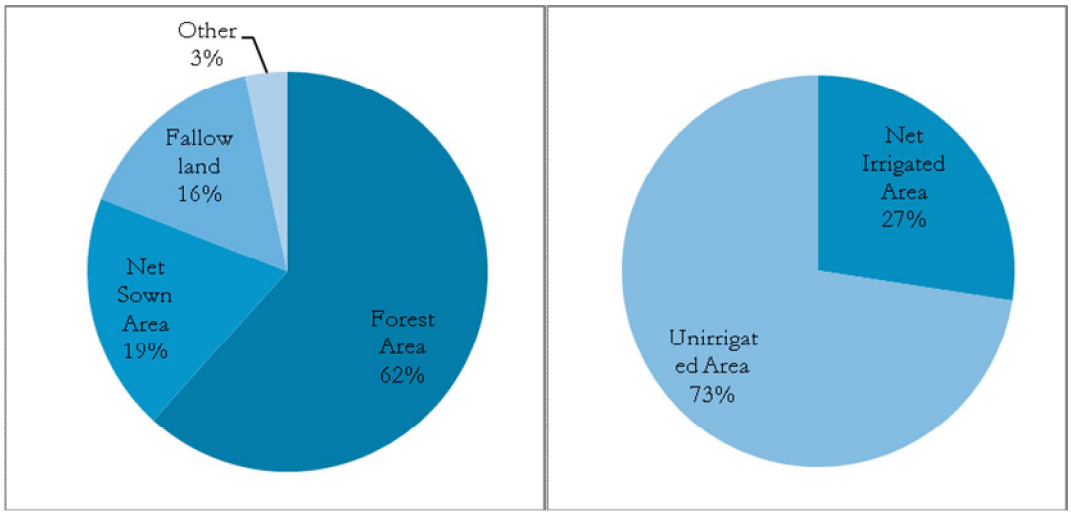
5.4.4 Expected Outcome of the Plan

Table 5.5.6 Result of successful implementation of the plan in Chatra Block		
	Present	**Projected in 5 years**
Cultivable Area	11757	11757
Net Sown Area (in ha)	6681	10022
Net Irrigated Area (in ha)	2003	8558 (85%)
Unirrigated Area	4678	1494
Gross Cropped Area	**25119**	**31831**

5.6 KANHACHATTI BLOCK:

Table 5.6.1 Kanhachatti Block Profile	
Number of Panchayats	10
Number of Villages	124
Demographics	
Total Number of Households	10756
Total Population	63012
SC Population	20308
ST Population	2016
Literacy Rate	62.88%
Main Workers	5282
Cultivators	2241
Agricultural Labourers	1528
Workers directly invovled in agriculture	3769
Land Utilization Pattern (units in ha)	
Total Geographical Area	22749
Cultivable Area	7949
Forest Area	14030
Net Sown Area	4389
Fallow land	3560
Other	770
Net Irrigated Area	1204
Unirrigated Area	3185
Gross Cropped Area	**16727**

Fig. 5.6.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.6.1 Cropping Pattern, Production & Productivity:

Table 5.6.2 Crop-wise - Area Production & Productivity of Kanhachatti (Source: Department of Agriculture)						
Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	2232	798	65286	2925	3000
	Maize	913	0	38893.8	4260	4457
	Pulses	801	0	6728.4	840	1128
Rabi	Wheat	704	704	13164.8	1870	2600
	Pulses	1136	0	16585.6	1460	1072
	Oilseeds	1090	0	3815	350	550
Horticulture	Tomato	200	200	3200	1600	1600
	Potato	300	300	4800	1600	1600
Total		**7376**	**2002**	**152474**	NA	NA

5.6.2 Status of Irrigation:

Table 5.6.3 Existing Irrigation Status of Kanhachatti Block											
Area Irrigated by Ground Water Bodies			**Area Irrigated by Surface Water Bodies**			**Canal Irrigation**		**Total Irrigated Area**			
Assets	**Kharif**	**Rabi**	**Assets**	**Kharif**	**Rabi**	**Kharif**	**Rabi**	**Kharif**	**Rabi**	**Summer**	**Total**
1397	698.5	558.8	356	712	356	0	0	1410.5	914.8	0	2325.3

Table 5.6.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)							
Total Water available for sustainable use		**Existing Water Usage for irrigation**		**Water required for irrigation (by 2020)**	**Gap**	**Additional Potential that should be created**	
GW	**SW**	**GW**	**SW**			**GW**	**SW**
0.01225	0.04000	0.00638	0.00339	0.02281	0.01304	0.00277	0.01026
GW - Ground Water, SW - Surface Water							

5.6.3 Strategic Action Plan of Kanhachatti Block:

Table 5.6.5 Strategic Action plan for Irrigation in Kanhachatti Block of Chatra district under PMKSY						
Concerned Ministry / Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implement ation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	0	0	0	0
		Check Dams (Minor Irrigation)	18	872	5 y	1339
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	10	NA	5 y	10
		RRR (Minor Irrigation)	16	347	5 y	415
MOA &FW		Dobhas / Farm Ponds	2155	NA	5 y	323
		Deep Boring	32	32	5 y	112
		Percolation Tank	28	84	5 y	126
		Check Dams	18	90	5 y	270
MoWR		Un lined Field Channels	2	22	5 y	20
DoRD-MoRD	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	190	118	5 y	90
	PMKSY (Watershed)	IWMP-VI	1 (5387.99 ha)	150	5 y	808.20
	Convergence with NREGA	Construction of Wells	510	204	5 y	1020
		Dobhas/ Farm Ponds	2480	NA	2 y	372
		New Talab Construction	499	998	5 y	998
		Renovation of Talabs	177	354	5 y	266
Irrigation Potential Created (ha)				**3271**	**Total Cost (in Lakhs)**	**6169.20**

5.6.4 Expected Outcome of the Plan

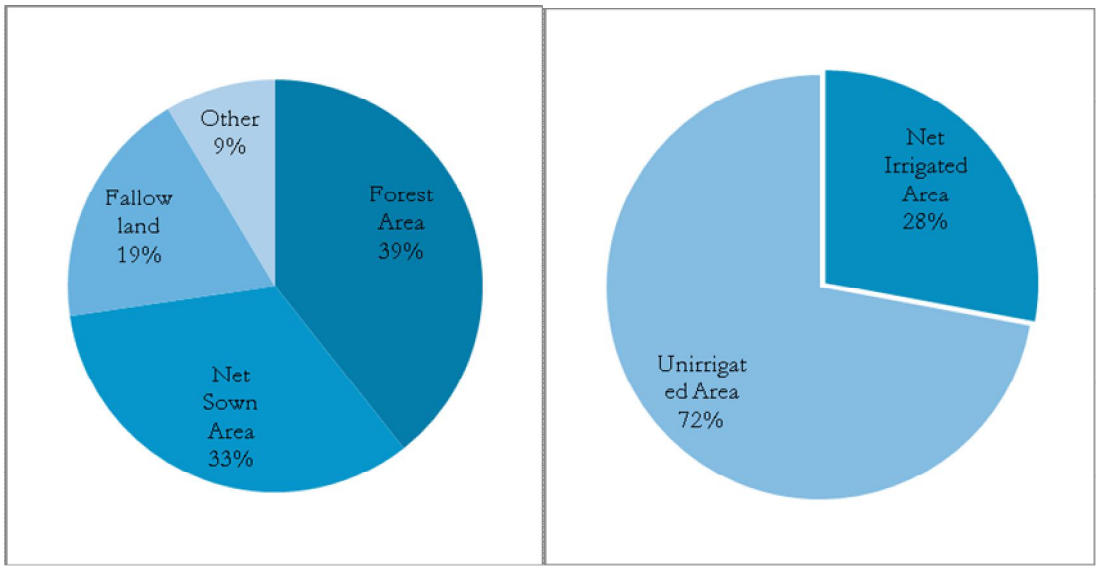
Table 5.6.6 Result of successful implementation of the plan in Kanhachatti Block		
	Present	**Projected in 5 years**
Cultivable Area	7949	7949
Net Sown Area (in ha)	4389	6583
Net Irrigated Area (in ha)	1204	4475 (68%)
Unirrigated Area	3185	1657
Gross Cropped Area	**16727**	**20664**

5.7ITKHORI BLOCK:

Itkhori has less forest area and high net sown area compared to other blocks of the district. This block has a relatively better performance on several human development indicators.

Table 5.7.1 Itkhori Block Profile	
Number of Panchayats	12
Number of Villages	159
Demographics	
Total Geographical Area	12373
Cultivable Area	74929
Forest Area	17882
Net Sown Area	338
Fallow land	68.02%
Other	13346
Net Irrigated Area	5349
Unirrigated Area	3716
Gross Cropped Area	9065
Land Utilization Pattern (units in ha)	
Total Geographical Area	16060
Cultivable Area	8349
Forest Area	6322
Net Sown Area	5352
Fallow land	2998
Other	1389
Net Irrigated Area	1493
Unirrigated Area	4099
Gross Cropped Area	**19053**

Fig. 5.7.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.7.1 Cropping Pattern, Production & Productivity:

Vegetables and fruits are widely grown in the block due to its proximity to Grand Trunk Road and higher standard of living. As one can observe from Table below, productivity of various crops sown in this block are high.

Table 5.7.2. Crop-wise - Area Production & Productivity of Itkhori

(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	2835	973	80117.1	2826	3000
	Maize	1001	0	32282.25	3225	4457
	Pulses	972	0	21384	2200	1128
Rabi	Wheat	803	803	25374.8	3160	2600
	Pulses	1296	200	11145.6	860	1072
	Oilseeds	1174	0	9392	800	550
Horticulture	Potato	300	300	4800	1600	1600
	Onion	150	150	2400	1600	1600
	Mango	150	0	5763	3842	3842
	Guava	80	0	560	700	700
Other	Sugarcane	60	60	3972	6620	6620
Total		**8821**	**2286**	**197191**	NA	NA

5.7.2 Status of Irrigation:

Many streams pass through the block but are not used optimally due to inadequate irrigation facilities.

Table 5.7.3 Existing Irrigation Status of Itkhori Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1648	824	659.2	368	736.4	368.2	320	400	1880.4	1427.4	150	3457.8

Table 5.7.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.01295	0.07000	0.00811	0.00377	0.02787	0.01599	0.00219	0.01380

GW - Ground Water, SW - Surface Water

5.7.3 Strategic Action Plan of Itkhori Block

Table 5.7.5 Strategic Action plan for Irrigation in Itkhori Block of Chatra district under PMKSY						
Concerned Ministry/ Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	1	1000	5 y	90
		Check Dams (Minor Irrigation)	9	500	5 y	529
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	10	NA	5 y	10
		RRR (Minor Irrigation)	23	563	5 y	479
MOA &FW		Dobhas / Farm Ponds	2720	NA	5 y	408
		Deep Boring	463	463	5 y	1620.50
		Percolation Tank	36	108	5 y	162
		Check Dams	24	120	5 y	360
MoWR		Un lined Field Channels	8	80	5 y	120
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	360	132	3 y	260
DoRD-MoRD	PMKSY (Watershed)	IWMP IIIB	1 (569.72 ha)	140	5	683
	Convergence with NREGA	Construction of Wells	317	127	5 y	634
		Dobhas/ Farm Ponds	3180	NA	2 y	477
		New Talab Construction	340	680	5 y	680
		Renovation of Talabs	92	184	5 y	138
Irrigation Potential Created (ha)				**4097**	**Total Cost (in Lakhs)**	**6650.50**

5.7.4 Expected Outcome of the Plan

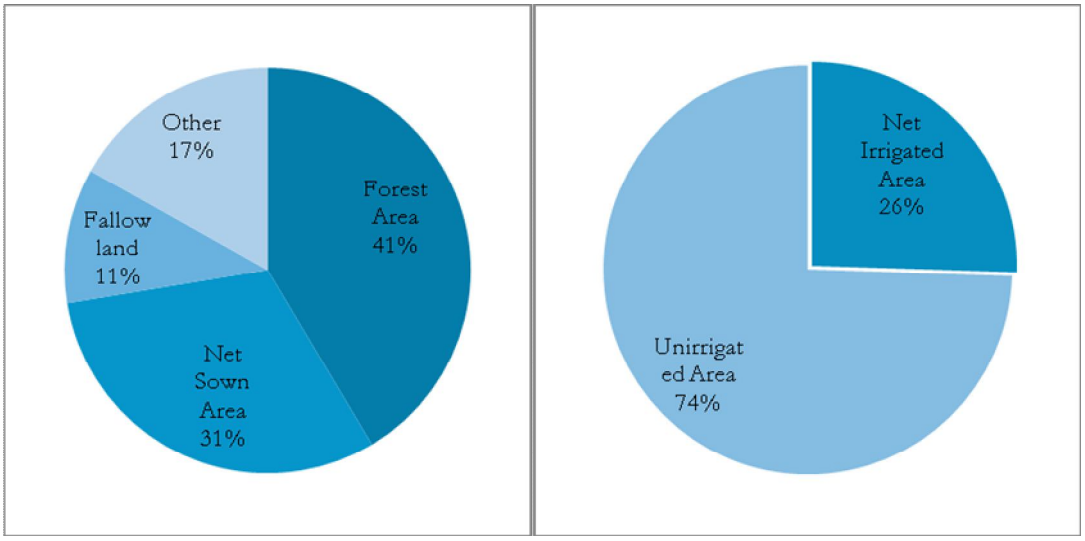
Table 5.7.6 Result of successful implementation of the plan in Itkhori Block		
	Present	**Projected in 5 years**
Cultivable Area	8349	8349
Net Sown Area (in ha)	5352	8027
Net Irrigated Area (in ha)	1493	5590 (69.6%)
Unirrigated Area	3859	2755
Gross Cropped Area	**19053**	**24721**

5.8MAYURHAND BLOCK:

Mayurhand and Itkhori share similar features like less forest area, high net sown area and higher standard of living.

Table 5.8.1 Mayurhand Block Profile	
Number of Panchayats	10
Number of Villages	118
Demographics	
Total Geographical Area	10235
Cultivable Area	58925
Forest Area	15448
Net Sown Area	212
Fallow land	64.41%
Other	11654
Net Irrigated Area	5675
Unirrigated Area	3722
Gross Cropped Area	9397
Land Utilization Pattern (units in ha)	
Total Geographical Area	13327
Cultivable Area	5566
Forest Area	5518
Net Sown Area	4127
Fallow land	1439
Other	2243
Net Irrigated Area	1053
Unirrigated Area	3074
Gross Cropped Area	**13820**

Fig. 5.8.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.8.1 Cropping Pattern, Production & Productivity:

Cropping pattern is almost similar to that of Itkhori.

