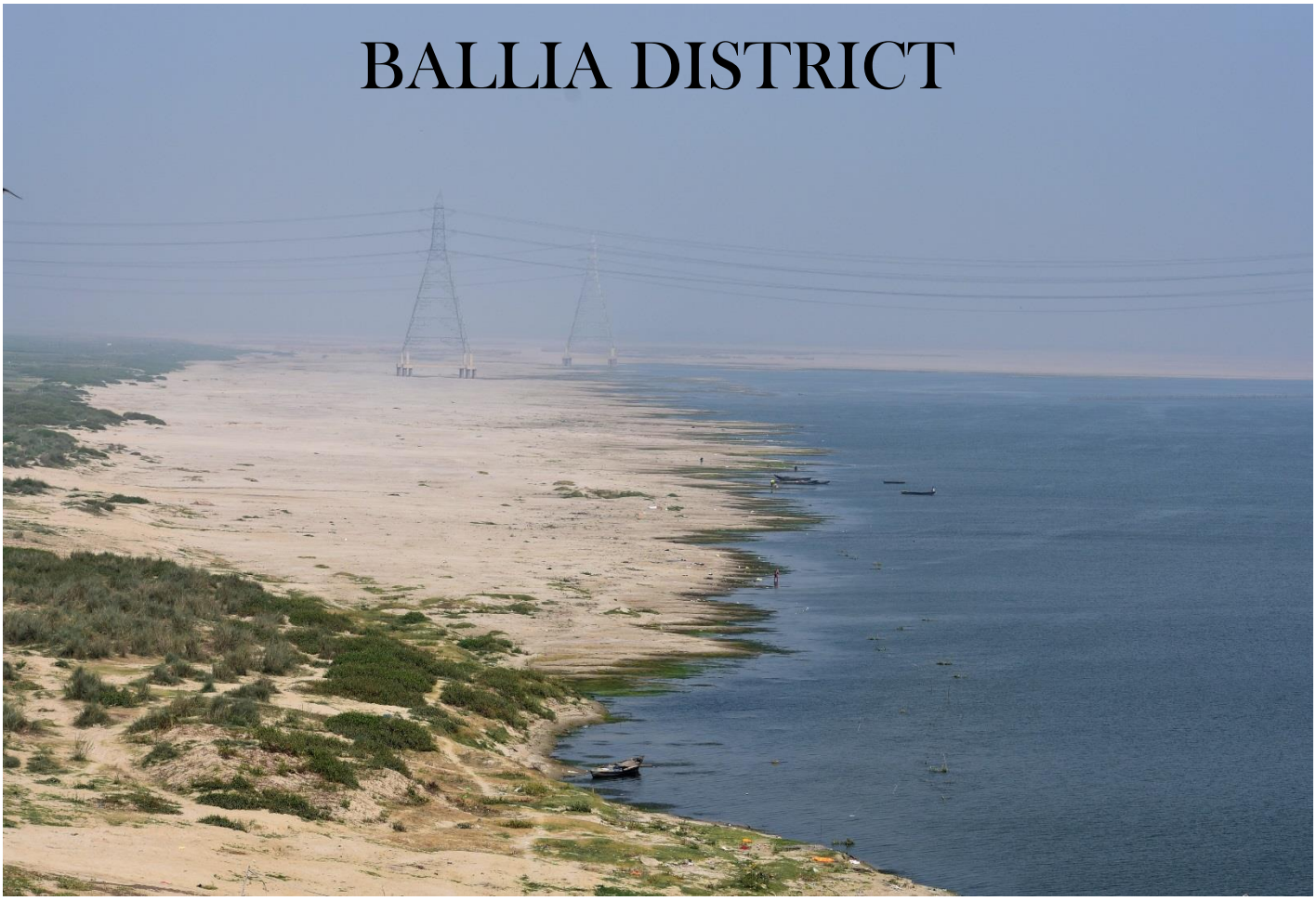
Ganga Cultural Documentation
2020

BALLIA DISTRICT



National Mission for Clean Ganga

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Map Credits: Abhishek Kumar Upadhyay

Front Cover: Ganga River as seen from Ballia-Chhapra bridge

Background: Ganga river as seen near Korantadih

Back cover: Sunset over Ganga river near Kanspur Ganga Ghat

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Sponsored by :

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1.0 Introduction

1.1 Ballia Distt. is an irregularly shaped district situated in the extreme north-eastern part of Uttar Pradesh state. It is surrounded by Mau on the west, Deoria in the north, Bihar in the north eastern part and Ghazipur in the south western part [Refer Map 1]. The Distt. is separated from Bihar state by two major rivers – Ganga and Ghaghra. The Ganga river forms southern boundary of Ballia separating it from Bhojpur and Buxar Distt.s of Bihar whereas the Ghaghra river forms eastern boundary of Ballia separating it from Siwan and Saran Distt.s of Bihar. Encompassing a total area of 2981 sq.km., the Distt. is divided into six tehsils – Ballia (Sadar), Belthra road, Bansdih, Bairia, Rasra and Sikandarpur which are further sub-divided into 17 different blocks. The headquarter of this Distt. lies in Ballia town which is well connected with major cities nearby such as Varanasi, Ghazipur, Patna, Buxar and Chhapra.

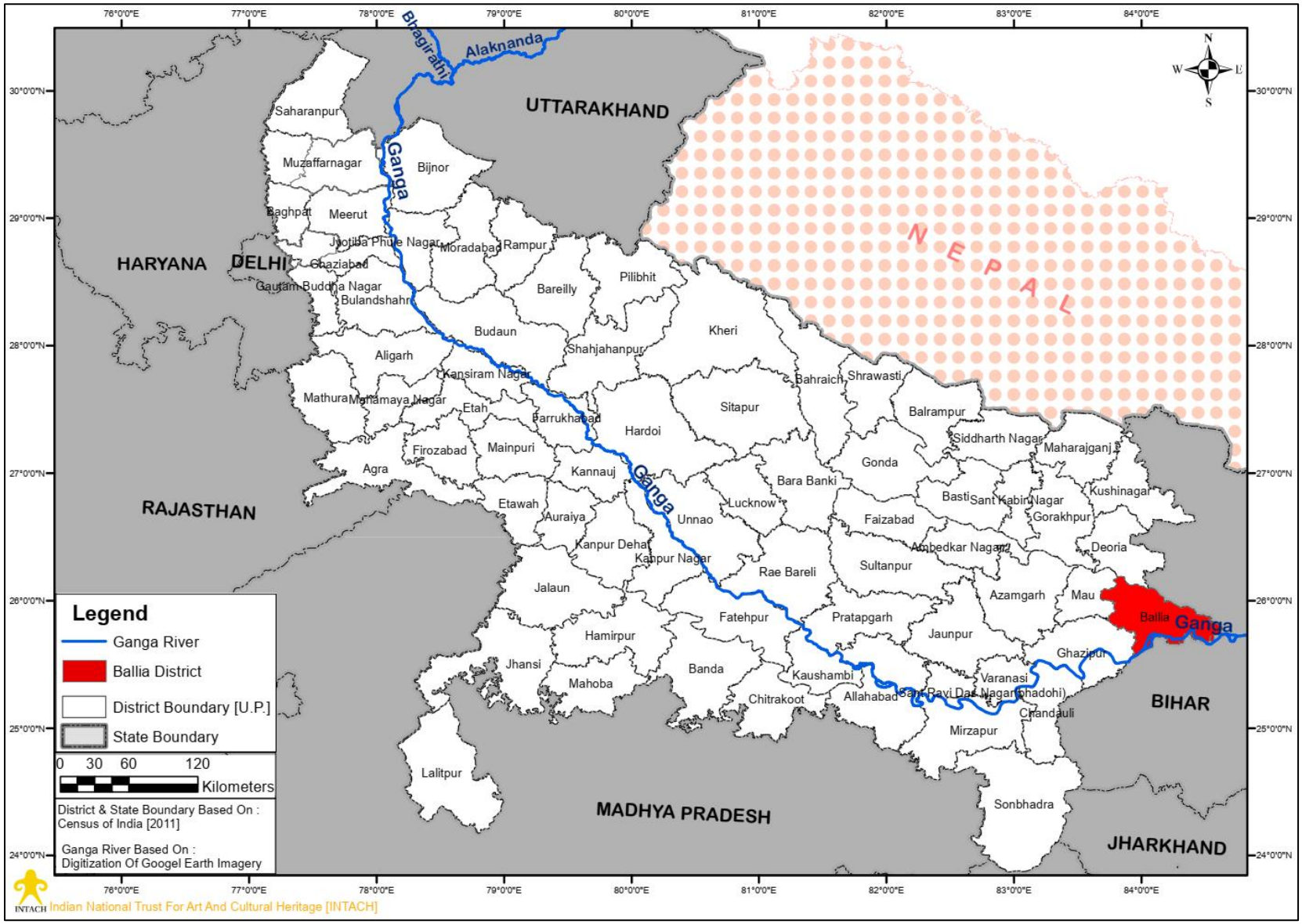
1.2 According to the Ballia district website (https://ballia.nic.in/history/), in ancient times the region covered by the present district of Ballia, lay in the Kingdom of Kosala. In the sixth century B.C. Kosala was known as one of the sixteen Mahajanpadas (great kingdoms). About the middle of the 4th century B.C., the realm of Kosala was brought to an end by Mahapadma Nanda. The Nandas were supplanted by Mauryas under Chandragupta (324-300 B.C.). With the fall of the Mauryas a new dynasty that of the Sungas came to power. The history of the district in the era immediately following the fall of the Sungas is shrouded in obscurity till the advent of the Kushanas. After the dismemberment of the Kushanas Empire, the history of Ballia is mostly enveloped in darkness. The tract occupied by the present district of Ballia finds no mention in the history of mediaeval India written by Muslims historians probably because the surrounding areas of Ghazipur, Jaunpur and Saran (in Bihar) remained in the possession of Hindu rulers. When Akbar came to the throne (in 1556) the east, in which was included the district of Ballia, was conquered in 1559. The records of Akbar's reign in the Ain-i-Akbari furnish a certain amount of information regarding the condition of Ballia in respect of cultivation, revenue and the principal land holders in each pargana.