Table 5.8.2. Crop-wise - Area Production & Productivity of Mayurhand						
(Source: Department of Agriculture)						
Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	2146	750	54379.64	2534	3000
	Maize	766	0	37457.4	4890	4457
	Pulses	797	0	9723.4	1220	1128
Rabi	Wheat	703	703	28541.8	4060	2600
	Pulses	1245	0	16434	1320	1072
	Oilseeds	1058	0	3808.8	360	550
Horticulture	Potato	200	200	3200	1600	1600
	Onion	150	150	2400	1600	1600
	Mango	140	0	5378.8	3842	3842
	Guava	80	0	560	700	700
Total		**7285**	**1803**	**161884**	NA	NA

5.8.2 Status of Irrigation:

Though many streams pass through the block, they are not exploited optimally for irrigation purposes.

Table 5.8.3 Existing Irrigation Status of Mayurhand Block											
Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1515	757.5	606	230	459.2	229.6	280	300	1496.7	1135.6	0	2632.3

Table 5.8.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)							
Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.00863	0.06000	0.00541	0.00171	0.02260	0.01549	0.00146	0.01403
GW - Ground Water, SW - Surface Water							

5.8.3 Strategic Action Plan of Mayurhand Block:

Table 5.8.5 Strategic Action plan for Irrigation in Mayurhand Block of Chatra district under PMKSY						
Concerned Ministry / Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	1	500	5 y	600
		Check Dams (Minor Irrigation)	30	1230	5 y	1774
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	30	NA	5 y	30
		RRR (Minor Irrigation)	33	893	5 y	907
MOA &FW		Dobhas / Farm Ponds	1870	NA	5 y	281
		Deep Boring	922	922	5 y	3227
		Percolation Tank	33	99	5 y	148.50
		Check Dams	21	110	5 y	315
MoWR		Un line Field Channels	9	10	5 y	90
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Sprinkler	80	16	3 y	80
DoRD-MoRD	Convergence with NREGA	PMKSY (Watershed)	0	0	0	0
		Construction of Wells	250	100	5 y	500
		Dobhas/ Farm Ponds	2360	NA	2 y	354
		New Talab Construction	251	502	5 y	502
		Renovation of Talabs	151	302	5 y	227
Irrigation Potential Created (ha)				**4684**	**Total Cost (in Lakhs)**	**9035.50**

5.8.4 Expected Outcome of the Plan

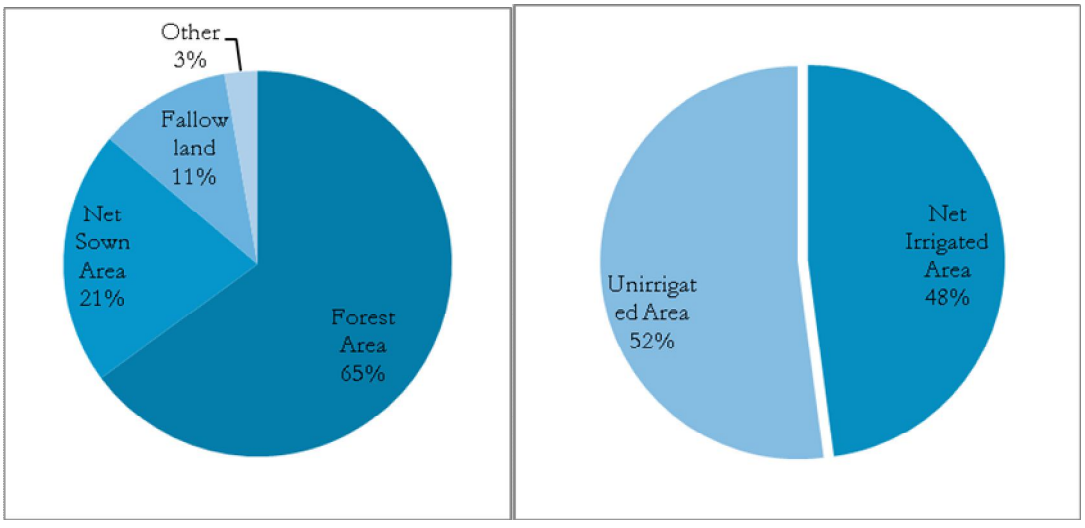
Table 5.8.6 Result of successful implementation of the plan in Mayurhand Block		
	Present	**Projected in 5 years**
Cultivable Area	5566	5566
Net Sown Area (in ha)	4127	5365
Net Irrigated Area (in ha)	1053	4344 (81%)
Unirrigated Area	3074	908
Gross Cropped Area	**13820**	**16183**

5.9 GIDHOUR BLOCK:

Gidhour has higher forest area but the net sown area and net irrigated area also higher unlike other blocks.

Table 5.9.1 Gidhour Block Profile	
Number of Panchayats	6
Number of Villages	38
Demographics	
Total Number of Households	6930
Total Population	40919
SC Population	9834
ST Population	704
Literacy Rate	68.08%
Main Workers	8801
Cultivators	4039
Agricultural Labourers	3302
Workers directly invovled in agriculture	7341
Land Utilization Pattern (units in ha)	
Total Geographical Area	17419
Cultivable Area	5629
Forest Area	11311
Net Sown Area	3702
Fallow land	1928
Other	479
Net Irrigated Area	1773
Unirrigated Area	1929
Gross Cropped Area	**13033**

Fig. 5.9.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.9.1 Cropping Pattern, Production & Productivity:

Gidhour is one of the major producer of vegetables due to better irrigational facilities and proximity to Hazaribag.

Table 5.9.2. Crop-wise - Area Production & Productivity of Gidhour

(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	1973	673	35514	1800	3000
	Maize	867	0	39708.6	4580	4457
	Pulses	478	0	3824	800	1128
Rabi	Wheat	753	753	19126.2	2540	2600
	Pulses	1155	0	11492.25	995	1072
	Oilseeds	1079	0	3992.3	370	550
Horticulture	Tomato	400	400	6400	1600	1600
	Potato	400	400	6400	1600	1600
	Onion	150	150	2400	1600	1600
	Chilly	70	70	1050	1500	1500
	Mango	90	0	3457.8	3842	3842
	Guava	60	0	420	700	700
Others	Sugarcane	30	30	1986	6620	6620
Total		**7505**	**2476**	**135771**	NA	NA

5.9.2 Status of Irrigation:

Majority of irrigation is provided by groundwater bodies including deep boring and wells.

Table 5.9.3 Existing Irrigation Status of Gidhour Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
2217	1108.5	886.8	290	579.6	289.8	0	0	1688.1	1176.6	408	3272.7

Table 5.9.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.01103	0.04000	0.00428	0.00116	0.02650	0.02106	0.00329	0.01777

GW - Ground Water, SW - Surface Water

5.9.3 Strategic Action Plan of Gidhour Block

Table 5.9.5 Strategic Action plan for Irrigation in Gidhour Block of Chatra district under PMKSY						
Concerned Ministry/ Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	1	400	5 y	300
		Check Dams (Minor Irrigation)	11	440	5 y	822
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	4	NA	5 y	4
		RRR (Minor Irrigation)	27	795	5 y	930
MOA &FW		Dobhas / Farm Ponds	850	NA	5 y	128
		Deep Boring	433	433	5 y	1515.50
		Percolatioin Tank	36	108	5 y	162
		Check Dams	18	90	5 y	270
MoWR		Un lined Field Channels	7	70	5 y	70
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/ Sprinkler	430	226	5 y	230
DoRD-MoRD	PMKSY (Watershed)	0	0	0	0	0
	Convergence with NREGA	Construction of Wells	540	216	5 y	1080
		Dobhas/ Farm Ponds	760	NA	2 y	114
		New Talab Construction	138	276	5 y	276
		Renovation of Talabs	12	24	5 y	18
Irrigation Potential Created (ha)				**3078**	**Total Cost (in Lakhs)**	**5919.50**

5.9.4 Expected Outcome of the Plan

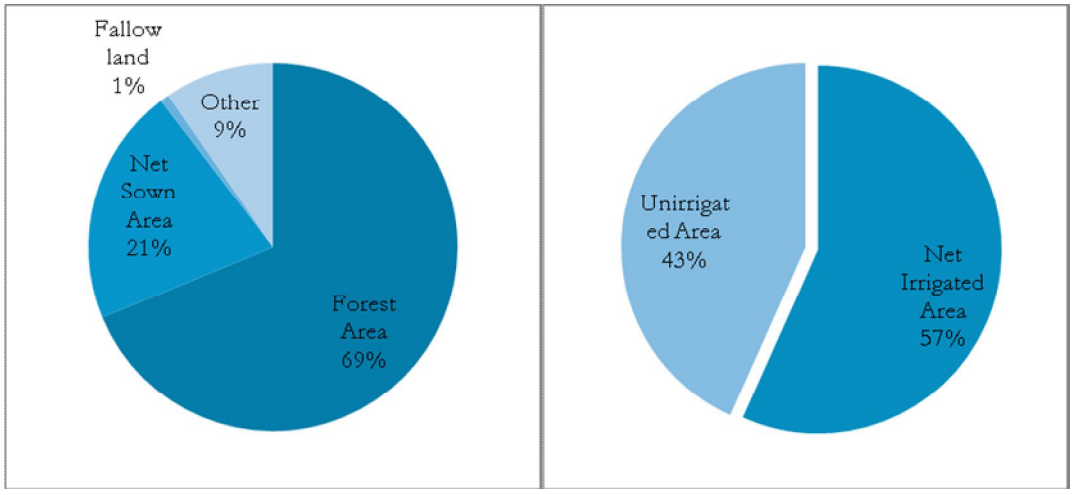
Table 5.9.6 Result of successful implementation of the plan in Gidhour Block		
	Present	**Projected in 5 years**
Cultivable Area	5629	5629
Net Sown Area (in ha)	3702	5552
Net Irrigated Area (in ha)	1773	4851 (87%)
Unirrigated Area	1929	899
Gross Cropped Area	**13033**	**16931**

5.10 PATHALGADA BLOCK:

Pathalgada share similar features with Gidhour in land utilization pattern. For instance, both blocks have high forest area, higher net sown area and higher irrigated area.

Table 5.10.1 Pathalgada Block Profile	
Number of Panchayats	5
Number of Villages	30
Demographics	
Total Number of Households	5701
Total Population	31530
SC Population	7927
ST Population	3163
Literacy Rate	67.39%
Main Workers	8861
Cultivators	5669
Agricultural Labourers	1549
Workers directly invovled in agriculture	7218
Land Utilization Pattern (units in ha)	
Total Geographical Area	13321
Cultivable Area	2880
Forest Area	9162
Net Sown Area	2774
Fallow land	106
Other	1279
Net Irrigated Area	1573
Unirrigated Area	1201
Gross Cropped Area	**8428**

Fig. 5.10.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.10.1 Cropping pattern, Production & Productivity

Cropping pattern is similar to that of Gidhour, although pathalgada is known for production of chillies.

Table 5.10.2 Crop-wise - Area Production & Productivity of Pathalgada (Source: Department of Agriculture)						
Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	1211	504	52726.94	4354	3000
	Maize	860	0	46698	5430	4457
	Pulses	401	0	3809.5	950	1128
Rabi	Wheat	553	553	22341.2	4040	2600
	Pulses	885	0	13894.5	1570	1072
	Oilseeds	918	0	9363.6	1020	550
Horticulture	Tomato	400	400	6400	1600	1600
	Potato	400	400	6400	1600	1600
	Onion	150	150	2400	1600	1600
	Chilly	70	70	1050	1500	1500
Other	Sugarcane	60	60	3972	6620	6620
Total		**5908**	**2137**	**169056**	NA	NA

5.10.2 Status of Irrigation:

Like Gidhour, majority of irrigation is through groundwater bodies.

Table 5.10.3 Existing Irrigation Status of Hunterganj Block											
Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
1948	974	779.2	388	775.6	387.8	0	0	1749.6	1167	123.5	3040.1

Table 5.10.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)							
Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.00913	0.03500	0.00204	0.00085	0.02202	0.01914	0.00335	0.01579
GW - Ground Water, SW - Surface Water							

5.10.3 Strategic Action Plan of Pathalgada Block

Table 5.10.5 Strategic Action plan for Irrigation in Pathalgada Block of Chatra district under PMKSY

Concerned Ministry/ Department	Component	Activity	Total Number	Command Area / Irrigation Potential(Ha)	Period of Implementation	Estimated cost (in Lakhs)
MoWR	AIBP	Major & Medium Irrigation	0	0	0	0
		Check Dams (Minor Irrigation)	14	180	5 y	1208
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	5	NA	5 y	5
		RRR (Minor Irrigation)	12	207	5 y	328
MOA &FW		Dobhas / Farm Ponds	720	NA	5 y	108
		Deep Boring	90	90	0	315
		Percolation Tank	25	75	5 y	112.5
		Check Dams	18	90	5 y	270
MoWR		Un lined Field Channels	2	20	5 y	20
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/ Mini Sprinkler	470	NA	5 y	170
DoRD-MoRD	Convergence with NREGA	Construction of Wells	840	336	5 y	1680
		Dobhas/ Farm Ponds	600	NA	2 y	90
		New Talab Construction	130	260	5 y	260
		Renovation of Talabs	33	66	5 y	50
Irrigation Potential Created (ha)				**1324**	**Total Cost (in Lakhs)**	**4616.5**

5.10.4 Expected Outcome of the Plan

Table 5.10.6 Result of successful implementation of the plan in Pathalgada Block		
	Present	**Projected in 5 years**
Cultivable Area	2880	2880
Net Sown Area (in ha)	2774	2880
Net Irrigated Area (in ha)	1573	2821 (98%)
Unirrigated Area	1201	0
Gross Cropped Area	**8428**	**8581**

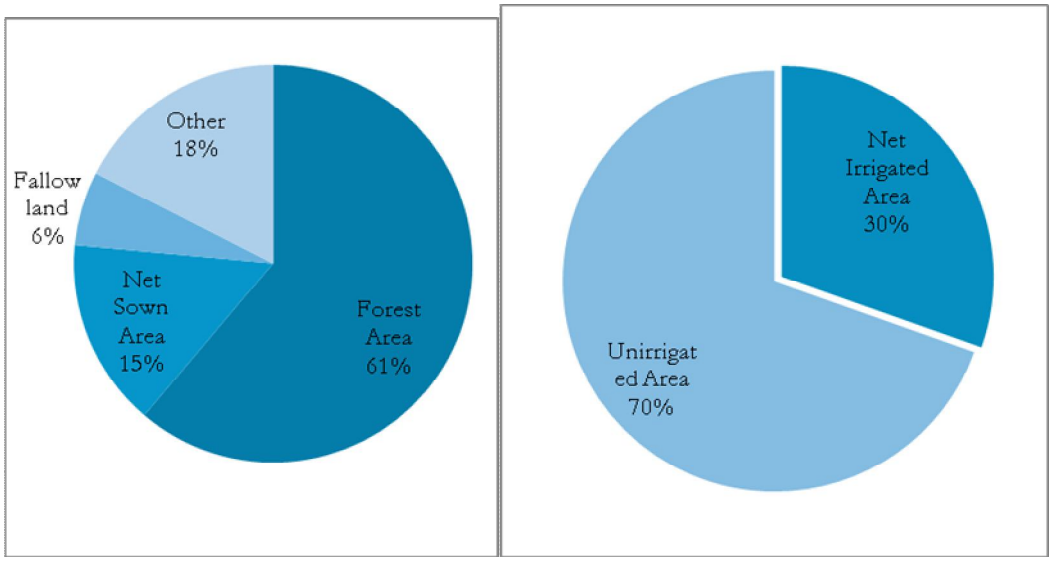
5.11 SIMARIA BLOCK:

Simaria is one of the larger blocks of Chatra and has a high forest area. It is similar to Pathalgada and Gidhour in the sense that all three blocks are major producer of vegetables to meet requirements of nearby town Hazaribag.

Table 5.11.1 Simaria Block Profile	
Number of Panchayats	17

Number of Villages	100
Demographics	
Total Number of Households	19556
Total Population	107871
SC Population	32496
ST Population	8761
Literacy Rate	63.40%
Main Workers	20286
Cultivators	10148
Agricultural Labourers	5333
Workers directly invovled in agriculture	15481
Land Utilization Pattern (units in ha)	
Total Geographical Area	51247
Cultivable Area	10944
Forest Area	31357
Net Sown Area	7842
Fallow land	3102
Other	8946
Net Irrigated Area	2386
Unirrigated Area	5456
Gross Cropped Area	**26628**

Fig. 5.11.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.11.1 Cropping Pattern, Production & Productivity

Vegetables are grown in all three seasons here similar to Pathalgada and Gidhour.

Table 5.11.2. Crop-wise - Area Production & Productivity of Simaria

(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district

Kharif	Paddy	4041	1426	152264.88	3768	3000
	Maize	1648	0	80208.16	4867	4457
	Pulses	1359	0	8833.5	650	1128
Rabi	Wheat	1106	1106	36166.2	3270	2600
	Pulses	1768	0	12376	700	1072
	Oilseeds	1644	0	9042	550	550
Horticulture	Tomato	500	500	8000	1600	1600
	Potato	500	500	8000	1600	1600
	Onion	200	200	3200	1600	1600
	Chilly	80	80	1200	1500	1500
	Mango	150	0	5763	3842	3842
Total		**12996**	**3812**	**325054**	NA	NA

5.11.2 Status of Irrigation:

30% of the net sown area of Simaria is irrigated. Most of the irrigation is through ground water bodies.

Table 5.11.3 Existing Irrigation Status of Simaria Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
3842	1921	1536.8	376	751.8	375.9	0	0	2672.8	1912.7	63	4648.5

Table 5.11.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.03840	0.04500	0.01033	0.00210	0.04077	0.02833	0.01368	0.01465
GW - Ground Water, SW - Surface Water							

5.11.3 Strategic Action Plan of Simaria Block

Table 5.11.5 Strategic Action plan for Irrigation in Simaria Block of Chatra district under PMKSY

Concerned Ministry / Department	Component	Activity	Total Number	Command Area / Irrigation Potential(Ha)	Period of Implementation	Estimated cost (in Lakhs)
MoWR	AIBP	Major & Medium Irrigation	1	500	3 y	200
		Check Dams (Minor Irrigation)	20	979	5 y	1416

MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	15	NA	5 y	15
		RRR (Minor Irrigation)	25	554	5 y	666
MOA &FW		Dobhas / Farm Ponds	2200	NA	5 y	330
		Deep Boring	325	325	5 y	1137.5
		Percolation Tank	51	155	5 y	229.5
		Check Dams	34	170	5 y	510
MoWR		Un lined Field Channels	9	90	5 y	90
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	550	250	5 y	250
DoRD-MoRD	PMKSY (Watershed)	IWMP-II V	2 (1186.95 ha)	150	5 y	1598.51
	Convergence with NREGA	Construction of Wells	960	384	5 y	1920
		Dobhas/ Farm Ponds	2000	NA	2 y	300
		New Talab Construction	533	1066	5 y	1066
		Renovation of Talabs	45	90	5 y	68
Irrigation Potential Created (ha)				**4713**	**Total Cost (in Lakhs)**	**9796.51**

5.11.4 Expected Outcome of the Plan

Table 5.11.6 Result of successful implementation of the plan in Simaria Block

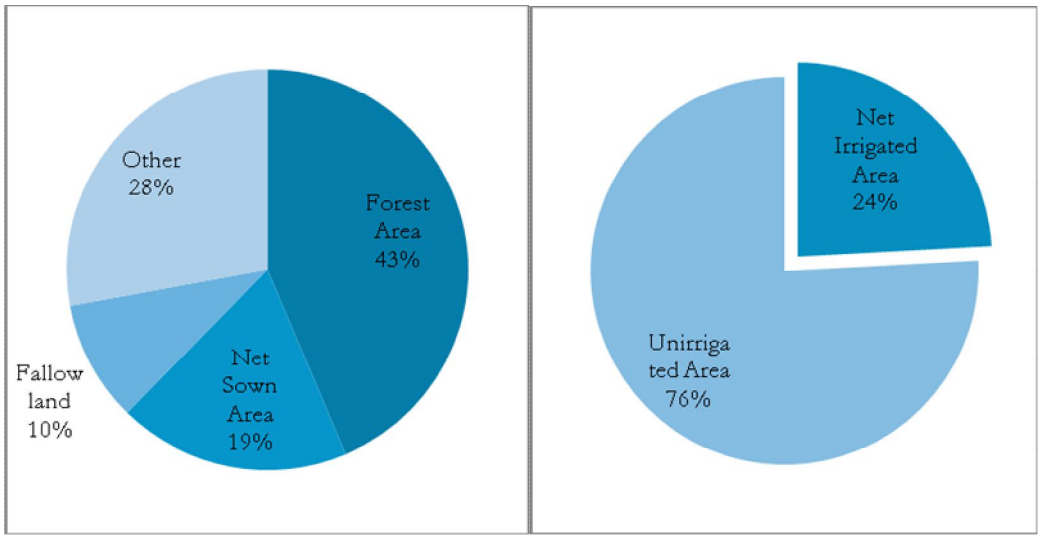
	Present	**Projected in 5 years**
Cultivable Area	10944	10944
Net Sown Area (in ha)	7842	10194
Net Irrigated Area (in ha)	2386	7099 (70%)
Unirrigated Area	5456	3050
Gross Cropped Area	**26628**	**31287**

5.12 TANDWA BLOCK:

Tandwa falls in South of Chatra and is known for coal mining. Hence, the proportion of other land is higher in this block. It has been major driver of Chatra's growth mainly because of its coal reserves. Further, an NTPC Power plant is about to kickstart in the block by 2017.

Table 5.12.1 Tandwa Block Profile	
Number of Panchayats	18
Number of Villages	94
Demographics	
Total Number of Households	23319
Total Population	126319
SC Population	30104
ST Population	20330
Literacy Rate	62.62%
Main Workers	19846
Cultivators	7797
Agricultural Labourers	3358
Workers directly invovled in agriculture	11155
Land Utilization Pattern (units in ha)	
Total Geographical Area	45521
Cultivable Area	12960
Forest Area	19861
Net Sown Area	8505
Fallow land	4455
Other	12700
Net Irrigated Area	2053
Unirrigated Area	6452
Gross Cropped Area	**29970**

Fig. 5.12.1 Charts showing Land Utilization and Irrigated area against TGA & Net Sown Area



5.12.1 Cropping Pattern, Production & Productivity:

As can be observed from table below, Tandwa has higher productivity for most of the crops.

Table 5.12.2. Crop-wise - Area Production & Productivity of Tandwa

(Source: Department of Agriculture)

Season	Crop	Area Sown (ha)	Irrigated Area (ha)	Production (quintal/year)	Productivity (kg/ha)	Overall Porductivity of Chatra district
Kharif	Paddy	4407	1546	123836.7	2810	3000
	Maize	1738	0	81164.6	4670	4457
	Pulses	1505	0	30100	2000	1128
Rabi	Wheat	903	903	20588.4	2280	2600
	Pulses	1600	1600	17600	1100	1072
	Oilseeds	1409	1409	11553.8	820	550
Horticulture	Tomato	500	500	8000	1600	1600
	Potato	500	500	8000	1600	1600
	Onion	150	150	2400	1600	1600
Total		**12712**	**6608**	**303244**	**NA**	**NA**

5.12.2 Status of Irrigation:

Table 5.12.3 Existing Irrigation Status of Tandwa Block

Area Irrigated by Ground Water Bodies			Area Irrigated by Surface Water Bodies			Canal Irrigation		Total Irrigated Area			
Assets	Kharif	Rabi	Assets	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Summer	Total
3023	1511.5	1209.2	416	831.6	415.8	0	0	2343.1	1625	52.5	4020.6

Table 5.12.4 Irrigation Potential Estimated to be created to achieve 100% irrigation (units in BCM)

Total Water available for sustainable use		Existing Water Usage for irrigation		Water required for irrigation (by 2020)	Gap	Additional Potential that should be created	
GW	SW	GW	SW			GW	SW
0.03156	0.05500	0.00829	0.00238	0.03809	0.02742	0.01116	0.01626

GW - Ground Water, SW - Surface Water

5.12.3 Strategic Action Plan

Table 5.12.5 Strategic Action plan for Irrigation in Tandwa Block of Chatra district under PMKSY						
Concerned Ministry/ Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	1	1500	5 y	2000
		Check Dams (Minor Irrigation)	26	780	5 y	1707
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	10	NA	5 y	10
		RRR (Minor Irrigation)	22	466	5 y	508
MOA &FW		Dobhas / Farm Ponds	2850	NA	5 y	428
		Deep Boring	0	0	0	0
		Percolation Tank	19	19	5 y	85.5
MoWR		Un lined Field Channels	10	100	5 y	110
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/ Sprinkler	180	36	0	180
DoRD-MoRD	PMKSY (Watershed)	IWMP-III V	2 (11468.31ha)	150	5 y	1720.39
	NREGA Convergence	Construction of Wells	615	246	5 y	1230
		Dobhas/ Farm Ponds	1880	NA	2 y	282
		New Talab Construction	245	490	5 y	490
		Renovation of Talabs	1	2	5 y	2
Irrigation Potential Created (ha)				**3789**	**Total Cost (in Lakhs)**	**8752.89**

5.12.4 Expected Outcome of the Plan

Table 5. 12.6Result of successful implementation of the plan in Tandwa Block		
	Present	**Projected in 5 years**
Cultivable Area	12960	12960
Net Sown Area (in ha)	8505	11057
Net Irrigated Area (in ha)	2053	5842 (53%)
Unirrigated Area	6452	4464
Gross Cropped Area	**29970**	**34323**

5.13 OVERALL PLAN FOR THE DISTRICT OF CHATRA

Strategic plan for Chatra to increase area under cultivation through enhanced irrigation facilities has been formulated based on following three objectives:

- **HarKhetKoPani:** Extending irrigation facilities to more than 80% of the net sown area from the current coverage of 27%. Irrigation structures such as building new dams & canals and renovating existing ones, building check dams and provision of microlifts for water withdrawal, building talabs and renovating existing ones are taken up to achieve this objective.

- **Per Drop More Crop**: To encourage efficient use of water, micro-irrigation facilities such as drip and sprinkler are planned to be provided especially in vegetable growing lands.

- **Soil Conservation by improving Moisture:**Bringing more fallow land under cultivation thereby increasing Net Sown Area. Construction of farm ponds, land levelling, afforestation activities, construction of bunds & terraces, ground water recharge structures are activities taken up to achieve the same. These activities are taken up under NREGA and by Soil Conservation Department. It is also believed that extending irrigation facilities will improve soil moisture and bring more land under cultivation.

Details of the strategic plan are provided in **Table 5.13.1.** Further, it has been recommended by Central Ground Water Board (CGWB) – Jharkhand to take artificial recharge at suitable locales. On the basis of the hydrogeological criteria such as post monsoon water level below 7 m bgl indicating availability of sufficient space in the unsaturated zone to retain additional water and availability of surplus surface runoff, 250 Sq. kms area in Chatra district has been demarcated as suitable for artificial recharge. Through this 41.25 mcm water can be recharged. As per the Groundwater Master Plan of Jharkhand State, 343 percolation tanks and 2060 Nala bunds are planned to be created at an estimated cost of Rs. 158 Cr.

5 Strategic Action plan for Irrigation of Chatra district under PMKSY						
Concerned Ministry / Department	**Component**	**Activity**	**Total Number**	**Command Area / Irrigation Potential(Ha)**	**Period of Implementation**	**Estimated cost (in Lakhs)**
MoWR	AIBP	Major & Medium Irrigation	12	10200	5-7 y	7400
		CheckDams/Surface Irrigation (Minor Irrigation)	251	9987	5 y	18109
MoWR	Harkhetkopani	Lift Irrigation (Minor Irrigation)	142	NA	5 y	142
		RRR of Water Bodies (Minor Irrigation)	306	6610	5 y	8235
MOA &FW		Dobhas / Farm Ponds	28055	NA	2 y	4209
		Deep Boring	4934	4934	5 y	17563
		Percolation Tank	442	1230	5 y	1989
		Check Dams	232	1165	5 y	3480
MoWR		Unlined Field Channels	95	1342	5 y	1106
MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip/Mini Sprinkler	4000	1432	5 y	2076
DoRD-MoRD	PMKSY (Watershed)	IWMP-III B (18612.97 ha)	6	590	5 y	4810
	Convergence with NREGA	Construction of Wells	10041	4016	5 y	20082
		Dobhas/ Farm Ponds	27400	NA	5 y	4110
		New Talab Construction	4104	8208	3 y	8208
		Renovation of Talabs	1255	2510	3 y	1886
Irrigation Potential Created (ha)				**52224**	**Total Cost (in Lakhs)**	**103405**

Table 5.13.3 Schemes planned by Jharkhand State GroundWater Board in Chatra District

(Source: Jharkhand GroundWater Master Plan)

Scheme	Number	Volume (MCM)	Cost Per Unit	Cost (in Lakhs)
Percolation Tanks	343	64.68	27.75 lakhs	9518.25
Nala Bunds	2060	64.68	3.07 lakhs	6324.2
Total Schemes	**2403**	**129.36**	**-**	**15842.45**

Table 5.13.2 Summary of the Plan			
S.No	**Department**	**Irrigation Potential (in ha)**	**Estimated Cost (In Crores)**
1	Major & Medium Irrigation Department	10200	74
2	Minor Irrigation Department	16597	264.86
3	Agriculture and Soil Conservation Department	10103	304.23
4	DRDA – MNREGA	14734	342.86
5	Ground Water Board - Jharkhand	NA	158
6	PMKSY (Water shed)	590	48.1
Total		**52224**	**1192.05**