1.3 In May, 1857 with the news of the outbreak of the freedom struggle, Ballia rapidly fell into a disorganised state and general anarchy, which prevailed there for a time. People of the district fought with the British forces under Kunwar Singh (the famous freedom fighter of Bihar). n 1921, Mahatma Gandhi launched his famous non-

cooperation movement which received enthusiastic response from all sections of the people in the district. Jawahar Lal Nehru visited Ballia in 1922 and again in 1923. Mahatma Gandhi visited Ballia in 1925. The civil disobedience movement was launched in 1930 and Ballia played an important role in the movement. During the quit India movement of August 1942, on August 16, the Rasra treasury was attacked and two days later the police station of Bairia was reattacked. On August 20, 1942, 'Independence' was declared for Ballia and a popular government was formed with Chittu Pandey as its first head. Eminent Personalities of Ballia are Chittu Panday, Mangal Pandey Acharya Parushram Chaturvedi, Acharya Hazari Prasad Dwivedi, Jay Prakash Narayan & Chandra Shekhar (Ex. Prime Minister).

1.4 The climate of Ballia Distt. is moist and relaxing except in the summer and cold seasons. The year may be divided into four seasons; the cold which start from half of November to February; the hot from March to middle of June; the south west monsoon from middle of June to the end of September and lastly the post monsoon or transitional season between October and half of November. About 88 percent of the annual rainfall is received during the south west monsoon months. The Distt. forms a part of Middle Ganga Plain – East with very little variation in height. On the basis of geology, soils, climate, topography and natural vegetation, the Distt. is divided into three regions – Ghaghra Khadar, Ballia plain and Ganga Khadar (Census of India, 2011).

Ballia is supposed to have derived its name by the eruption of the name Valmiki, that of the great sage who is said to have had his hermitage or to have dwelt here for some time. It is also associated with Bhrigu, another renowned sage who, according to a local legend, came and dwelt here because of the sacredness of the place Other rishis Like Garga Parasar, Vashishta and Atri are traditionally believed to have visited the neighborhood of Ballia attesting to the sacredness of its environs extending to a circuit of about 16 km. Some other places of this district are also associated the Vedic sages: Bhalsand (in tahsil Ballia) is said to have derived its name from Bhardwaja who resided there for some time and Dhuband (also in tahsil Ballia) to be a corruption of Durvasa-ashrama, signifying the abode of Durvasa, a celebrated rishi.



Map 1 : Location Of Ballia Distt.

2.0 Ganga River In Ballia Distt.

2.1 Ganga river enters Ballia Distt. near Narainpur which is at a short distance before Korantadih Dak Bungalow built by the Britishers. Here, the river banks of both Ballia and opposite Buxar Distt. are situated at a height comprising of permanent *Kanker* formation. The river flows here as a single uninterrupted channel [Image 1] crossing through alluvial lands at a little distance ahead which are constantly being cut away and altered. Shortly after crossing the Ballia-Buxar bridge, Ganga river makes a bend towards Ballia town during which it is bifurcated by the presence of a group of irregularly shaped riverine islands (*diaras*). The part of river touching Ballia Distt. along these *diaras* usually starts drying from the post monsoon season up to the summers. To the east of Ballia town, the river makes a large loop southward encompassing few *diaras*. Further eastwards, the river makes another extensive bend with reverse action causing bank erosion in one direction slowly at first and then with great force.

2.2 Upon moving eastward, the river touches Sitab diara region [Image 2] soon after which it is joined by Ghaghra river. While Sitab diara lies in Ballia Distt., the confluence point of these two rivers situated adjacent to it falls under Saran Distt. of Bihar. According to the Ballia Distt. Gazetteer (Neville, 1907), the confluence of Ghaghra and Ganga rivers was not at this point in the earlier days. The Ghaghra river has a much higher velocity than Ganga river and brings far more coarse sand. When the two rivers combine, the joint stream flows with a slower current and is unable to carry off the heavy deposit, thereby accumulating at the junction forcing these two rivers to be apart. In the early 1800s, the traditional point of union for these two rivers is believed to be at Suraha Taal. However, it went on shifting south-east and eastward in the next two centuries bringing the confluence to where it lies currently.

2.3 According to Desai et al. (2011), Ganga river shows a braided pattern at different places near Ballia and west of Ballia which indicates that the river channel is incapable of carrying any further sediment load. The study also highlighted that a sharp meander observed in Ganga river course near Rudrapur in Ballia Distt. suggests that the river may be controlled by some basement structure like fault or fracture in that region. Furthermore, the river channel in the Distt. has also been shifting at various places which is mainly due to erosional and depositional processes of the river.

Image 1 : Ganga River As Seen Near Ujjiar Ghat On 15th February, 2021

Image 2 : Ganga River As Seen Near Sitab Diara on 16th February, 2021

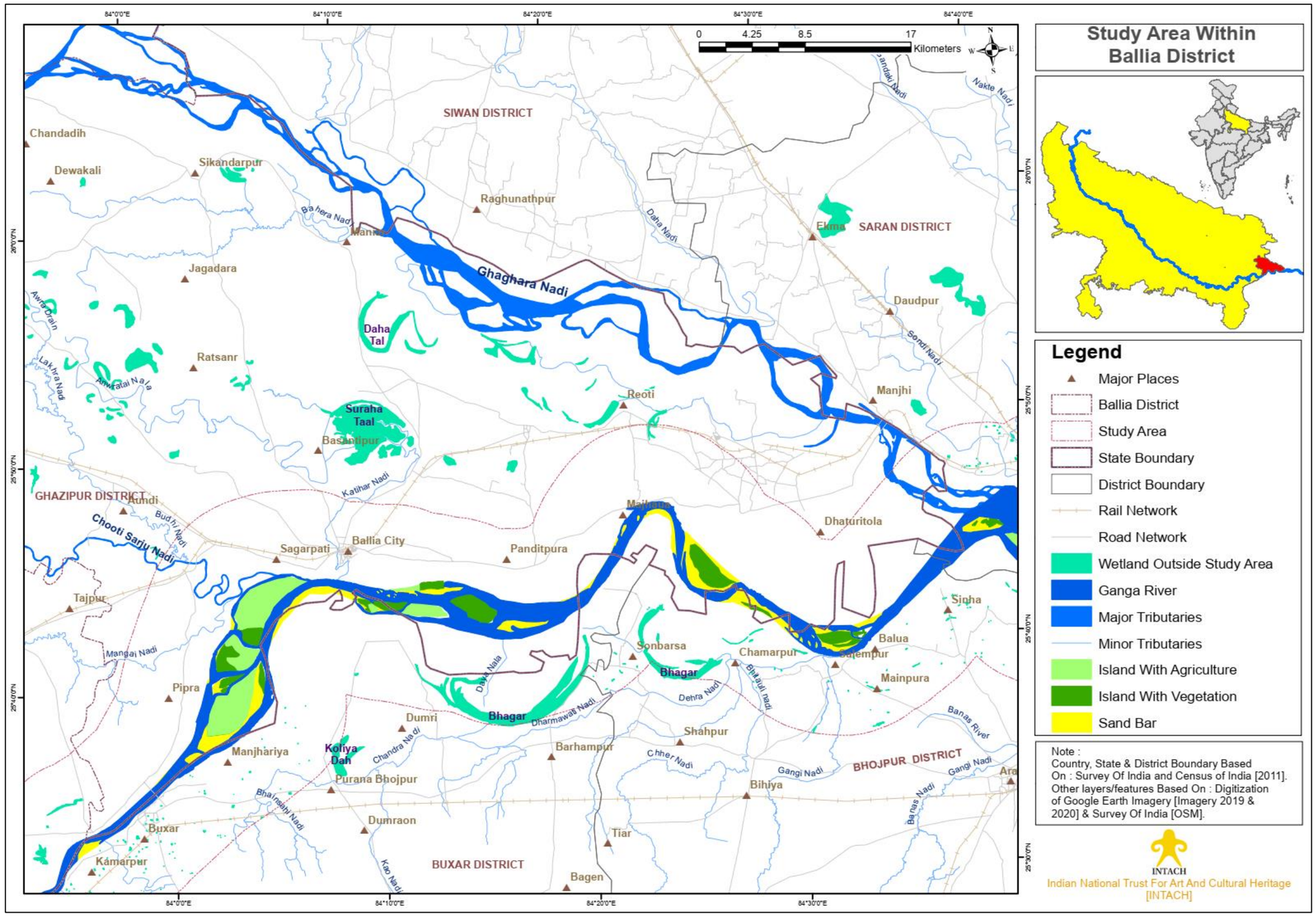
3.0 Methodology

3.1 Ganga River flows in Ballia Distt. for about 95 kms adjoining it mostly on the left bank. Hence, for carrying out the ground survey a 7 km of buffer zone on the left bank of Ganga River was selected [Refer Map 2]. Based on the secondary information analyzed and the features noted on Google Earth imagery, plan for the fieldwork was constituted to cover different elements of natural heritage in these grids. Special focus was laid on denoting the sites important for riparian biodiversity, riverine fishing, boat making communities, river and stream confluences, important water bodies and oxbow lakes. Furthermore, contacts were developed with various stakeholders including riparian & *Diara* communities in the Distt. for carrying out relevant interactions.