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	**Name of the Blocks/Sub Districts**	**Concerned Ministry/ Department**	**Component**	**Activity**	**Total Number/Capacity(cum)**	**Command Area/Irrigation Potential(Ha)**	**Period of Implementation (5/7 yrs)**	**Estimated cost (in Rs.)**
1		MoWR	AIBP	Major Irrigation	12	10200	5-7 yrs	7400
2		MoWR		Medium Irrigation				
3		MoWR		Surface Minor Irrigation	251	9987	5 yrs	18109
4		MoWR	Har khet ko pani	Lift Irrigation	142	NA	5 yrs	142
5		MoWR		Ground Water Development				
6		MoWR		RRR of Water Bodies	306	6610	5 yrs	8235
7		MoWR		**Construction of Field Channels**				
7.1		MoWR		Lined Field Channels	0	0	0	0
7.2		MoWR		Unlined Channels	95	1342	5 yrs	1106
8		MoWR		Micro-Irrigation	0	0	0	0
9		MOA &FW-DAC&FW	Per drop more crop (Micro Irrigation)	DPAP Drip	4000	1432	5 yrs	2076
10		MOA &FW-DAC&FW		DPAP Sprinkler	0	0	0	0
11		MOA &FW-DAC&FW		Non -DPAP Drip	0	0	0	0

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	**Name of the Blocks/Sub Districts**	**Concerned Ministry/ Department**	**Component**	**Activity**	**Total Number/Capacity(cum)**	**Command Area/Irrigation Potential(Ha)**	**Period of Implementation (5/7 yrs)**	**Estimated cost (in Rs.)**
12		MOA &FW-DAC&FW		Non -DPAP Sprinkler	0	0	0	0
13		MOA &FW-DAC&FW	Per drop more crop (other water management activities)	Topping up of MGNREGA	0	0	0	0
14		MOA &FW-DAC&FW		Drought Proofing through check Dams/Water Harvesting Structures	33663	7329	5 yrs	27241
15		MOA &FW-DAC&FW		Secondary Storage Structures	0	0	0	0
16		MOA &FW-DAC&FW		On Farm Development (distribution pipe / raised bed and furrow system etc.)	0	0	0	0
17		DoLR-MoRD	PMKSY Watershed	**Newly created WHS**				
17.1		DoLR-MoRD		Farm Ponds	269	6824.53	5	668.902

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	Name of the Blocks/Sub Districts	Concerned Ministry/ Department	Component	Activity	Total Number/Capacity(cum)	Command Area/Irrigation Potential(Ha)	Period of Implementation (5/7 yrs)	Estimated cost (in Rs.)
17.2		DoLR-MoRD		Check Dams	109	3081.43		257.852
17.3		DoLR-MoRD		Nallah Bunds	8348	6553.18		118.137
17.4		DoLR-MoRD		Percolation Tanks	165	3280.2		155.208
17.5		DoLR-MoRD		Other Ground Water Recharge Structure	3520.8	41545.44		780.00
17.6		DoLR-MoRD		Fishery ponds/cattle pond	0	0		0
18		DoLR-MoRD		**Renovated WHS**				
18.1		DoLR-MoRD		Farm Ponds	291	4036.17	5	409.422
18.2		DoLR-MoRD		Check Dams	92	1306.4		46.79
18.3		DoLR-MoRD		Nallah Bunds	0	0		0
18.4		DoLR-MoRD		Percolation Tanks	287	3128.3		79.10
18.5		DoLR-MoRD		Other Ground Water Recharge Structure	1689.5 ha	10728.325		348.42

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	**Name of the Blocks/Sub Districts**	**Concerned Ministry/ Department**	**Component**	**Activity**	**Total Number/Capacity(cum)**	**Command Area/Irrigation Potential(Ha)**	**Period of Implementation (5/7 yrs)**	**Estimated cost (in Rs.)**
18.6		DoLR-MoRD		Fishery ponds/cattle pond	0	0		0
19		DoRD-MoRD	Convergence with MGNREGA	**Newly Created**				
19.1		DoRD-MoRD		Water Conservation:	27400	NA	5 yr	4110
19.2		DoRD-MoRD		Water Harvesting:	5359	33908	3 yr	10094
19.3		DoRD-MoRD		Creation of Irrigation canals and Drains:				
19.4		DoRD-MoRD		**Providing Infrastructure for Irrigation:**	10041	4016	5 yr	20082
19.5		DoRD-MoRD		**Land Development:**	6000	39804.1		62.4
20		DoRD-MoRD		**Renovation**				
20.1		DoRD-MoRd		Renovation of water bodies including desilting:	575	12106	5	14.34
20.2		DoRD-MoRD		Renovation & Maintenance of Irrigation Canals & Drains:	415	13827.8		16.6

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	**Name of the Blocks/Sub Districts**	**Concerned Ministry/ Department**	**Component**	**Activity**	**Total Number/Capacity(cum)**	**Command Area/Irrigation Potential(Ha)**	**Period of Implementation (5/7 yrs)**	**Estimated cost (in Rs.)**
21		**State Planned Scheme of Irrigation**						
21.1		State Irrigation Department	Name of the scheme	Major Irrigation				
21.2		State Irrigation Department	Name of the scheme	Medium Irrigation				
21.3		State Irrigation Department	Name of the scheme	Surface Minor Irrigation				
22		Irrigation Scheme of State Agriculture Department	Name of the scheme					
23		Irrigation Scheme of other Line Departments of State Govt.	Name of the Scheme					
24		Externally aided projects	Name of the Scheme					

5 Strategic Action plan for Irrigation in District under PMKSY								
S.No.	**Name of the Blocks/Sub Districts**	**Concerned Ministry/ Department**	**Component**	**Activity**	**Total Number/Capacity(cum)**	**Command Area/Irrigation Potential(Ha)**	**Period of Implementation (5/7 yrs)**	**Estimated cost (in Rs.)**
25		other loan projects like NABARD	Name of the Scheme					

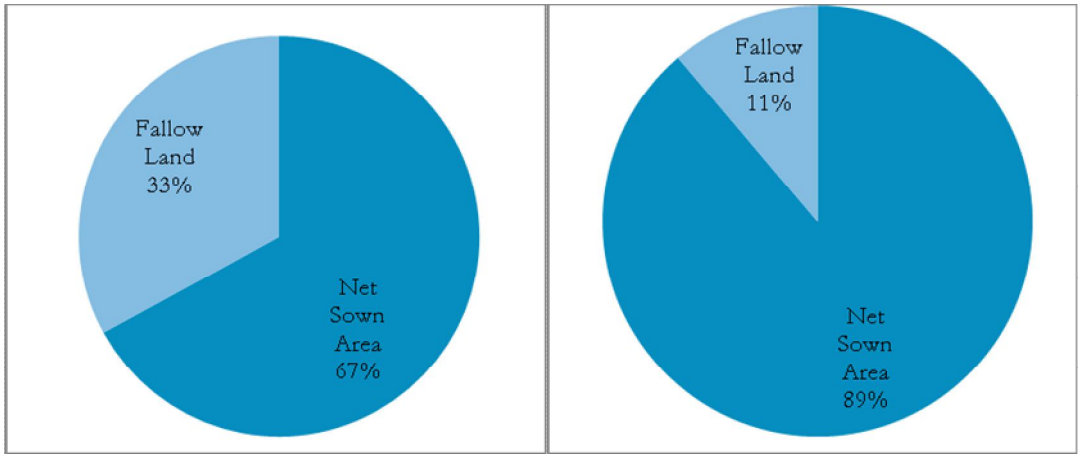
The expenditure for the plan is Rs.1192.05 Cr for five years. Out of this, Rs. 342.86 Cr is expected to come from works taken up under MGNREGA, Rs. 264.86 Cr by Minor Irrigation department for taking up its core activities such as construction of large check dams, Rs. 304.23 Cr is expected to be spent by the Soil Conservation and agriculture department and Rs. 74 Cr is expected to be spent for major and medium irrigation works. And the rest Rs. 158 Cr on groundwater recharge structures.

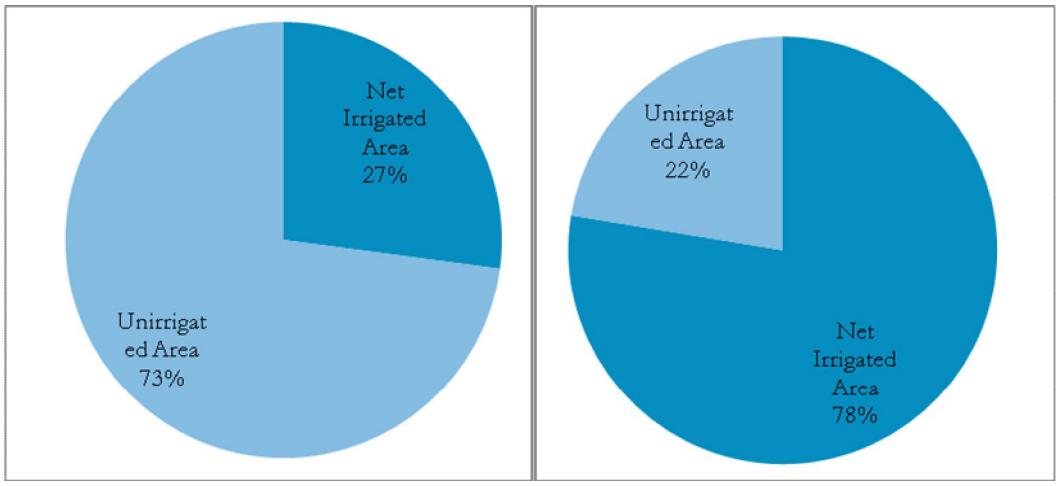
5.13.1 Expected Outcome of the Plan:

Table 5.13.3 Projected Outcome in 5 years

	Present	Projected in 5 years
Cultivable Area	103578	103578
Net Sown Area	69394	91951
Fallow Land	34185	11627
Net Irrigated Area	18801 (27%)	71025 (77%)
Unirrigated Area	50593	20926
Gross Cropped Area	**276551**	**299107**
* All units in hectares		

Fig. 5.13.1 Charts showing present and projected status of Irrigation after the implementation of the plan





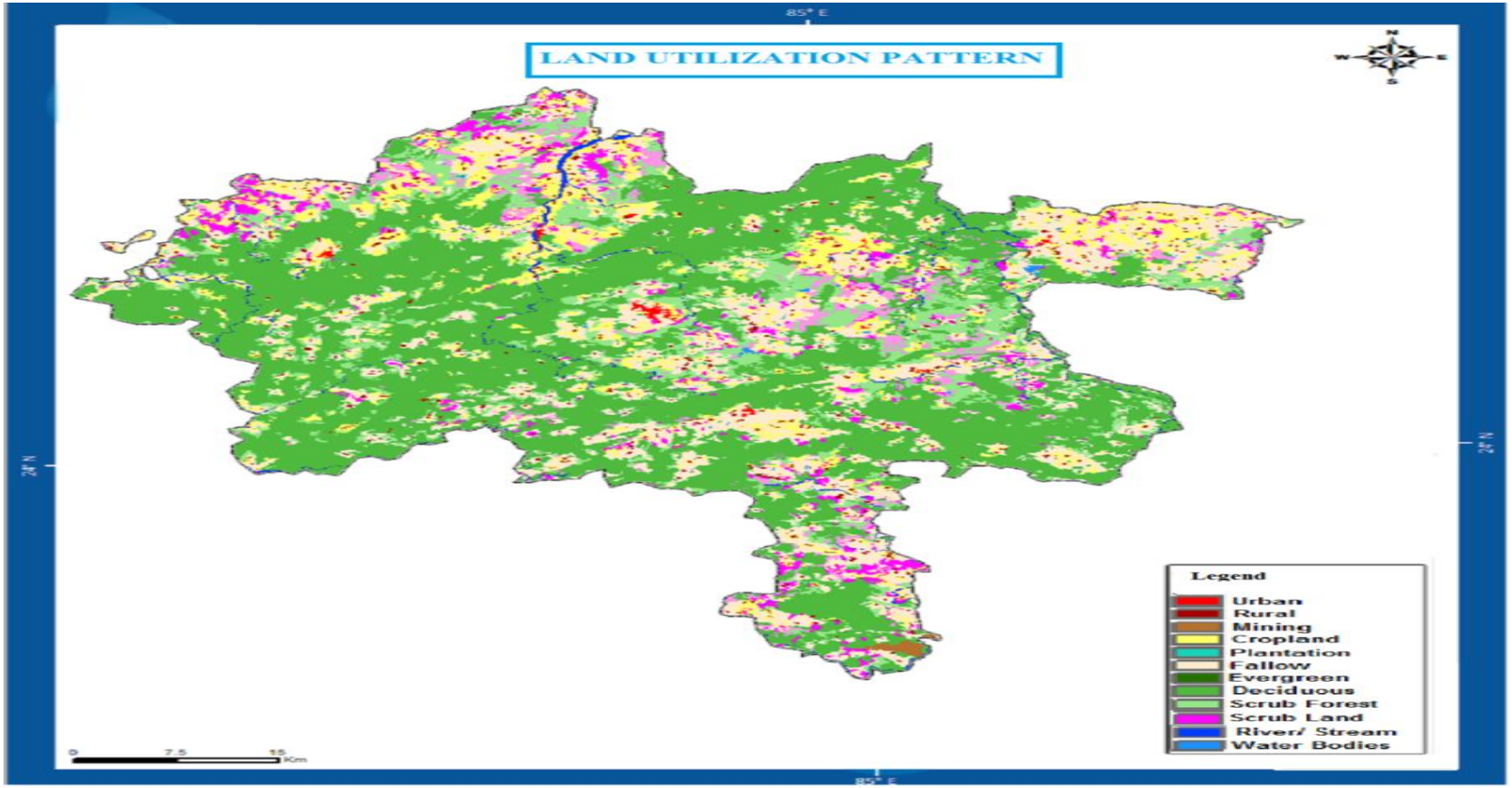
Overall, the plan proposes achieve the stated objectives of increasing net sown area and net irrigated area. Net Sown Area is expected to increase from 69,394 ha to 91,951 ha – a substantial increase from 67% to 89% of cultivable land. Further, net irrigated area is expected to increase from 18,801 ha to 72,195 ha – bringing 78% of net sown area under assured irrigation from current 27%. Gross Cropped area is expected to increase by more than 50%.

With enhanced irrigation facilities, farmers would opt for remunerative crops such as Wheat during winter in place of oilseeds or pulses. This may have positive impact on cropping pattern of the district. Also, productivity of crops would increase by no less than 15%. Overall, such a tremendous increase in irrigation potential would bring prosperity to majority of lives in Chatra and transform it into a food-surplus district.

Appendix A : District Map with available layer of attributes

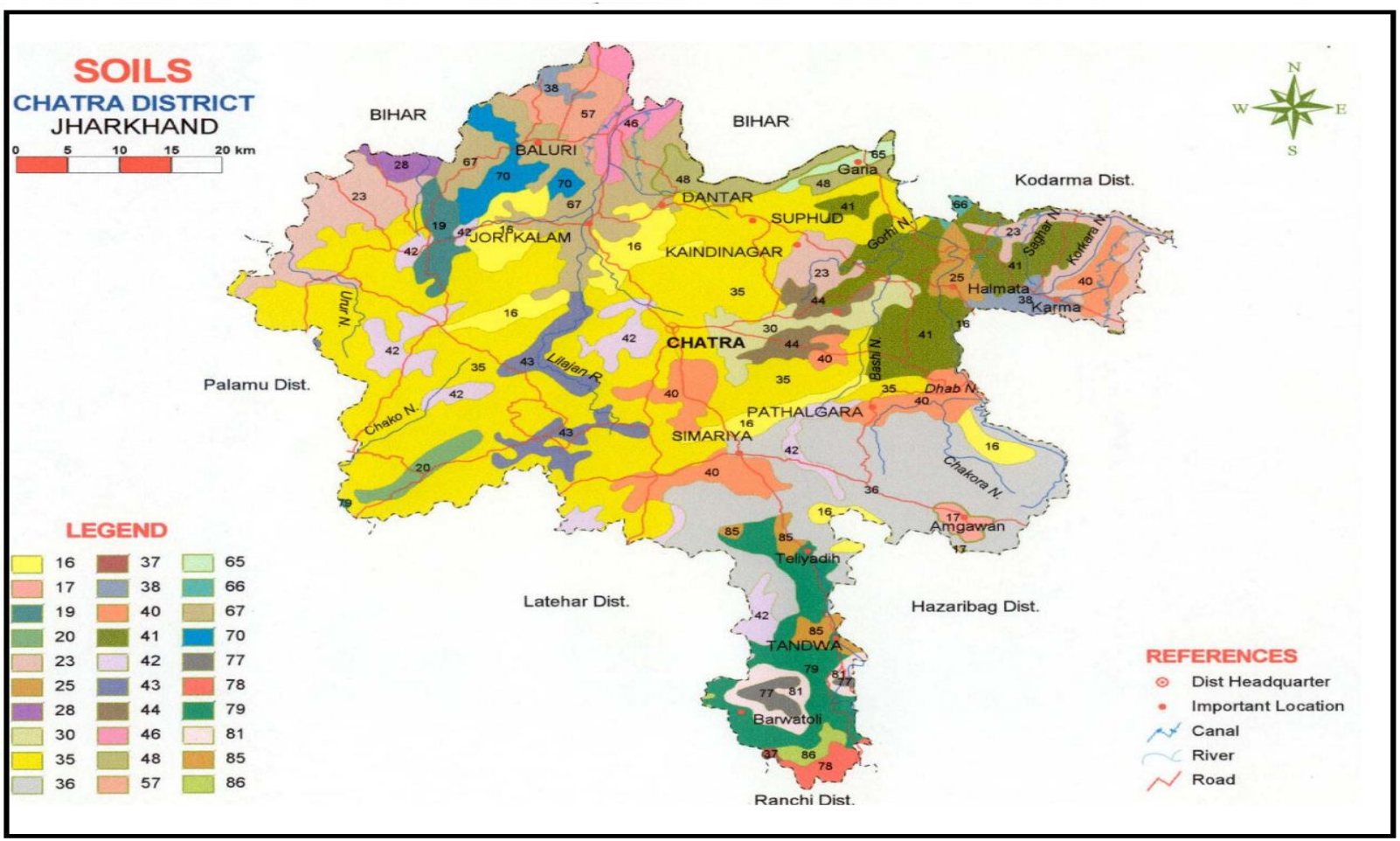
i) Land Use of the district :

Fig.1.7Map showing Land Use Pattern of Chatra



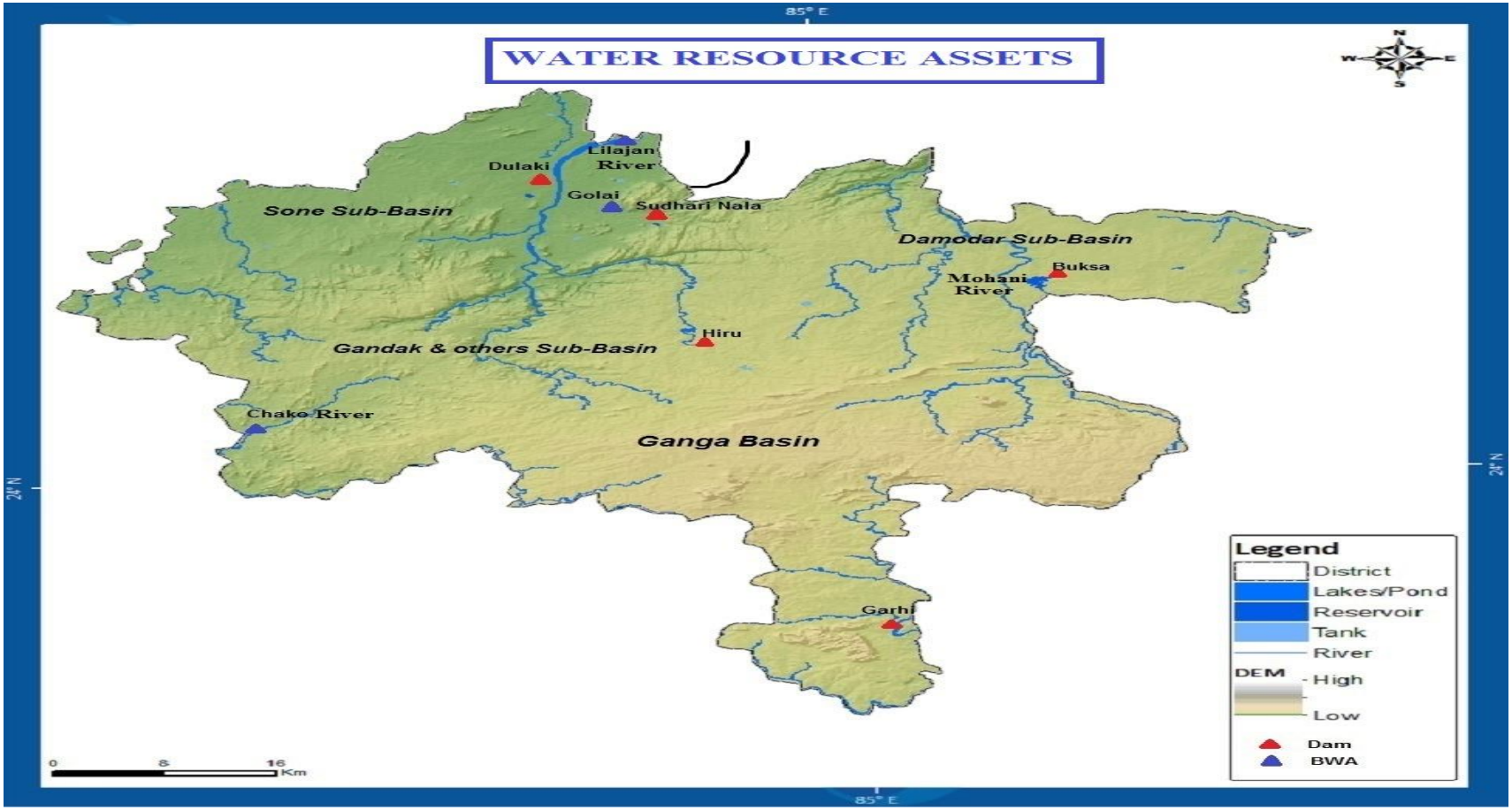
ii) Soil Type of the district :

Fig. 1.8 Map showing location-based soil type



iii) Cultivable Command area (Kharif, Rabi, Zayad) :

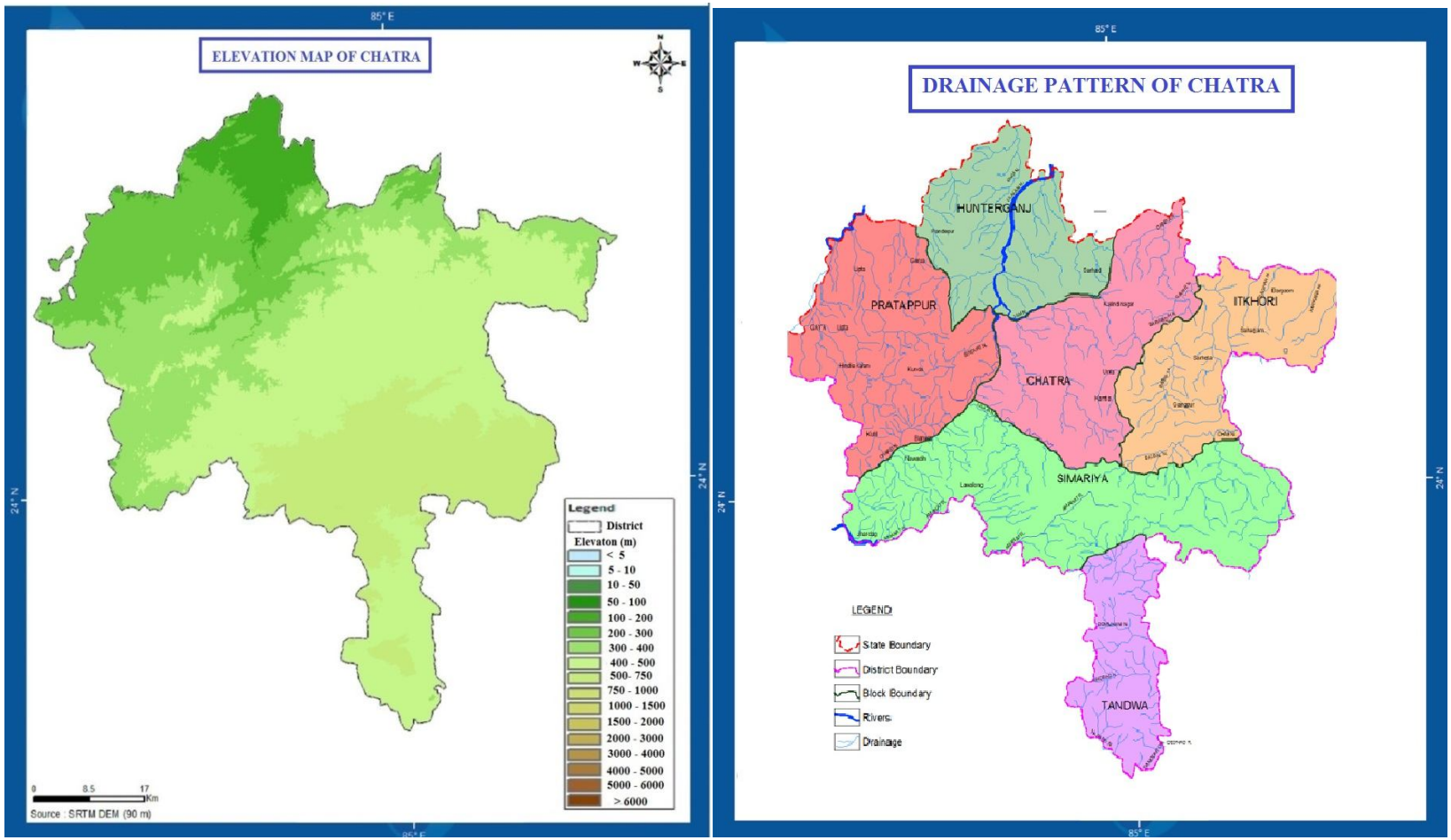
Fig. 3.1 Map showing Water Resource Assets in Chatra



v) Surface and sub-surface water :

Fig. 3.2 Map showing Ground Water Development Potential in various blocks

Fig1.5 : Maps showing Elevation Map & Drainage Pattern of Chatra



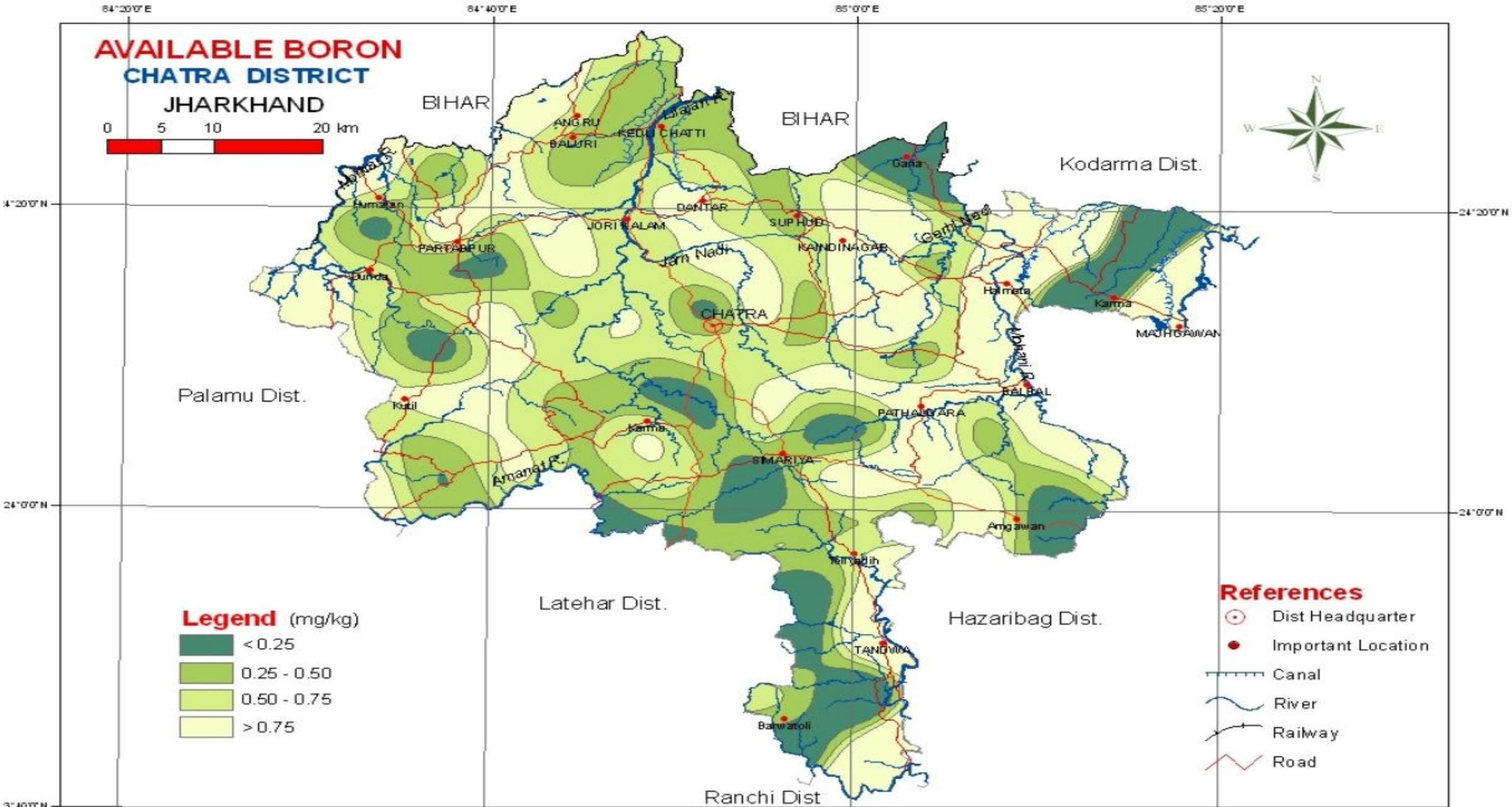
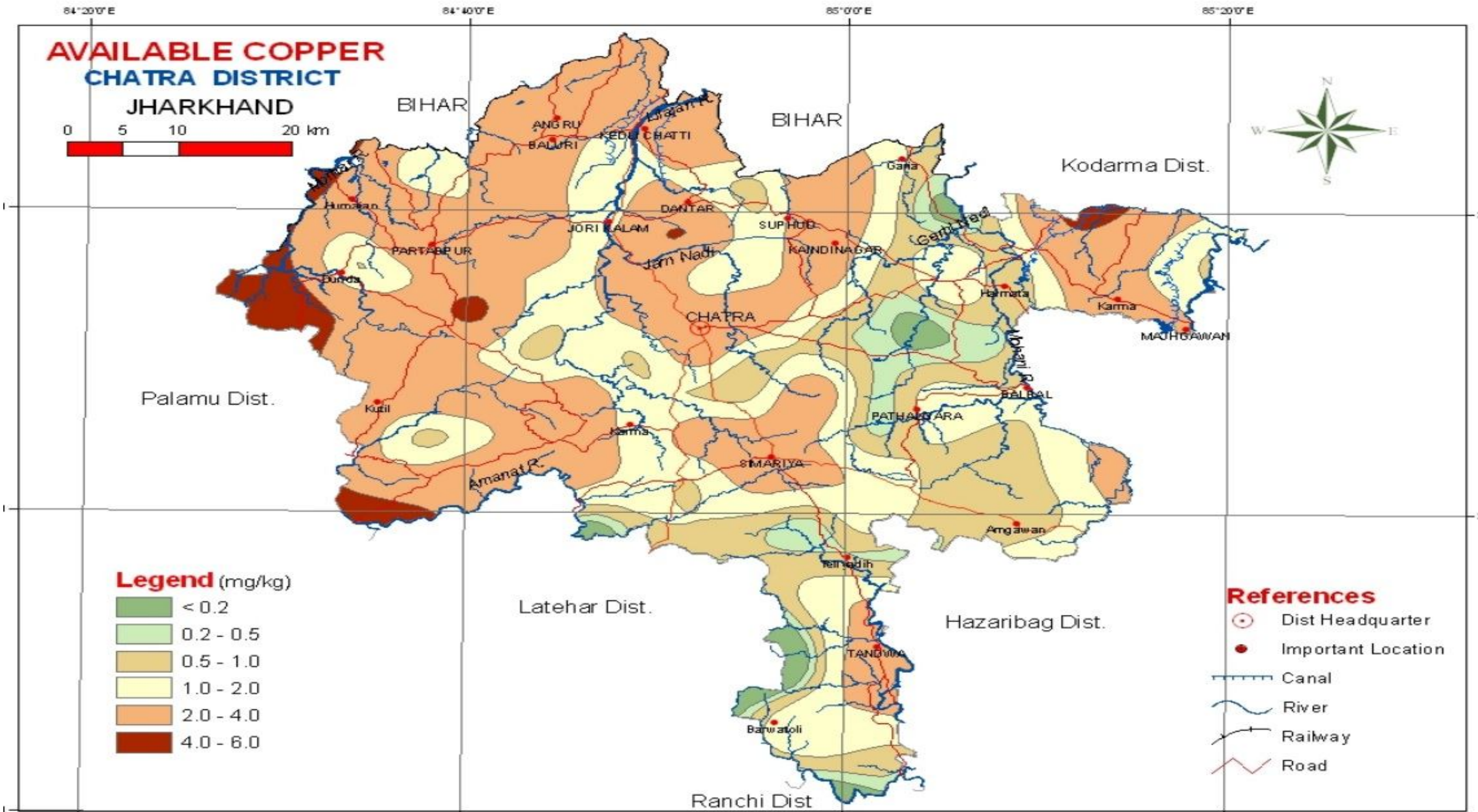