3.2 The field survey in Ballia Distt. was undertaken from 09-19 February, 2021. The documentation and necessary permissions for the survey were taken from DM Office in Ballia town. During the survey, areas such as Narainpur, Korantadih, Ujjiar Ghat, Maldepur, Paliya Khas, Sujanpur, Majhoua, Panchrukhiya Ghat, Daya Chhapra, Raghunathpur and Sitab Diara were visited where good quality pictures related to the study were collected using Nikon D3400 DSLR camera. The GPS locations were also collected using Garmin hand-held GPS and videography at the study sites was done using Sony Handycam. The plants observed in the survey were identified based on available handbooks and online databases while the birds observed in the survey were identified using Grimmett et al. (2011). The information on current status of Ganga river and changes from the past was obtained from detailed interactions with different stakeholders such as agriculture and cattle farmers, temple priests, village heads, fishermen and boatmen in the study region [Images 3-4].

Image 3 : Interaction With Local Residents Of Raghunathpur In Ballia Distt.

Image 4 : Interactions With Local People And Field Photography Near Maldepur In Ballia Distt.



Map 2 : Study Area In Ballia Distt.

4.0 Tributaries Of Ganga River

4.1 **Ghaghra River:** Ghaghra river (also known as 'Karnali' in Nepali) is a perennial, trans-boundary river originating in the Tibetan plateau near Lake Mansarovar. Rising from an altitude of 3962 m, the Karnali river cuts through the Himalayas in Nepal on its way to the convergence with the Sarda River at Brahmaghat in India from where it flows as Ghaghra river. It is the largest tributary of Ganga river by volume and the second longest tributary of Ganga river by length after Yamuna. After entering India, the river flows southeast through the states of Uttar Pradesh and Bihar to confluence with Ganga river between Chhapra in Saran district and Sitab Diara in Ballia Distt. [Refer Map 3]. It travels a total distance of 1080 km throughout and carries more water than Ganga river before its convergence near Chhapra. Through its flow in Ballia Distt., it acts as a separating border between Ballia in UP with Siwan and Saran Distt.s in Bihar state. While the flow of Ghaghra river was found to have decreased during the survey [Image 5], it is known from interactions that the river swells up during monsoon often leading to flooding of nearby villages. The lateral erosion of river bank along Ghaghra was also observed during the survey [Image 6]. According to a study (Singh & Awasthi, 2011), the main reasons for lateral erosion along Ghaghra river are the sandy facies, low degree of compaction, scouring, fractures, palaeocurrent and mass movement.

Image 5 : Ghaghra River As Seen Near Sitab Diara In Ballia Distt. on 16th February, 2021

Image 6 : Lateral Bank Erosion Along Ghaghra River As Observed On 16th February, 2021

4.2 During the survey along Gandak river in the study region, Sitab diara was observed to be an important place both from historic and mythology point of view. This diara is a cluster of 27 riverine hamlets which are located in the confluence region of Ghaghra and Ganga rivers. While 19 of the 27 hamlets fall under Ballia Distt. of Uttar Pradesh, the rest 8 fall under Saran Distt. of Bihar (Tripathi, 2019). This place is the birth town of Jai Prakash Narayan (also popularly referred as 'JP' or 'Lok Nayak') who is credited for his role in the Quit India Movement against British rule and for leading the JP Movement against the then Prime Minister of India – Indira Gandhi. The area where his house is located in this village has been now developed as a tourist center also housing a museum depicting the life events and achievements of this leader [Images 7-8]. Upon interaction, local residents here recalled the social work done by JP for the poor and his contributions in development of this village. Along with this historic importance, the respondents of this diara also reiterated that this confluence region is considered to be a sacred site owing to a third river – Sone which joins Ganga at a short distance just after crossing Chhapra city. During festivities and other religious occasions, people from both UP and Bihar states visit this Sangam site for offering their prayers and taking holy bath.

Image 7 : The House Of Jai Prakash Narayan In Sitab Diara, Ballia Distt.

Image 8 : The Museum Housing Life Events And Achievements Of Jai Prakash Narayan In Sitab Diara, Ballia Distt.

4.3 **Tamsa river:** It is a tributary of Ganga river flowing through several districts of Uttar Pradesh namely – Ayodhya, Ambedkar Nagar, Azamgarh, Mau and Ballia. Originating in the Ayodhya Distt., this river has immense cultural significance as it is believed that Lord Ram spent the first night on its banks after his exile from Ayodhya. Flowing between Ghaghra and Gomti rivers, it traverses a distance of approximately 577 kms before confluencing with Ganga river near Salahabad village of Ballia Distt. (UPPCB, 2019). During the survey in Thamanpura and Gangahara villages situated around Tamsa river, it was observed that agriculture was being practiced extensively using the water from this river for irrigation. Some residents had even grown mustard crops until the current active flow of this river [Image 9]. The respondents reiterated that this river swells up with water during monsoons only and it goes on reducing till summer season. Some local residents also informed about fishing activities in this river with the major fish caught being Rohu and Tengara. The fish catch obtained was less and usually sold in the nearby villages for local consumption. Owing to its cultural significance, a site has been designated in Maldepur at a little distance ahead of Tamsa-Ganga confluence where numerous visitors come for bathing on auspicious occasions and festivities [Image 10].

Image 9 : Tamsa River Surrounded By Agriculture Fields As Observed Near Gangahara Village In Ballia Distt. On 14th February, 2021

Image 10 : Site Designated In Maldepur Near Tamsa-Ganga Confluence For Bathing And Worshipping

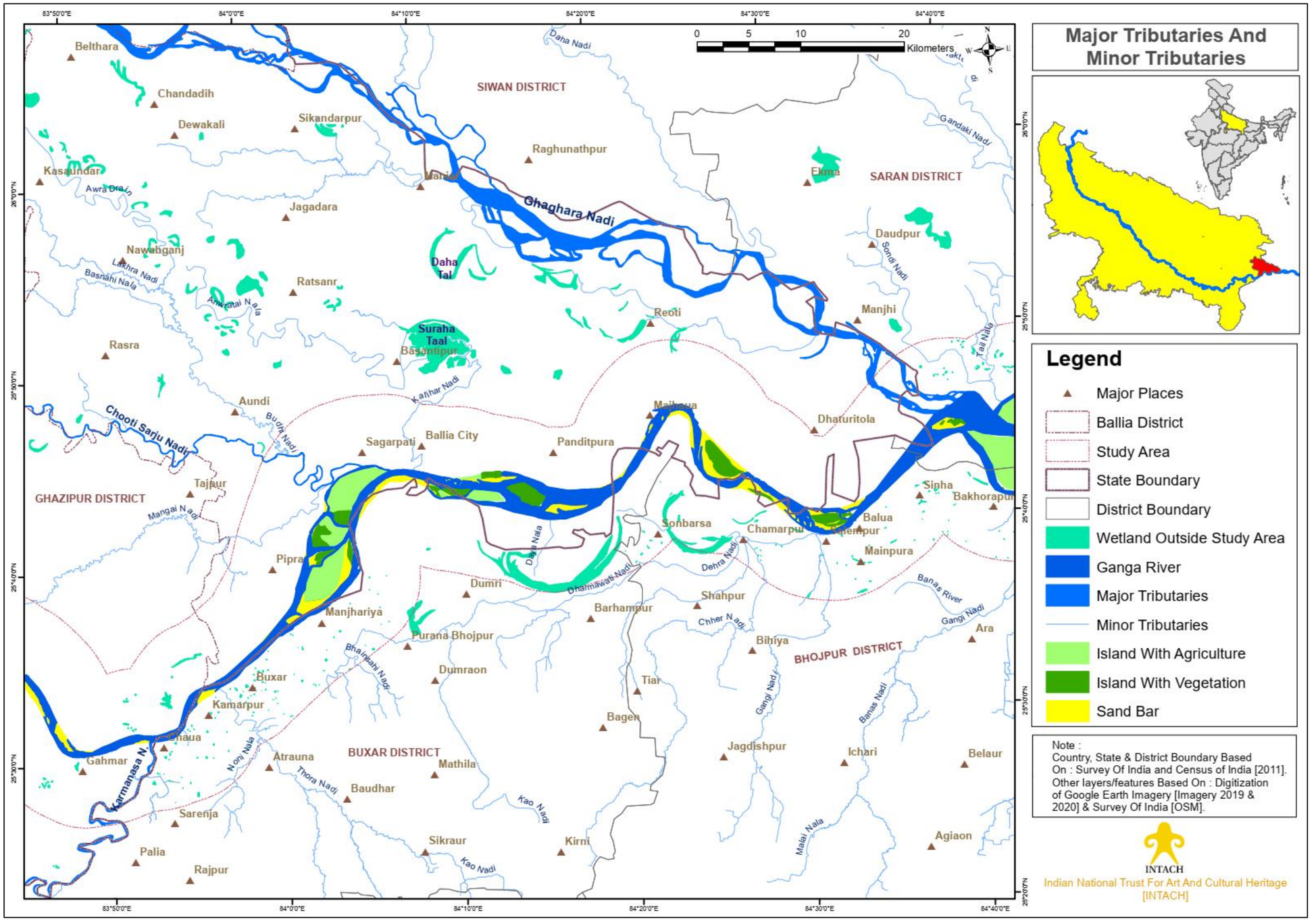
4.4 **Magai river:** The Magai (also known as 'Mangai') river is a large stream of remarkable length originating in the Sultanpur Distt. of Uttar Pradesh. It passes through parts of Sultanpur, Mau, Azamgarh and Ghazipur Distt.s before entering Ballia Distt. near Kathariya. It then flows in the southeasterly direction in the Distt. and confluences with Tamsa river near Bhikaripur village just before Tamsa-Ganga confluence. Upon interaction it was found that this stream swells up during monsoons while shrinks to a breadth of almost 20 feet or less during post monsoon and summer seasons [Image 11]. The water from this stream is used for irrigation of fields in the nearby villages. Near Bairiya village of Ballia Distt., fishing was also observed in this stream using fine-sized plastic nets [Image 12].