AVAILABLE BORON
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
SIMARIYA
TANDWA
PATHALGARA
DANTAR
SUPHUD
JORI
PARTABPUR
Legend (mg/kg)
< 0.25
0.25 - 0.50
0.50 - 0.75
> 0.75
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 12



AVAILABLE COPPER
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
PARTAPPUR
JORI KALAM
DANTAR
SUPHUD
KAINDINAGAR
Jam Nadi
KEDU CHATTI
ANGRU
BALURI
Gana
Garhi Nadi
Halmata
Karma
MAJHGAWAN
BALBAL
PATHALGARA
SIMARIYA
Amanat R.
Kutil
Amgawan
Tandwa
Barwatoli
Legend (mg/kg)
< 0.2
0.2 - 0.5
0.5 - 1.0
1.0 - 2.0
2.0 - 4.0
4.0 - 6.0
References
Dist Headquarter
Important Location
Canal
River
Railway
Road
84°20'0" E
84°40'0" E
85°0'0" E
85°20'0" E

Fig. 11

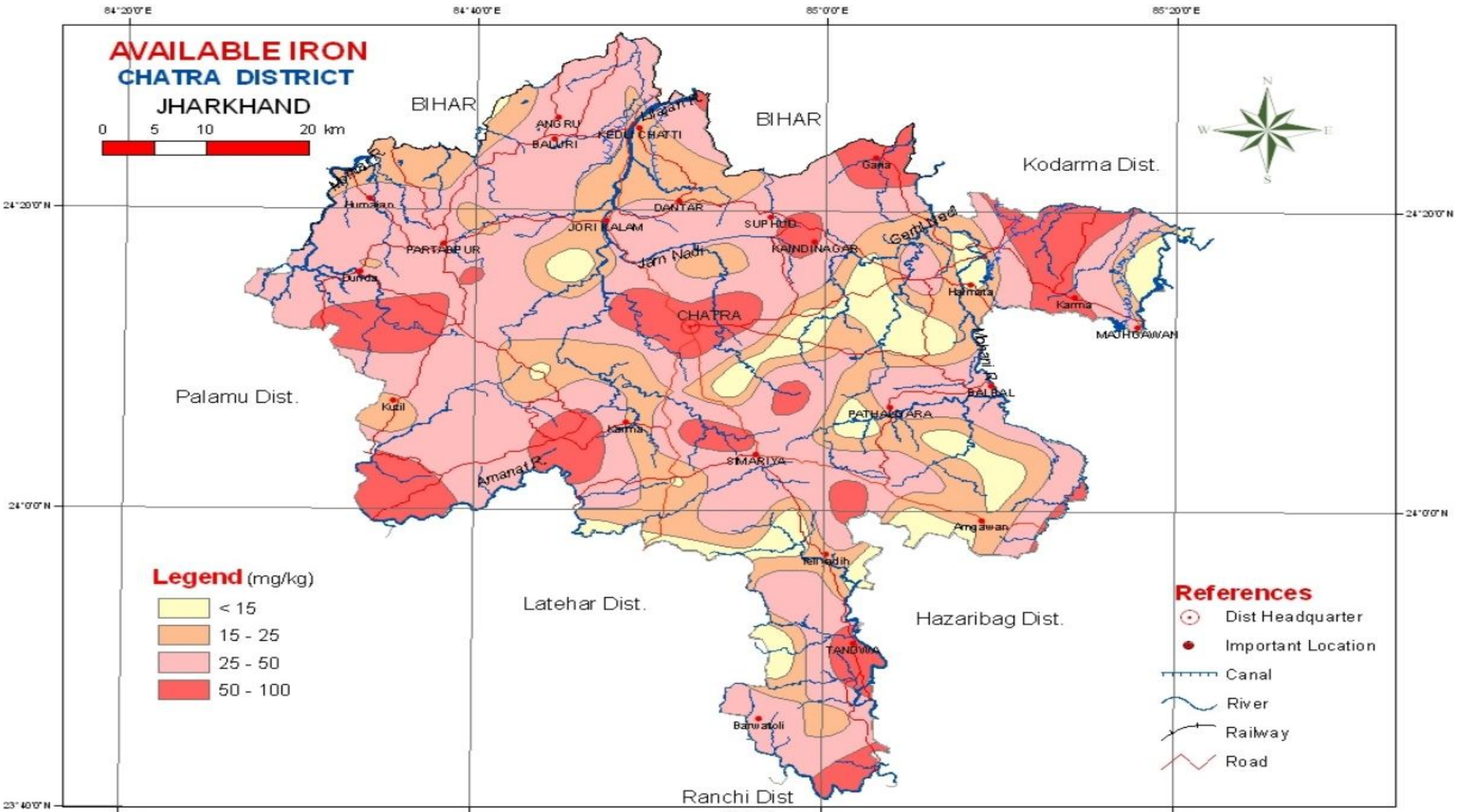

AVAILABLE IRON
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Legend (mg/kg)
< 15
15 - 25
25 - 50
50 - 100
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 8

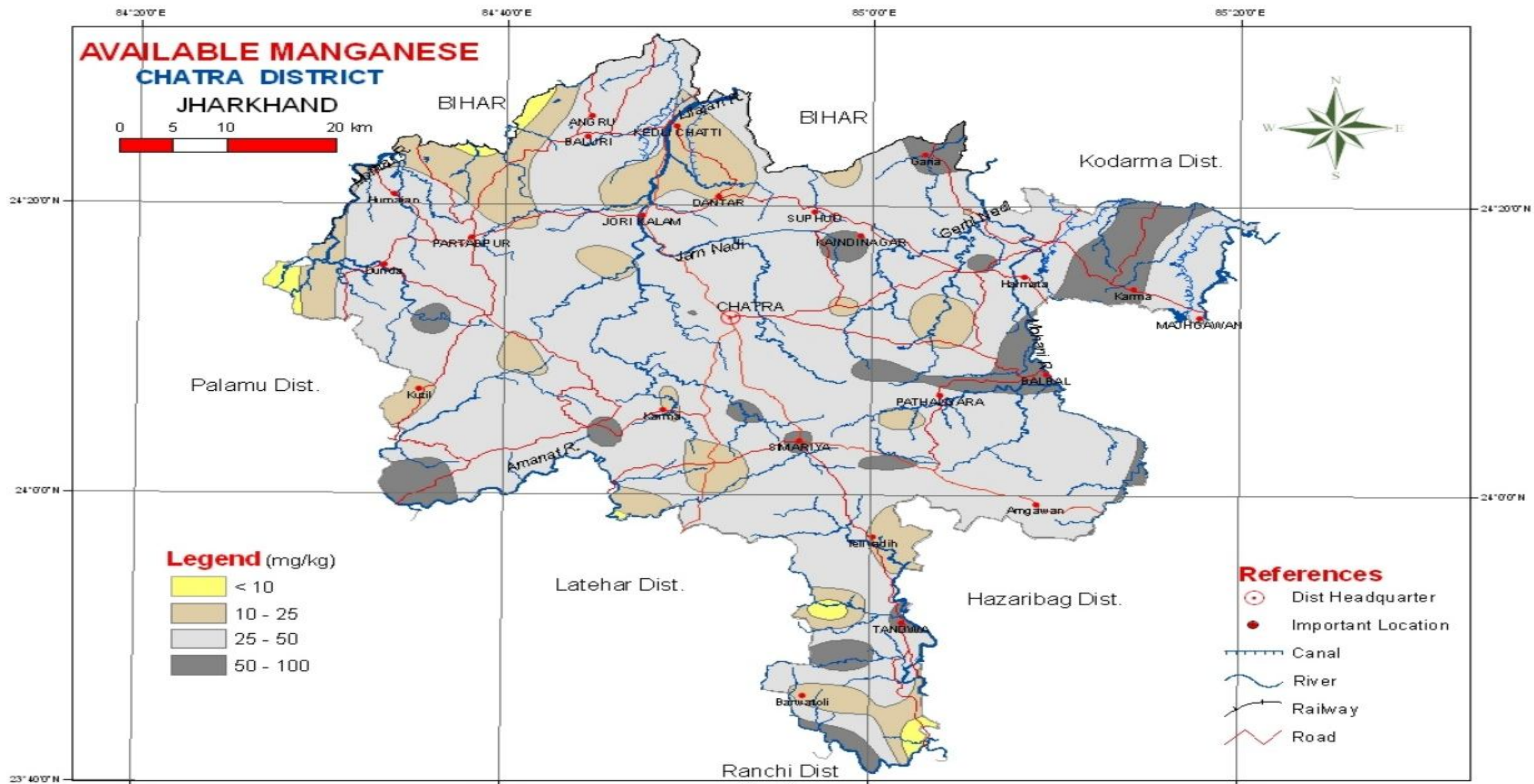

AVAILABLE MANGANESE
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Legend (mg/kg)
< 10
10 - 25
25 - 50
50 - 100
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 9

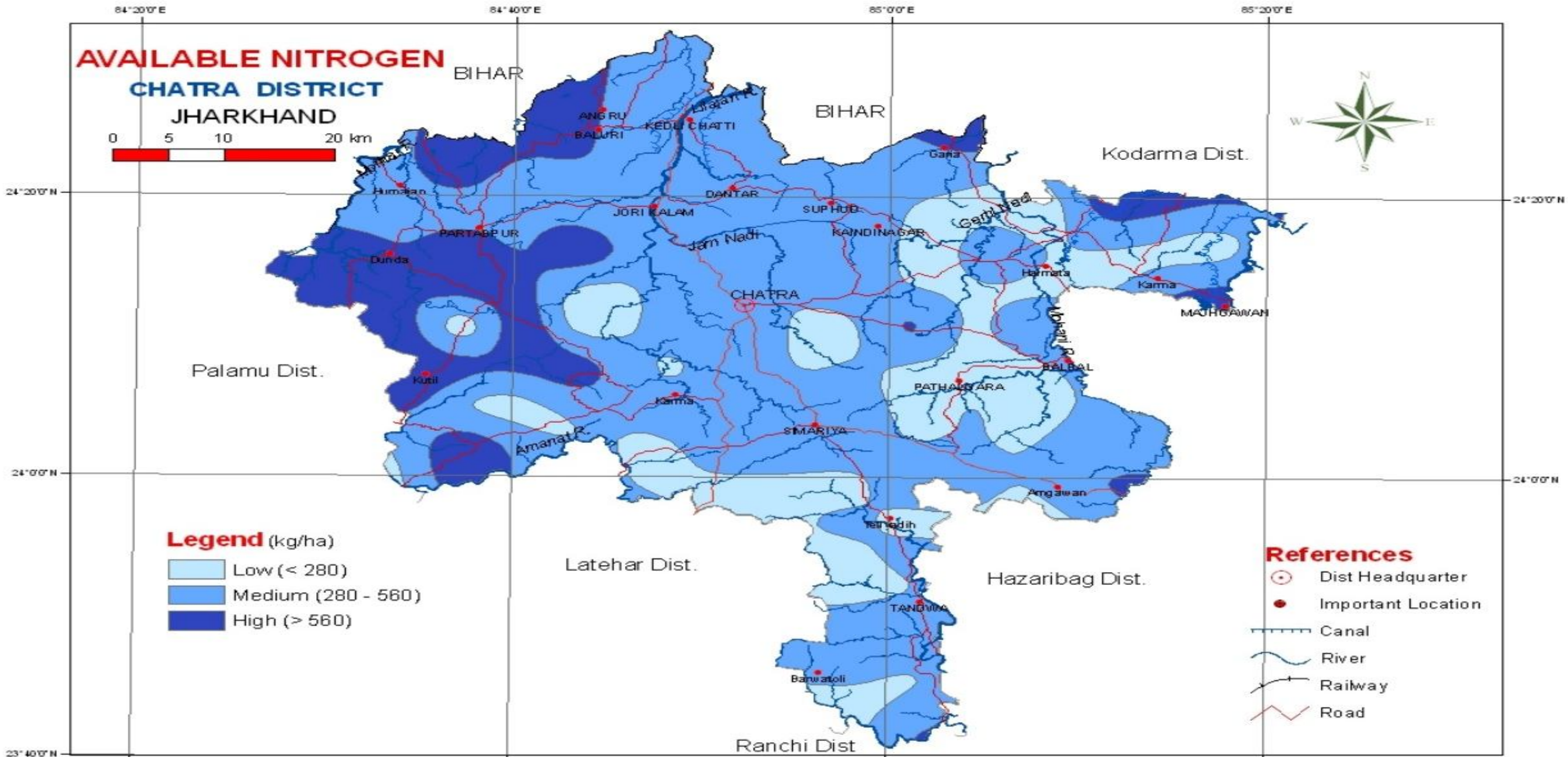

AVAILABLE NITROGEN
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Legend (kg/ha)
Low (< 280)
Medium (280 - 560)
High (> 560)
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 4