Image 11 : Magai River As Observed Near Bairiya Village In Ballia Distt. On 15th February 2021

Image 12 : Fine-Sized Plastic Nets Used For Fishing In Magai River Near Bairiya Village

4.5 **Katahal Nala:** While mentioning the tributaries of Ganga river in Ballia Distt., a special mention is to be made of Katahal Nala. Upon detailed interaction with Dr. Ganesh Pathak, it was recorded that this nala was erstwhile known as 'Kashthar Nala' (meaning remover of troubles). It serves as an important connecting link between Suraha Tal and Ganga river in Ballia. When the river swells up during monsoons, it carries excess water into the Tal and vice-versa it also carries overflow of Tal into the river. Hence, the native residents used to refer this as 'Kashthar Nala' which subsequently was recorded in the Gazetteer as 'Katehar Nala' and is now currently known as 'Katahal Nala'. It swells up only during the monsoon season while during rest of the year it dries up mostly. Once it crosses Ballia town, all the sewage water is dumped into this Nala along with a heap of solid waste [Image 13] which subsequently enters Ganga river leading to water pollution.

Image 13 : Katahal Nala As Seen Near Ballia Town On 14th February, 2021



Map 3 : Major And Minor Tributaries Of Ganga River In The Study Region

5.0 Land Use/Land Cover

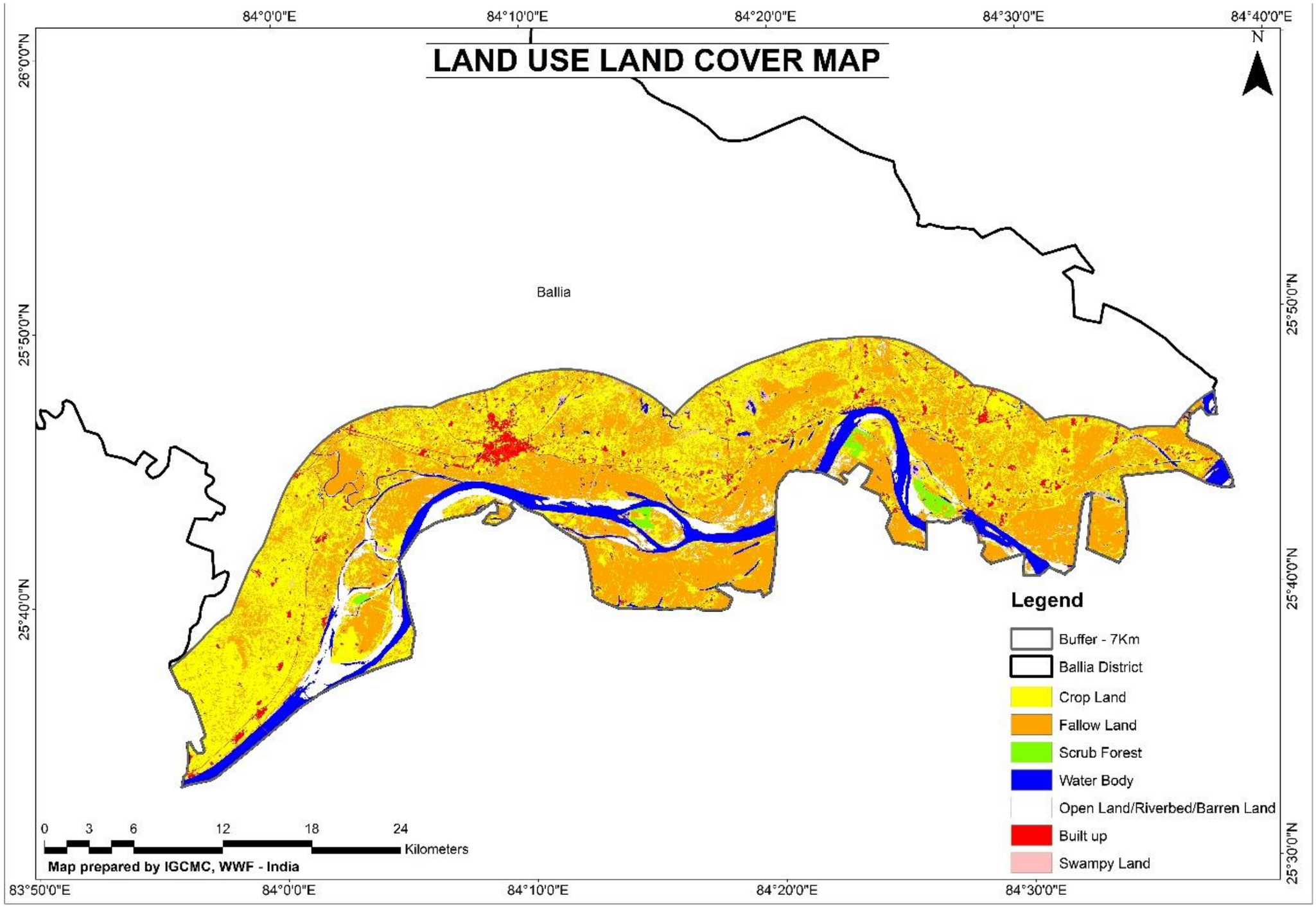
5.1 Land Use Land Cover [LULC] map of the study area has been prepared from Landsat imagery for the year 2020 [Table 1]. Using supervised classification system, 7 different classes were generated – crop land, fallow land, scrub forest, waterbody, open land/riverbed/barren land, built-up and swampy land area [Map 4]. Since agriculture is the primary occupation in the Distt., cropland area dominates other classes.

5.2 Major insights are the following :

i. Cropland is the dominant land use with around 38% of the total area [294 Sq. Km]
ii. Together with fallow land, total area under agriculture is around 82% [636 Sq. km]
iii. Dense forest is nil while scrub forest is only 1.6% [i.e. 8.18 Sq.km]
iv. Waterbody which also includes river area is around 7.9% [i.e. 62 Sq. Km]
v. Open/Barren/Riverbed occupies around 5% [38 Sq. km] while built up includes only 2.8 % [22.17 Sq. km]
vi. Swampy land occupies only 1.09% [8.42 Sq.km] which includes depressions and some wetland area.

Table 1 : Land Use/Land Cover Of Study Area In Ballia Distt. (2020)

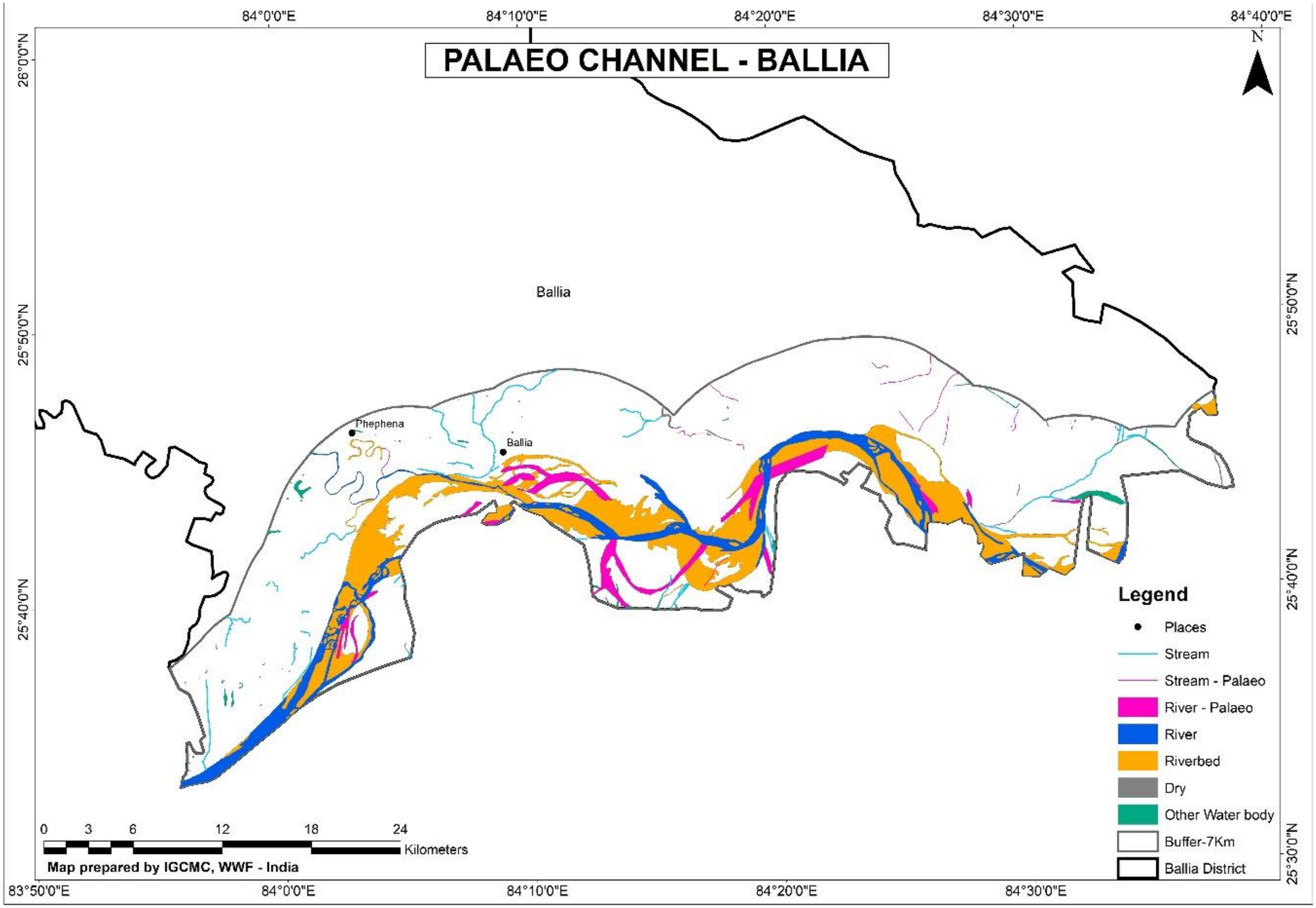
CLASSES	AREA (Ha)	AREA (Sq. Km)	AREA (%)
Crop Land	29373.80	293.74	37.90
Fallow Land	34255.50	342.56	44.19
Scrub Forest	818.41	8.18	1.06
Water Body	6172.06	61.72	7.96
Open Land/Riverbed/Barren Land	3831.58	38.32	4.94
Built up	2217.47	22.17	2.86
Swampy Land	842.36	8.42	1.09
Total	**77511.18**	**775.11**	**100**



Map 4 : Land Use/Land Cover Map Of Study Region In Ballia Distt.

6.0 Palaeochannels Of Ganga River In Ballia Distt.

6.1 Palaeo-channels are the remnants or old channels of once active rivers or streams, some of which are lie buried under the cover of younger sediments. They are formed when the rivers or streams migrate their courses and form new ones. Paleochannels are important to understand area geology, old river routes, sediment deposition and are considered suitable areas for ground water recharge. Factors such as change in land use pattern, sand mining, agricultural practices, and industrial activities lead to disappearance of such channels along rivers. Generally, such old channels do not carry water during most of the year but may flow during flood events. Such abandoned and silted palaeochannels can be mapped using old maps and remote sensing techniques. Based on the available satellite data and remote sensing technique, Map 5 was prepared, which depicts the various palaeochannels in the study area of Ballia Distt. [See the pink polygons]. During the survey many smaller waterbodies and oxbow lakes were found which were once part of the river.



Map 5 : Palaeochannels In The Study Region

7.0 Floodplain Of Ganga River In Ballia Distt.

7.1 The active flood plain of a river is defined as an area on either side of the river channel with regular flooding on a periodic basis. Maintaining active flood plain of a river is critical for assuring equilibrium in ecosystem. The floodplains harbour rich biodiversity including riparian vegetation as well as many other groups of organisms which help in maintaining fertility of this region. Along with this, the floodplains have been of great cultural and economic importance with many early civilizations having risen in these fertile lands. As the rivers naturally meander through the landscape over a period of time, they deposit sand, silt and other soil forming materials in the floodplain region which make them ideal for agricultural production. Throughout history, people have learned to cultivate in the fertile floodplains and use their rich resources for sustaining livelihoods. Even today, in most of the riverine regions especially in India, the floodplains have been occupied by local farmers for carrying out their agricultural activities especially in the non-monsoon season. Ganga River floodplain is one such important floodplain in India which has been extensively utilized in almost all the districts, where it passes through, for agricultural purposes. Image 14 shows the active floodplain region of Ganga river in Ballia Distt.

Image 14 : Active Floodplain Of Ganga River With Agricutlure As Seen From Beyasi-Ballia Bridge

7.2 Ballia Distt. falls under the Eastern Plain Zone and Vindhyan Zone according to NARP (National Agricultural Research Project) with the major soils being clay loam, loam and sandy loam soils. Agriculture the chief source of income for majority of the residents of this Distt. and it is benefitted by the fertile alluvium brought by Ganga river and its tributaries. Vast floodplain lands of Ganga river were observed during the survey to be under intensive cultivation throughout the Distt. While wheat is the main Rabi crop, rice is the main Kharif crop grown almost throughout the Distt. Other major crops in the floodplain region were mustard, chana, masur and arhar. Along with this, the fertile floodplains were also utilized for cultivation of vegetables such as potato, tomato, onion, mutter, cauliflower and parwal. The extent of agriculture in floodplain region was such that in many places the crop cultivation could be observed up to the edge of the active flow channel of Ganga river indicating that the villagers expanded their fields till the current river channel. The details of some villages surveyed along with their floodplain agriculture produce is provided in Table 2 while some crops grown in the Distt. are depicted in Images 15-17.

Image 15 : Mustard Cultivation In Narhi Village

Image 16 : Mutter (Green Pea) Cultivation near Raghunathpur Village

Image 17 : Wheat cultivation in Daya Chhapra village

Table 2 : Some Floodplain Villages Along With Their Agricultural Produce In Ballia Distt.

Sr. No.	Village Name	Agricultural Produce
1.	Gangahara	Mustard, Wheat, Mutter, Chana, Arhar
2.	Thamanpura	Mustard, Mutter, Parwal, Lauki
3.	Trilokpur Mathia	Wheat, Mustard, Potato, Onion
4.	Maldepur	Chana, Mutter, Wheat, Lauki, Tomato, Karela
5.	Belhari	Wheat, Mustard, Chana, Masur, Parwal
6.	Daya Chhapra	Wheat, Mustard, Onion, Garlic, Mutter, Masur
7.	Raghunathpur	Wheat, Mustard, Corn, Mutter, Chana
8.	Ichhchaube Ka Purawa	Wheat, Mustard, Parwal, Mutter, Potato
9.	Sitab diara	Mustard, Wheat, Chana, Parwal, Potato, Arhar

7.4 **Floodplain Grasses :** The grass species – *Saccharum spontaneum* L. (commonly known as '*Kaans*' in the district) was the most widespread grass in the floodplain region of Ballia distt [Image 18]. This species is a tall and perennial grass growing naturally in the alluvial plains, swamps and riparian areas of north India. Owing to the deep roots and rhizomes, this grass successfully colonizes the floodplains and grows rapidly spreading in huge areas with its height reaching 3-4 m in some places. *Kaans* was found growing in different habitats throughout the Distt. with its most abundance in the Ganga river floodplain region [Image 19] and the *diaras*. Upon interaction, the respondents revealed that they use the dried Saccharum grass for thatching the roofs of their houses and for making temporary huts in the fields for resting [Image 20].

Image 18 : *Saccharum spontaneum* (Kaans grass)

Image 19 : Luxuriant Growth Of Kaans Grass In Ganga River Floodplain As Seen From Beyasi-Ballia Bridge

Image 20 : A Hut Made Using Dried Kaans Grass Near Maldepur

8.0 Wetlands In Ballia Distt.

8.1 Wetlands are one of the most productive and unique ecosystems. They help in maintaining the food web and provide habitat for the aquatic biodiversity. They also help in controlling floods, recharging groundwater, nutrient recycling, climate stabilization and carbon sequestration. In this study a total of 98 different wetlands are identified in the study region with the help of Google imagery and satellite data out of which some selected wetlands are discussed in this section. The list of identified wetlands is presented in Table 3. And their spatial distribution is depicted in Map 6.

Table 3 : List Of Wetlands In The Study Region

Sr. No.	Wetland	Coordinates		Area [In Hectares]
		Latitude	Longitude	
01	01	25°38'31.65"N	83°56'38.11"E	0.23
02	02	25°38'50.78"N	83°57'1.86"E	0.33
03	03	25°43'47.03"N	84° 0'6.38"E	0.45
04	04	25°43'40.49"N	84° 0'5.03"E	0.10
05	05	25°44'3.39"N	84° 0'49.08"E	48.5
06	06	25°44'34.75"N	84° 0'40.70"E	0.62
07	07	25°44'41.34"N	84° 0'37.85"E	0.66
08	08	25°44'49.60"N	84° 0'57.83"E	3.76
09	09	25°44'48.53"N	84° 0'40.63"E	0.89
10	10	25°44'39.93"N	84° 1'0.95"E	1.54
11	11	25°44'40.32"N	84° 0'54.16"E	0.29
12	12	25°44'57.10"N	84° 0'56.17"E	0.74
13	13	25°45'10.38"N	84° 1'37.67"E	1.18
14	14	25°45'30.25"N	84° 1'54.20"E	1.79
15	15	25°45'42.46"N	84° 2'55.40"E	5.34
16	16	25°46'11.87"N	84° 2'25.25"E	2.95
17	17	25°46'22.52"N	84° 2'45.20"E	1.15
18	18	25°46'8.39"N	84° 2'55.31"E	0.35
19	19	25°45'50.51"N	84° 3'39.82"E	2.36

20	20	25°46'15.39"N	84° 3'3.87"E	2.86
21	21	25°45'59.95"N	84° 3'45.08"E	O.86
22	22	25°46'3.61"N	84° 3'54.80"E	0.60
23	23	25°45'54.81"N	84° 4'9.78"E	0.38
24	24	25°45'49.39"N	84° 4'25.15"E	0.85
25	25	25°45'50.31"N	84° 4'50.53"E	0.85
26	26	25°45'51.97"N	84° 4'45.71"E	0.57
27	27	25°46'20.85"N	84° 3'14.94"E	0.28
28	28	25°46'4.75"N	84° 4'11.46"E	0.68
29	29	25°46'10.95"N	84° 4'12.88"E	1.62
30	30	25°46'58.51"N	84° 4'18.97"E	1.68
31	31	25°46'20.31"N	84° 4'33.28"E	0.54
32	32	25°46'20.12"N	84° 4'58.30"E	0.13
33	33	25°46'37.81"N	84° 5'3.63"E	0.28
34	34	25°46'27.09"N	84° 5'25.15"E	0.37
35	35	25°46'48.70"N	84° 5'21.62"E	0.47
36	36	25°45'59.26"N	84° 5'26.46"E	0.64
37	37	25°46'47.64"N	84° 6'51.49"E	0.82
38	38	25°46'20.33"N	84° 6'44.16"E	0.26
39	39	25°46'23.30"N	84° 6'46.62"E	1.10
40	40	25°46'11.26"N	84° 6'50.05"E	1.15
41	41	25°46'28.59"N	84° 6'49.81"E	2.54
42	42	25°46'32.69"N	84° 6'54.86"E	0.10
43	43	25°46'40.82"N	84° 7'2.10"E	1.57
44	44	25°47'10.41"N	84° 8'13.97"E	1.57
45	45	25°46'47.80"N	84°14'48.55"E	7.73
46	46	25°46'14.33"N	84°15'43.34"E	20.6
47	47	25°48'53.92"N	84°23'45.10"E	0.45
48	48	25°45'44.35"N	84°31'56.57"E	0.83
49	49	25°45'51.21"N	84°31'52.30"E	0.43