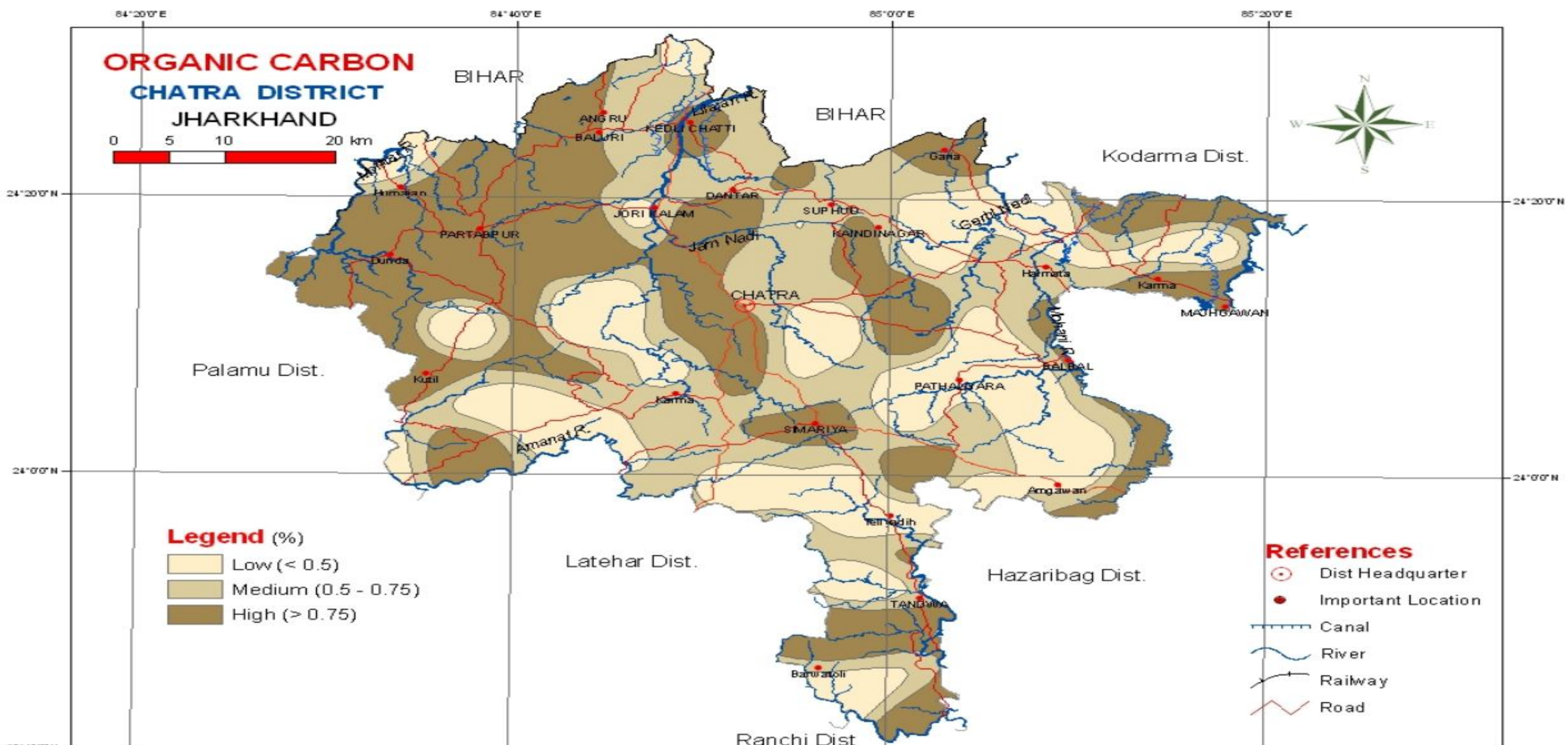

ORGANIC CARBON
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
SIMARIYA
TANDWA
PATHALGARA
Legend (%)
Low (< 0.5)
Medium (0.5 - 0.75)
High (> 0.75)
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 3

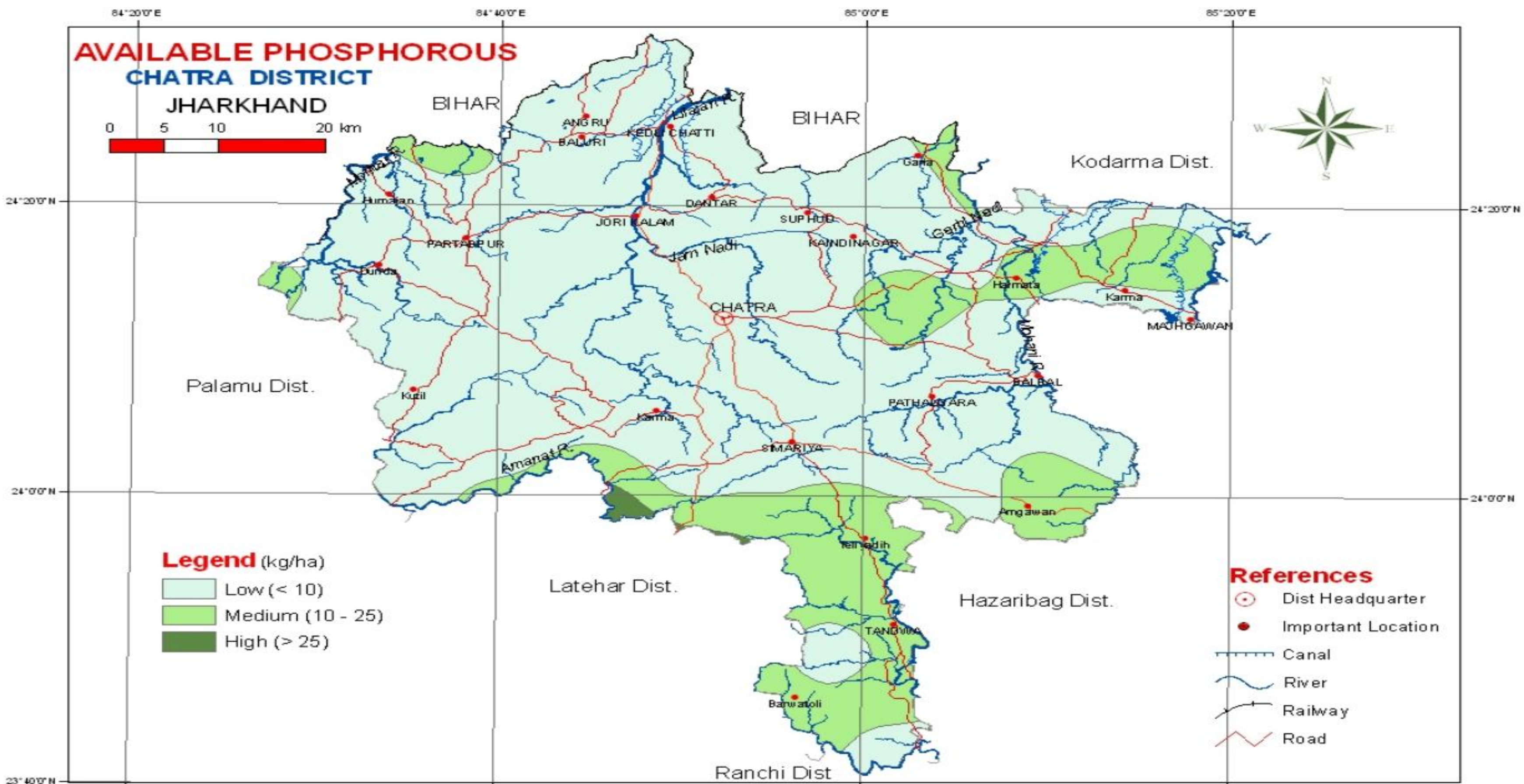

AVAILABLE PHOSPHOROUS
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Jam Nadi
Amanat R.
Legend (kg/ha)
Low (< 10)
Medium (10 - 25)
High (> 25)
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 5

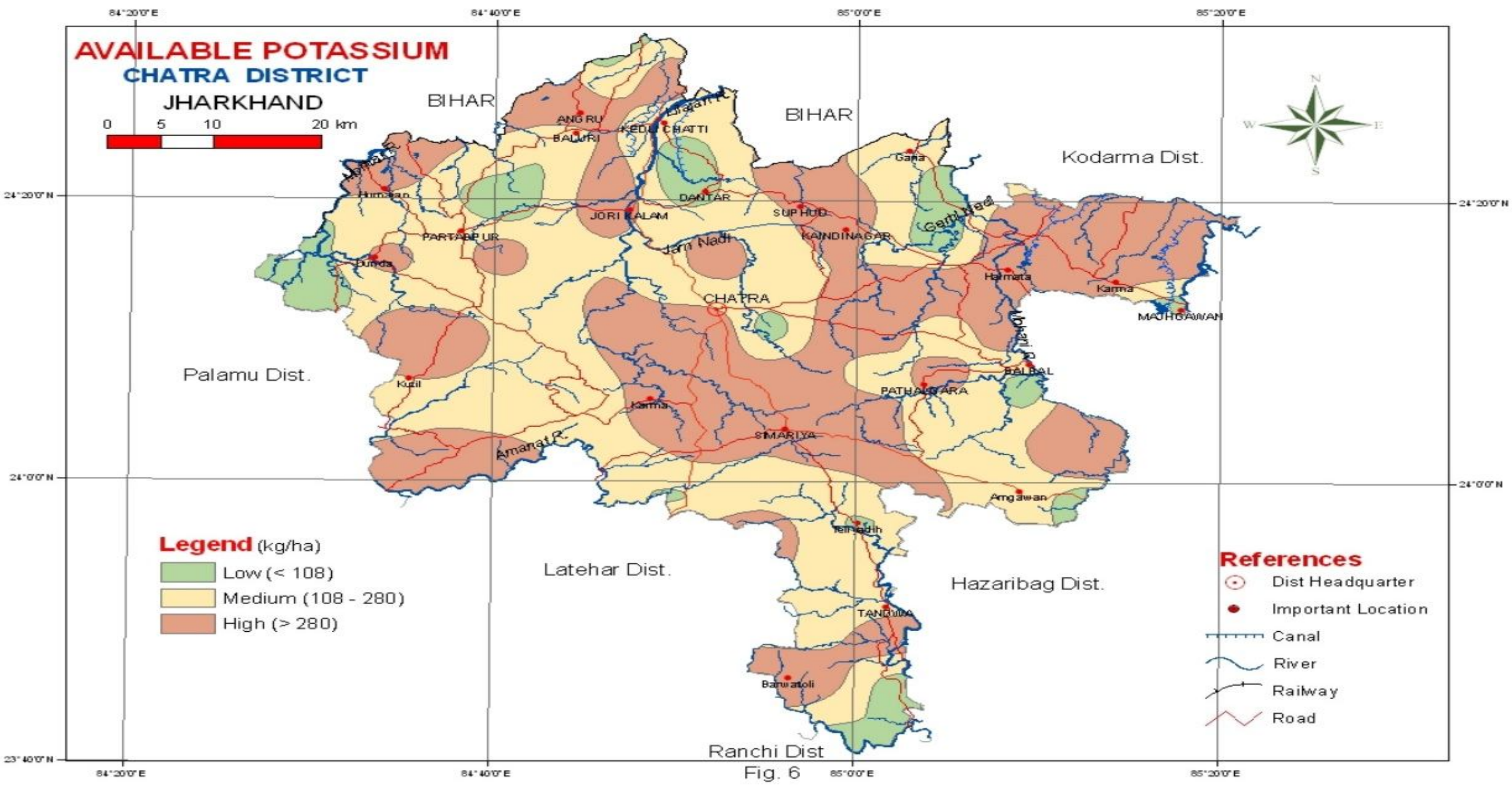
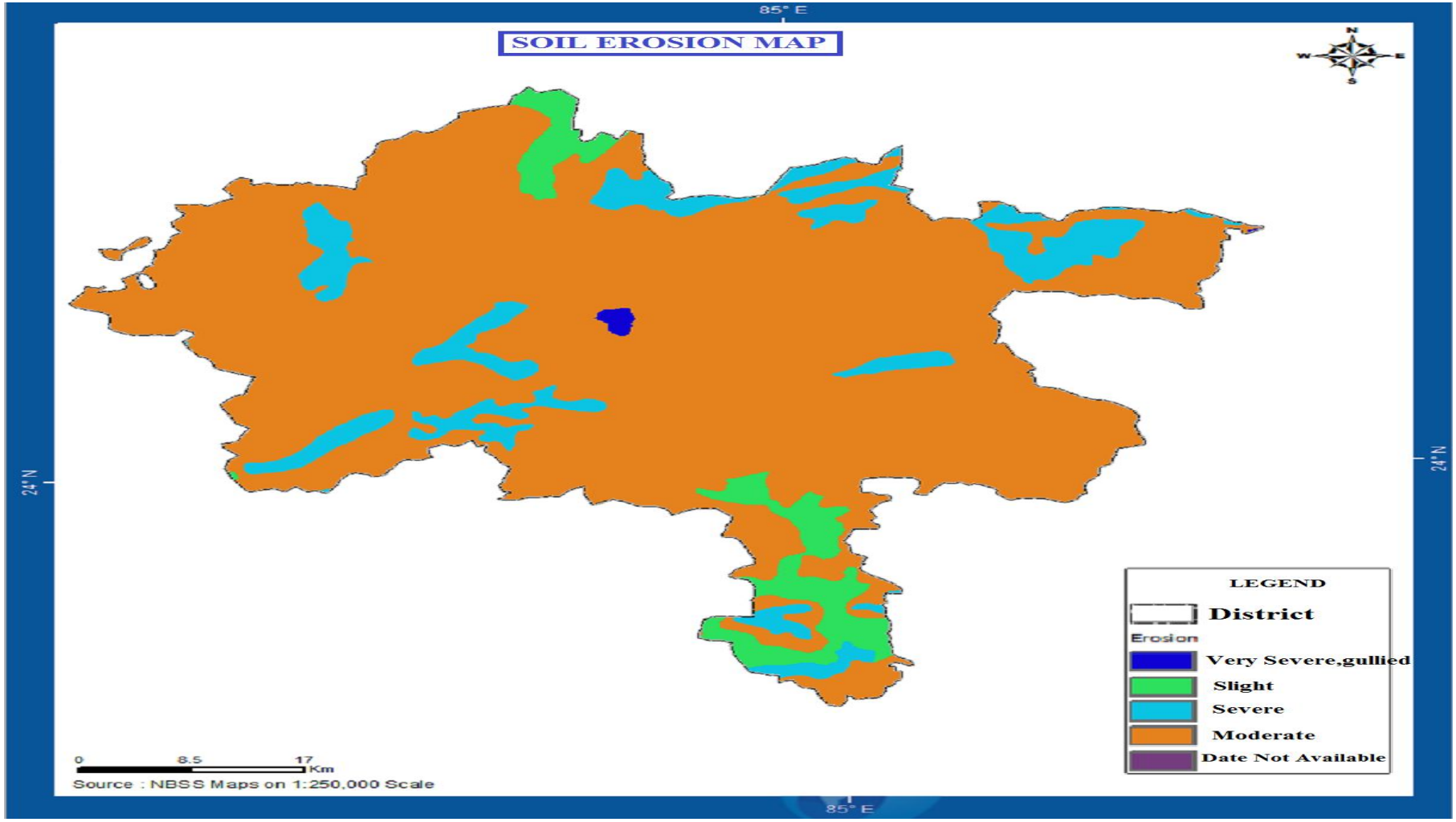