50	50	25°45'56.80"N	84°31'52.69"E	0.42
51	51	25°45'55.60"N	84°32'2.73"E	0.78
52	52	25°45'38.72"N	84°33'44.85"E	2.23
53	53	25°44'59.85"N	84°33'33.46"E	1.12
54	54	25°45'3.73"N	84°37'4.06"E	0.81
55	55	25°45'1.39"N	84°37'17.54"E	0.39
56	56	25°45'4.11"N	84°37'11.80"E	0.15
57	57	25°44'47.03"N	84°31'35.68"E	1.13
58	58	25°46'10.05"N	84°28'15.66"E	0.49
59	59	25°46'36.89"N	84°10'50.24"E	1.30
60	60	25°46'51.60"N	84°10'31.80"E	1.00
61	61	25°46'59.21"N	84°10'36.09"E	0.97
62	62	25°46'40.33"N	84° 9'47.45"E	0.97
63	63	25°46'23.87"N	84° 8'37.88"E	1.15
64	64	25°46'30.41"N	84° 7'55.88"E	1.12
65	65	25°46'18.19"N	84° 7'34.44"E	0.93
66	66	25°46'30.59"N	84° 7'32.65"E	0.89
67	67	25°46'19.74"N	84° 7'11.36"E	2.15
68	68	25°45'56.78"N	84° 6'8.98"E	1.89
69	69	25°45'24.58"N	84° 3'46.61"E	2.70
70	70	25°43'44.87"N	84° 0'49.46"E	0.63
71	71	25°38'24.16"N	83°57'21.86"E	0.63
72	72	25°38'30.91"N	83°57'24.33"E	0.83
73	73	25°36'37.70"N	83°57'33.22"E	10.5
74	74	25°45'14.67"N	84° 5'39.39"E	3.91
75	75	25°45'15.69"N	84° 8'3.14"E	2.68
76	76	25°45'31.28"N	84° 8'14.66"E	0.71
77	77	25°45'48.49"N	84°13'49.61"E	2.83
78	78	25°45'58.87"N	84°14'34.34"E	3.00
79	79	25°46'53.34"N	84°23'47.08"E	0.28

80	80	25°46'57.53"N	84°23'49.51"E	0.20
81	81	25°46'52.06"N	84°23'59.44"E	0.21
82	82	25°44'22.49"N	84°36'5.04"E	16.7
83	83	25°46'9.10"N	84°21'49.05"E	11.5
84	84	25°46'0.50"N	84°21'21.30"E	5.16
85	85	25°45'35.21"N	84°21'19.30"E	17.8
86	86	25°45'31.51"N	84°20'27.63"E	19.9
87	87	25°45'16.74"N	84°19'3.10"E	3.52
88	88	25°44'41.74"N	84° 7'33.31"E	1.00
89	89	25°37'39.25"N	83°59'54.30"E	1.12
90	90	25°37'31.40"N	83°59'49.65"E	0.69
91	91	25°34'14.06"N	83°56'4.00"E	2.43
92	92	25°34'0.94"N	83°56'17.29"E	0.42
93	93	25°33'57.80"N	83°56'21.76"E	0.26
94	94	25°34'32.43"N	83°56'18.09"E	0.83
95	95	25°43'50.70"N	84°17'59.58"E	1.96
96	96	25°40'15.26"N	84°17'22.44"E	63.9
97	97	25°43'9.96"N	84°33'19.22"E	87.3
98	98	25°46'39.38"N	84° 3'11.87"E	0.53

8.2 **Suraha Taal:** Suraha Tal is an oval shaped oxbow lake situated between 25°48' and 25°52' N latitude and 84°8' and 84°13' E longitude at a distance of about 10 kms from Ballia town [Images 21-22]. Though this wetland falls outside the study region, it was considered in this survey owing to its huge area and immense importance in the region. This wetland is connected with Ganga river through Katahal Nala which serves as an inlet or outlet depending upon the water levels of both the river and Tal. The lake encompasses an area of more than 3400 hectares which gets filled completely with water during monsoons and shrinks in size during remaining part of the year. Owing to the rich biodiversity this lake supports including a large number of resident and migratory birds, it was notified as Jai Prakash Narayan Bird Sanctuary by Gazette notification No. 1088(1) Lucknow dated 24.03.1991. Recently, MoEF, Govt. of India also declared an area to an extent of one kilometre uniform around the boundary of this sanctuary as 'Eco-Sensitive Zone' by Gazette notification No. 1172 New Delhi dated 11.03.2019.

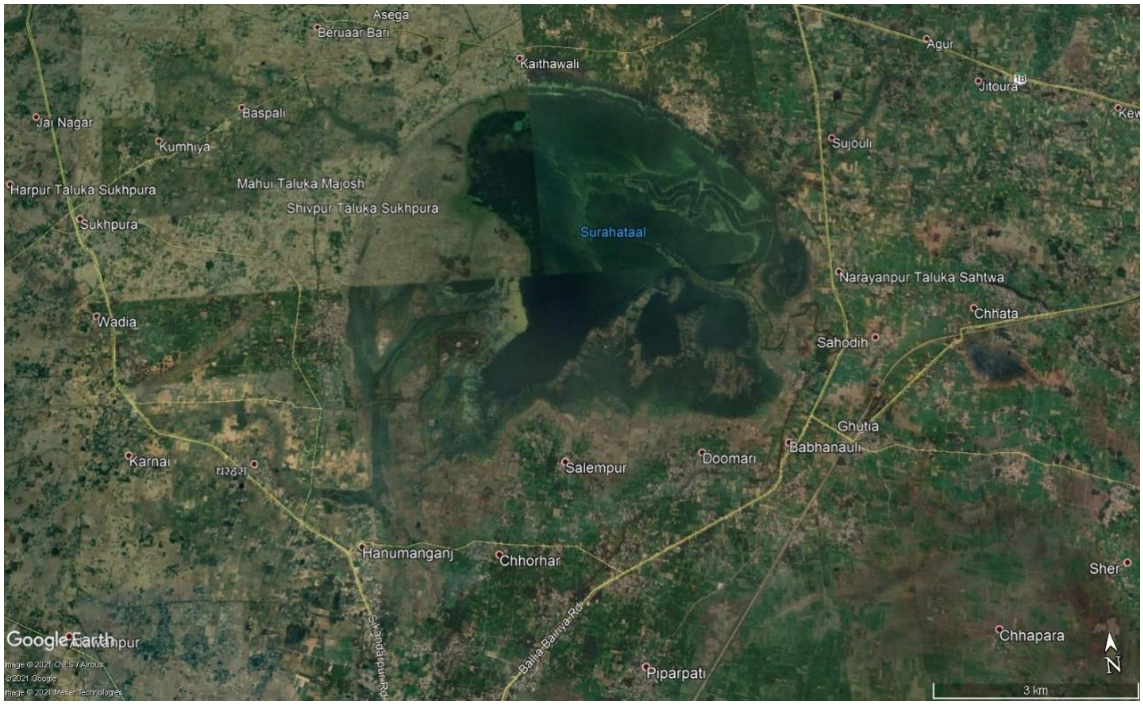


Image 21 : Location Of Suraha Tal [25°50'15.18"N, 84°10'14.08"E]

Image 22 : Suraha Tal As Seen On 17th February, 2021

8.3 The lake is surrounded by human habitation throughout its periphery with agriculture (mainly paddy cultivation) and fishing being the main occupations. According to a study by Srivastava & Srivastava (2009), 54 different fish species belonging to 7 orders and 20 families have been recorded from this lake. However, the population of Indian Major Carps has declined here with the percentage of catfish and forage fish increasing dramatically. During the survey, interactions with some members of Mallah community involved in fishing from this lake also revealed similar observations. The fishermen used small boats for rowing in different parts of the lake where they placed fine-sized plastic fishing nets in conical form with the help of wooden sticks for catching fish [Image 23].

Image 23 : Fishermen Placing Fishing Nets In Suraha Tal

8.4 The bird sanctuary region is also an important habitat for avifauna including native and migratory species. During an extensive field survey conducted by Srivastava & Srivastava (2012), 91 different bird species belonging to 13 orders and 33 families were recorded from this area. Most of the birds are recorded during winter season as compared to summer. The study also highlighted that the avifaunal diversity in this region has decreased over the years mainly due to poaching of birds and extensive use of fertilizers and pesticides in the paddy fields surrounding the lake. During the current field survey in this lake, sarus cranes were sighted in the tal [Image 24]. Sarus crane (*Grus antigone*) is an IUCN Red Listed species classified as 'Vulnerable' with a decreasing population trend.

Image 24 : Sarus Crane (*Grus antigone*) Sighted In Suraha Tal Area

8.5 **Group of floodplain wetlands near Ganga:** A group of wetlands having varying shapes and sizes were observed in the floodplain region of Ganga between Belhari, Gaighat and Majhoua villages of Ballia Distt. Upon interacting with local residents, it was noted that these wetlands are depressions that remain submerged in flood waters during monsoon and afterwards when Ganga river recedes, the spillover water is collected here making them wetlands for the remaining part of the year. During post monsoon and summer season these wetlands serve as an important source of irrigation for the floodplain agriculture in the nearby villages. Apart from this, these wetlands also support avifaunal diversity and provide fish resources for the local residents. The common fish species caught from these wetlands include – rohu (*Labeo rohita*), katla (*Labeo catla*), tengara (*Mystus tengara*), Garai (*Channa punctata*), sidhari (*Puntius* sp.) and barari (*Wallago attu*). Most of these fish are caught using hook and line technique for local consumption by the native residents. The location and field observation for some of the wetlands surveyed in the study region are depicted in Images 25-27.

Image 25 : Location Of The Wetlands Between Belhari And Majhoua In Ballia Distt. [25°45'29.96"N, 84°20'22.00"E; 25°46'0.59"N, 84°21'18.83"E; 25°46'8.04"N, 84°21'46.13"E]

Image 26 : A Floodplain Wetland Near Belhari Village

Image 27 : A Floodplain Wetland Near Majhoua Village

8.6 **Oxbow Lake in Raghunathpur:** A huge oxbow lake is situated in the Ganga river floodplain region near Raghunathpur village of Ballia Distt. [Image 28]. According to the local residents, this wetland receives flood water of the river during monsoons and remains filled during rest of the year thereby serving as an important source of irrigation for surrounding agricultural fields. Some people also use small wooden boats for fishing in this wetland with the major fish caught being rohu (*Labeo rohita*), sidhari (*Puntius* sp.) and barari (*Wallago attu*). However, the respondents reiterated that a good fish catch from this wetland is only obtained during monsoon season while during remaining part of the year, fish population decreases. During the survey, water of this wetland was found to be infested with algal growth as seen in Image 29.

Image 28 : Location Of Oxbow Lake Near Raghunathpur [25°43'16.16"N, 84°33'5.35"E]

Image 29 : Oxbow Lake Near Raghunathpur Village

8.7 **Deendayal Bhakt Barai Pokhara:** This is a sacred pond located in Chitbaragaon village of Ballia Distt. [Image 30]. According to the folk tale reiterated by local respondents this pond is believed to be more than hundred years old and was constructed by Deendayal Bhakt who discovered wealth in this region. The pond is associated with a Shiva temple and is one of the most popular places to visit in this region [Image 31]. The pond also harbors a rich fish diversity which is protected by the local people and fish catching is banned here. According to another folk tale, this land is believed to be a holy place where many saints visited and practiced penance. Some of these sages were angered by watching the local residents eating fish and other animals in this region. Hence, they put a curse that anybody who indulges in animal killing or eating will suffer from bad consequences. As a result, Chitbaragaon till today is a unique village in terms that no local resident buys, sells or eats any kind of non-vegetarian food.

Image 30 : Location Of Deendayal Bhakt Baraiya Ka Pokhara [25°44'25.38"N, 84° 0'7.66"E]

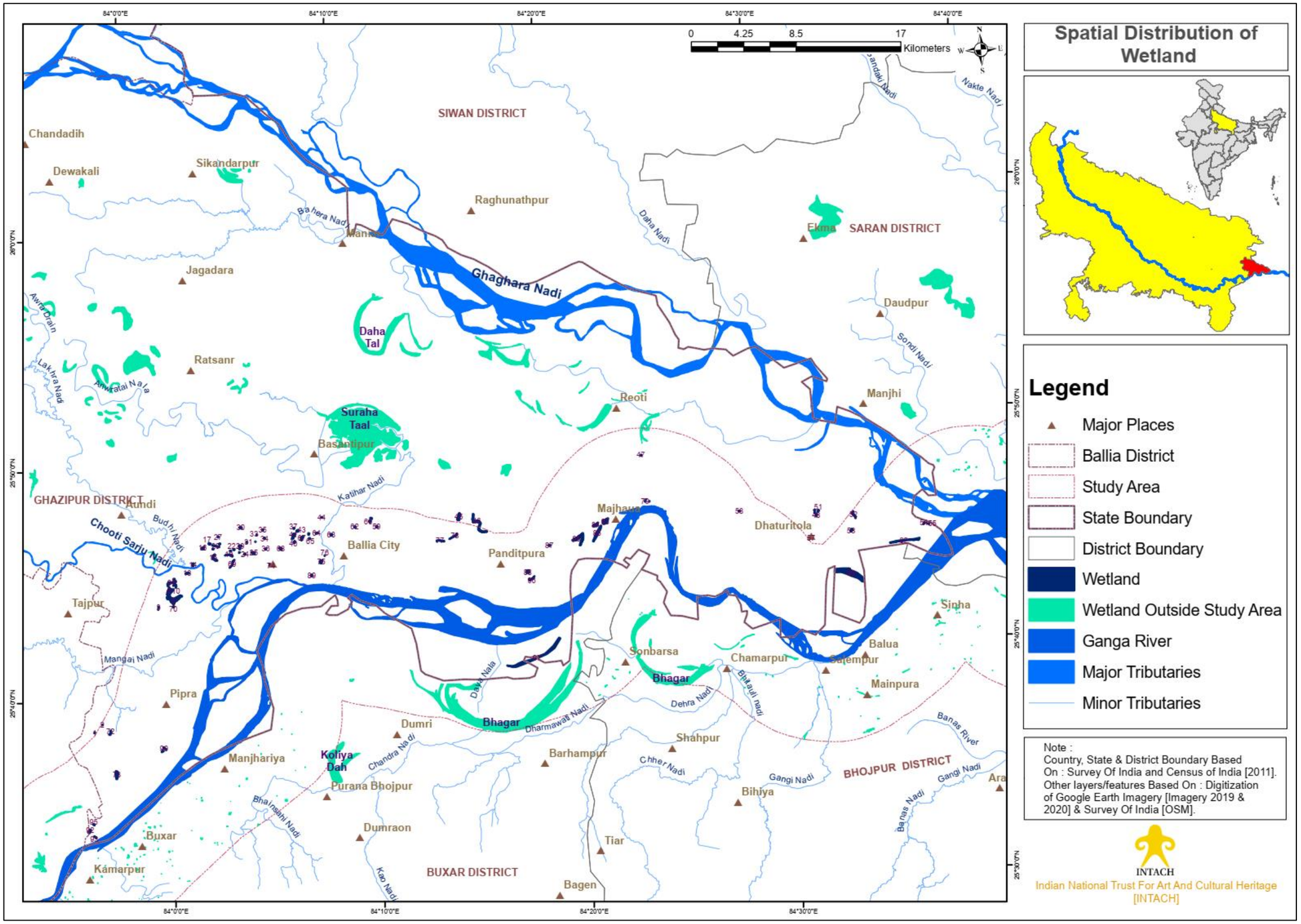
Image 31 : Deendayal Bhakt Baraiya Ka Pokhara

8.8 **Kolnala:** It is a roughly oxbow shaped wetland located near Reoti town in Ballia Distt. [Image 32]. It is connected by a small stream locally known as 'Bhagad' which is the main source of water inlet here along with another stream which connects it to Ghaghra river. It remains inundated with water during monsoons while during remaining part of the year it resembles a marshy land. The Bhagad stream mostly drains sewage water into this wetland probably due to which over a period of time it has come to be known as 'Kolnala'. During the survey this wetland was found to be covered with grasses and water hyacinth along with algal and *Azolla* (mosquito fern) infested water [Image 33]. However, it was also observed that this wetland serves as an important site for birds such as Asian Openbill Storks and Cormorants [Image 34].

Image 32 : Location Of Kolnala [25°50'16.63"N, 84°24'0.69"E]

Image 33 : Kolnala Covered With Vegetation

Image 34 : A Group Of Open Billed Storks At Kolnala



Map 6 : Spatial Distribution Of Water Bodies In Ballia Distt.

9.0 Riparian Flora Along Ganga River In Ballia

9.1 The riparian areas, lying between the aquatic and the terrestrial habitats, serve as functional interfaces within the landscapes, mediating energy and matter between these two ecosystems. With dynamic environmental conditions and ecological processes, these areas tend to harbor rich biodiversity. A major component of this biodiversity is the plant communities growing along the river bank which are interacting with both terrestrial and aquatic ecosystems. The riparian vegetation is significant in the overall ecology and environmental aspects of the region owing to its important roles in soil conservation, harboring faunal diversity and providing livelihood resources (Groffman *et al.*, 1990; Castelle *et al.,* 1994).

9.2 Till some time ago, no proper systematic sampling had been undertaken or record had been maintained for the riparian plant diversity all along Ganga river. There are however, some scattered but significant works of Pallis (1934), Auden (1941), Sahai (1953), Gupta (1960), Bhattacharyya and Goel (1982), Groffman *et al.* (1990), Krishanmurti (1991), Castelle *et al.* (1994), Shyam (2008), Gangwar and Joshi (2006) and Gangwar and Gangwar (2011) which have explored the biodiversity of Ganga river basin. Also, a detailed study published in the form of a book titled – "The Ganga – A Scientific Study" edited by Krishnamurti (1991) documents 475 riparian plant species from Rishikesh to Chinasura. The vegetation of Mirzapur-Ballia stretch was was studied by Tripathi (1991) who reported total 36 macrophytes in which some species like *Ruellia prostrata, Amaranthus spinosus, Calotropis procera* and *Polygonum plebeium* were present along the bank of river.

9.3 During the survey in Ballia Distt., sparse riparian vegetation was found along Ganga river as most of these areas were exploited for agriculture. A total of 26 different riparian flora species were recorded from the study region comprising of trees, shrubs, herbs and grasses. The major tree species in this region included – Bili patra (*Aegle marmelos*), Peepal (*Ficus religiosa*), Banyan (*Ficus benghalensis*), Babool (*Acacia nilotica*) and Semal (*Bombax ceiba*). Among these, peepal and banyan trees included some old growth individuals which were protected owing to their association with temples or local deities. The bili patra (or 'bel patra') tree was found growing associated to human habitations in the riparian villages [Image 35]. The leaves and fruits of this tree play an important role in the worship of Lord Shiva. Other trees such as Eucalyptus, Semal, Taad and Mango were mostly planted in different areas along the river. Among the ground flora, Kaans grass (*Saccharum spontaneum*) was found to grow in

luxuriance throughout the study region followed by Ban tulsi (*Croton bonplandianus*) and Kateli (*Solanum xanthocarpum*). Table 4 presents the plant species recorded while Images 36-37 depict some commonly occurring species along Ganga river.