AVAILABLE POTASSIUM
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
SIMARIYA
PATHALGARA
JORI KALAM
PARTABPUR
DANTAR
SUPHUD
KANDINAGAR
MAJHGAWAN
TANDWA
Legend (kg/ha)
Low (< 108)
Medium (108 - 280)
High (> 280)
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 6


85° E
SOIL EROSION MAP
N
W
E
S
24° N
LEGEND
District
Erosion
Very Severe,gullied
Slight
Severe
Moderate
Date Not Available
0
8.5
17
Km
Source : NBSS Maps on 1:250,000 Scale

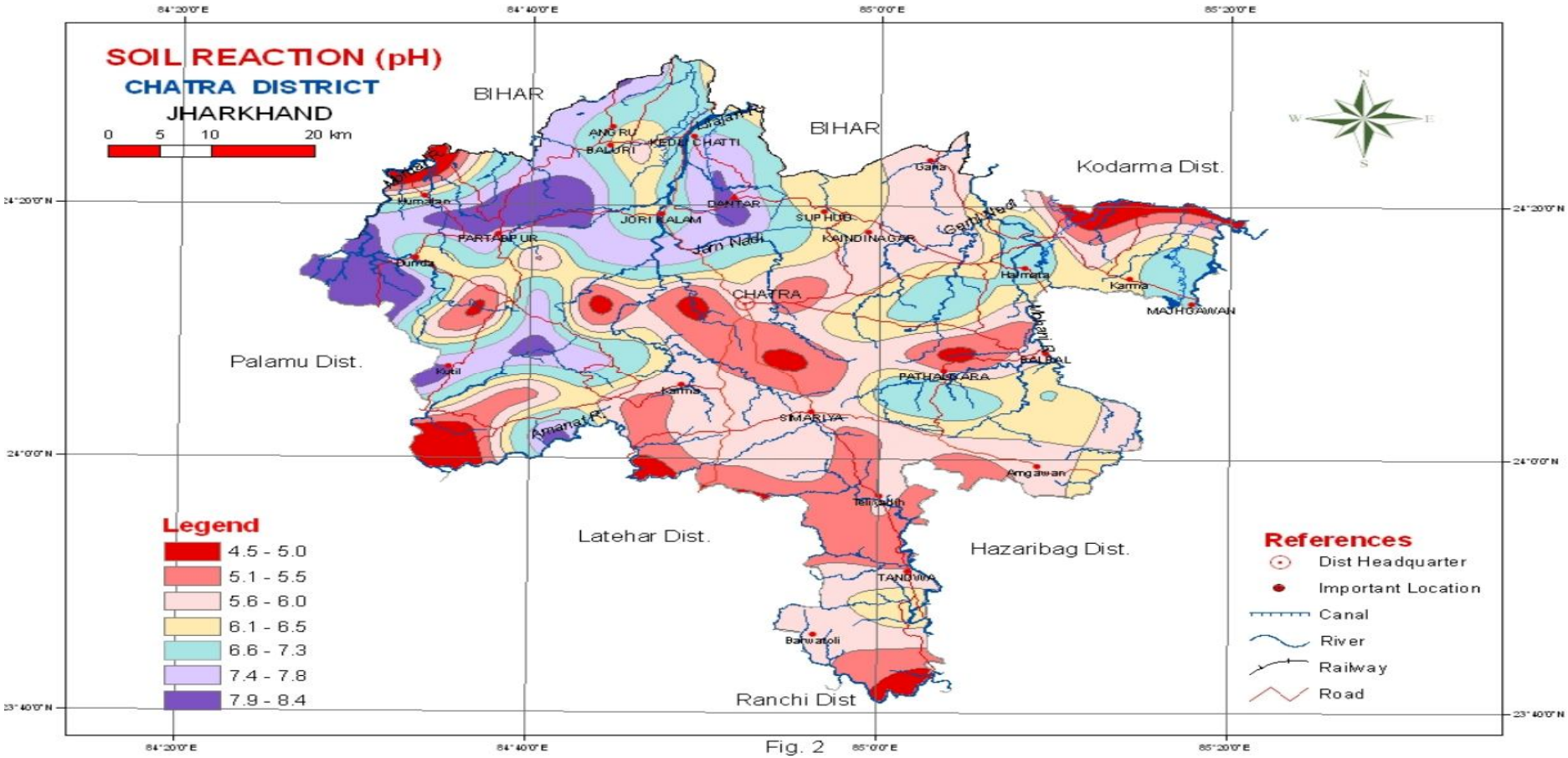

SOIL REACTION (pH)
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Jam Nadi
Legend
4.5 - 5.0
5.1 - 5.5
5.6 - 6.0
6.1 - 6.5
6.6 - 7.3
7.4 - 7.8
7.9 - 8.4
References
Dist Headquarter
Important Location
Canal
River
Railway
Road
84°20'0"E
84°40'0"E
85°0'0"E
85°20'0"E
24°20'0"N
24°0'0"N
23°40'0"N

Fig. 2

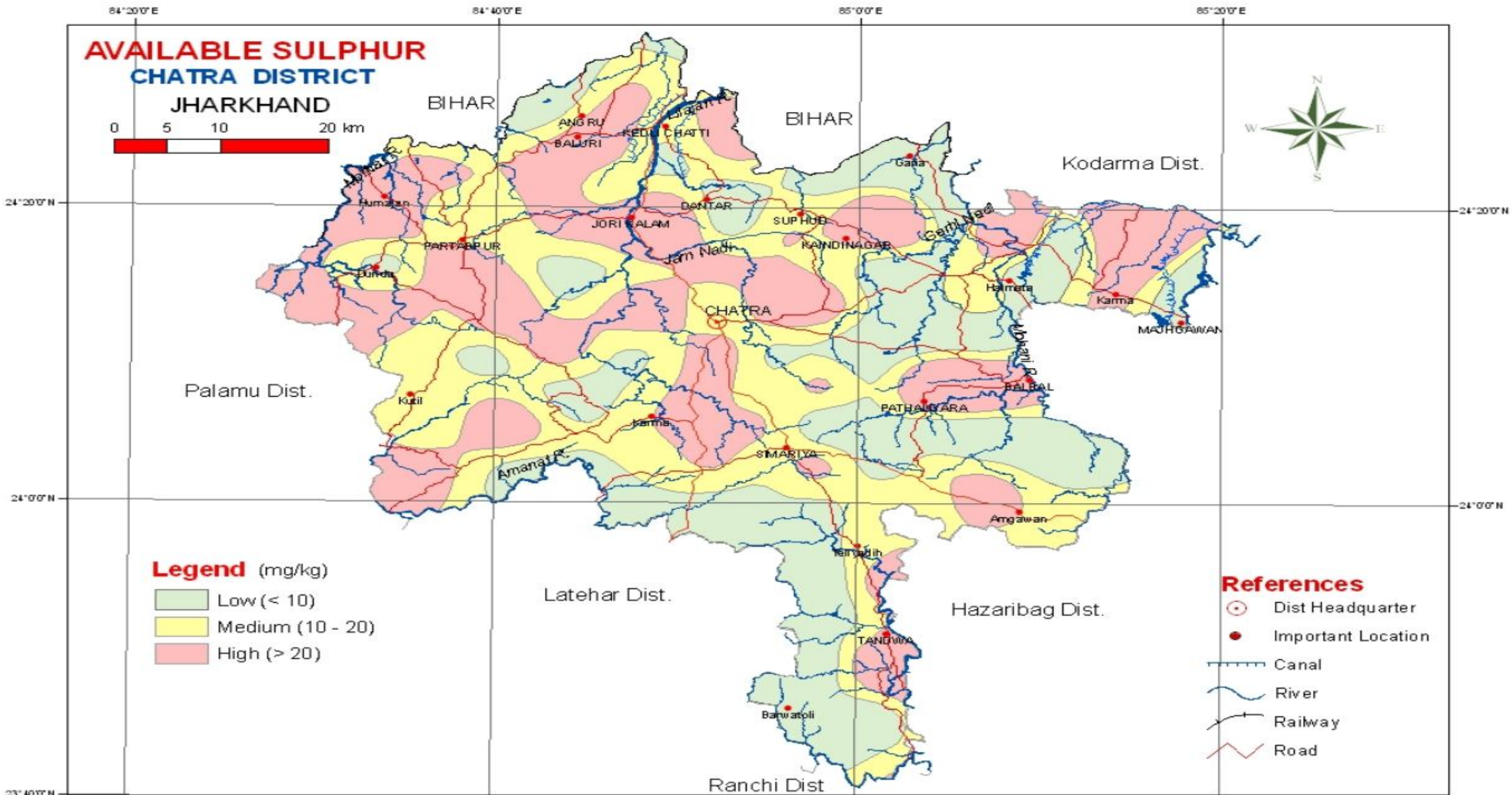
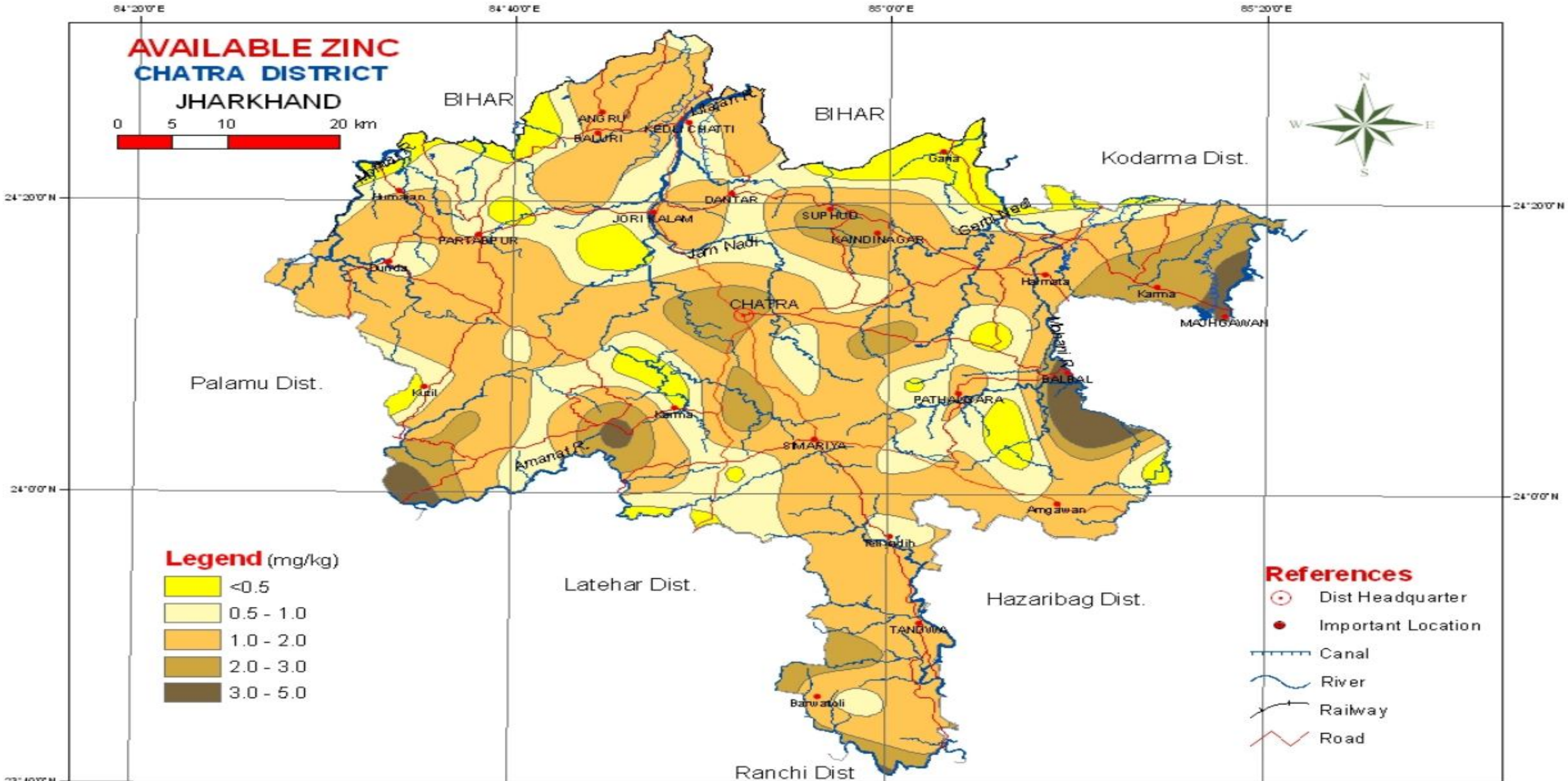

AVAILABLE SULPHUR
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Legend (mg/kg)
Low (< 10)
Medium (10 - 20)
High (> 20)
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 7



AVAILABLE ZINC
CHATRA DISTRICT
JHARKHAND
0 5 10 20 km
BIHAR
BIHAR
Kodarma Dist.
Palamu Dist.
Latehar Dist.
Hazaribag Dist.
Ranchi Dist
CHATRA
Legend (mg/kg)
<0.5
0.5 - 1.0
1.0 - 2.0
2.0 - 3.0
3.0 - 5.0
References
Dist Headquarter
Important Location
Canal
River
Railway
Road

Fig. 10