Image 35 : Leaves And Fruits Of Bel Patra Tree (*Aegle marmelos*)

Table 4 : Riparian Plant Species Recorded In The Study Area

Sr. No.	Botanical Name	Common Name	Family	Habit
1.	*Acacia nilotic*a (L.) Delile	Babool	Fabaceae	Tree
2.	*Aegle marmelos* (L.) Correa	Bili Patra	Rutaceae	Tree
3.	*Azadirachta indica* A. Juss.	Neem	Meliaceae	Tree
4.	*Bombax ceiba* L.	Semal	Bombacaceae	Tree
5.	*Borassus flabellifer* L.	Taad	Arecaceae	Tree
6.	*Dalbergia sissoo* DC.	Shisham	Fabaceae	Tree
7.	*Eucalyptus globulus* Labill.	Eucalyptus/Nilgiri	Myrtaceae	Tree

8.	*Ficus benghalensis* L.	Banyan tree	Moraceae	Tree
9.	*Ficus religiosa* L.	Peepal	Moraceae	Tree
10.	*Mangifera indica* L.	Aam	Anacardiaceae	Tree
11.	*Phoenix dactylifera* L.	Khajur	Arecaceae	Tree
12.	*Peltophorum pterocarpum* (DC.) K.Heyne		Fabaceae	Tree
13.	*Polyalthia longifolia* (Sonn.) Thwaites	Ashok	Annonaceae	Tree
14.	*Tectona grandis* L.f.	Teak/Saagwan	Lamiaceae	Tree
15.	*Calotropis gigantea* (L.) Dryand.	Safed Aak	Apocynaceae	Shrub
16.	*Lippia alba* (Mill.) N.E.Br. ex Britton & P.Wilson		Verbenaceae	Shrub
17.	*Polygonum glabrum* Willd.	Common marsh buckweed	Polygonaceae	Shrub
18.	*Ricinus communis* L.	Castor	Euphorbiaceae	Shrub
19.	*Ageratum conyzoides* L.	Goat weed	Asteraceae	Herb
20.	*Argemone mexicana* L.	Satyanashi	Papavareceae	Herb
21.	*Croton bonplandianus* Baill.	Ban Tulsi	Euphoriaceae	Herb
22.	*Euphorbia hirta* L.	Asthma weed	Euphorbiaceae	Herb
23.	*Parthenium hysterophorus* L.	Congress grass	Asteraceae	Herb
24.	*Solanum xanthocarpum Schrad. & H. Wendl.*	Kateli	Solanaceae	Herb
25.	*Xanthium strumarium* L.	Chhota Gokhuru	Asteraceae	Herb
26.	*Saccharum spontaneum* L.	Kans/Katha	Poaceae	Grass
27.	*Bambusa bambos* (L.) Voss	Indian thorny bamboo	Poaceae	Bamboo Grass

Image 36 : *Croton bonplandianus* (Ban Tulsi)

Image 37 : *Solanum xanthocarpum* (Kateli)

10.0 Faunal Diversity In Ballia Distt.

10.1 **Gangetic Dolphin :** The Gangetic River Dolphin is exclusively aquatic and piscivorus, occasionally found in small groups. It is one of the three freshwater dolphin species in the world and is distributed in the Ganga–Brahmaputra–Meghna and Sangu–Karnaphuli River systems in India, Nepal, and Bangladesh (Sinha & Kannan, 2014). It has been declared as the National Aquatic Animal by Govt. of India (Sinha & Kannan, 2014) and is classified as 'Endangered' in the IUCN Red List owing to the decrease in its population in the last 3-4 decades. The presence of dolphins in the study region was reiterated by the local residents including fisherfolk. Visual sightings of dolphins were also made at sites such as Maldepur, Ujjiar Ghat and Daya Chhapra in Ballia Distt. Most of respondents during the survey reiterated an increase in dolphin sightings during monsoons as compared to other seasons.

10.2 **Turtles:** India is one of the world's hotspots for turtle diversity representing 29 species of tortoises and freshwater turtles among which 13 different species find their abode in the Ganga river system. These turtles play a significant role in the river by scavenging dead organic material and diseases fish, controlling fish population as predators and controlling aquatic plants and weeds (WII, 2017). Upon interacting with the local fisherfolk, it was observed that turtle population in this region has decreased significantly in the last few decades. Not many direct sightings of turtle can be observed in the current time. However, the presence of *Chitra indica* (Indian narrow-headed softshell turtle) could be confirmed based on information of the respondents in this region. Some fisherfolk also reiterated accidental killings of turtle due to fishing nets placed inside Ganga river water.

10.3 **Nilgai:** The Nilgai antelope – Boselaphus tragocamelus is widely distributed throughout the country. However, due to prolonged breeding activity and lack of potential predators, the numbers of Nilgai have increased considerably and become locally overabundant in states of Gujarat, Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan, Madhya Pradesh and Delhi (Meena, 2017). In the due course of time, this species has been successful in adjusting to the human-altered landscapes and in many places have become serious pests of agricultural crops. During the survey, nilgai presence was recorded almost throughout the floodplain sites visited in the study region [Images 38-39]. The farmers in this region often complained about the large-scale damages to agricultural produce caused by nilgai but despite this they claimed to never kill this animal. The villagers often enclosed their fields with mesh nets or wires or thorny plants to keep nilgai away and used to drive them with the help of sticks and stones.

Image 38 : Male Individuals Of Nilgai Foraging In A Mustard Field Near Birpur In Ballia Distt.

Image 39 : A Herd Of Nilgai In Floodplain Region Near Sitab Diara In Ballia Distt.

10.4 **Wild Boar:** The Indian wild boar (Sus scrofa L.) also known as the wild pig is one of the widespread animals throughout the world. In recent times, wild boar has become a regular menace for farmers as it generally causes damage right from planting till the maturity of the crop (Vasudeva Rao et al., 2015). The farmers practicing agriculture in Ganga river floodplains of the study region reiterated strongly about the large-scale damages caused by wild boar to crops especially such as potato. They claimed that the boars destroyed entire fields sometimes resulting in huge losses and even attacked small children or some local residents who tried to drive them away. Hence, in some cases the local villagers had to resort to killing these boars in order to safeguard themselves and their agriculture produce. Image 40 shows an agriculture field patch damaged by wild boars near Iccha Chaubey Pura in Ballia Distt.

Image 40 : An Agricultural Field Patch Damaged By Wild Boars Near Iccha Chaubey Pura In Ballia Distt.

10.5 **Golden Jackal:** The golden jackal (Canis aureus) is a wolf-like canid that is native to Southeast Europe, Southwest Asia, South Asia, and regions of Southeast Asia. It is listed as of Least Concern in the IUCN Red List with their population trend increasing in the last couple of years owing to their widespread distribution, availability of shelter and food in good quantity and they being generalist foragers. It was sighted during the survey from an embankment in Sitab diara area of Ballia Distt. [Image 41].

Image 41 : Golden Jackal [*Canis aureus indicus*] Sighted From Embankment At Sitab Diara, Ballia

10.6 **Avian diversity:** The Distt. seems to have rich diversity of birds. During field survey, the diversity of avian species was recorded using binoculars and identified using field guides (Grimmett et al., 2016 and others). During the field visit, a total of 54 bird species were sighted. Out of which 21 are aquatic species and remaining 33 are terrestrial birds [Table 5]. Following important observations were made for the avian fauna in study region:

- Most of the aquatic bird species were sighted at lakes, depressions and riverbanks and river islands.
- Two bird species – Painted Stork and River Lapwing fall under IUCN's 'Near Threatened' category.

- Cormorants, Lapwings, White-throated Kingfisher, Indian Pond Heron were frequently sighted in and around the river.
- Common Coot, Black-winged Stilt, Little Grebe, Indian Pond Heron, Painted Stork, Common Moorehen, White-breasted Waterhen, were sighted in waterbodies and depressions.
- Cattle Egret, Black Drongo, Common and Bank Myna Robins, White Wagtails were frequently sighted in the agriculture fields.

Table 5 : List Of Birds Recorded In The Study Region

S. No.	Common Name	Scientific Name	Conservation Status
1.	Asian Openbill	*Anastomus oscitans*	Least Concern
2.	White throated Kingfisher	*Halcyon smyrnensis*	Least Concern
3.	Ruddy Shelduck	*Tadorna ferruginea*	Least Concern
4.	Cattle Egret	*Bubulcus ibis*	Least Concern
5.	Little Egret	*Egretta garzetta*	Least Concern
6.	Great Egret	*Ardea alba*	Least Concern
7.	Little Cormorant	*Microcarbo niger*	Least Concern
8.	Indian Cormorant	*Phalacrocorax fuscicollis*	Least Concern
9.	White breasted -Waterhen	*Amaurornis phoenicurus*	Least Concern
10.	Indian Pond Heron	*Ardeola grayii*	Least Concern
11.	**Painted Stork**	***Mycteria leucocephala***	**Near Threatened**
12.	Yellow-wattled Lapwing	*Vanellus malabaricus*	Least Concern
13.	Red-wattled Lapwing	*Vanellus indicus*	Least Concern
14.	Little Grebe	*Tachybaptus ruficollis*	Least Concern
15.	Grey Heron	*Ardea cinerea*	Least Concern
16.	**River Lapwing**	***Vanellus duvaucelii***	**Near Threatened**
17.	Common Moorehen	*Gallinula chloropus*	Least Concern
18.	Common Coot	*Fulica atra*	Least Concern
19.	Lesser Whistling Duck	*Dendrocygna javanica*	Least Concern
20.	Gadwall	*Mareca strepera*	Least Concern
21.	Black-winged Stilt	*Himantopus himantpus*	Least Concern
22.	Rufous treepie	*Dendrocitta vagabunda*	Least Concern
23.	Paddyfield Pipit	*Anthus rufulus*	Least Concern

24.	Ashy-crowned Sparrow Lark	*Eremopterix griseus*	Least Concern
25.	Indian Silverbill	*Euodice malabarica*	Least Concern
26.	Black Drongo	*Dicrurus macrocercus*	Least Concern
27.	Bank Myna	*Acridotheres ginginianus*	Least Concern
28.	Common Myna	*Acridotheres tristis*	Least Concern
29.	Oriental Dove	*Streptopelia orientalis*	Least Concern
30.	Spotted Dove	*Spilopelia chinesis*	Least Concern
31.	Common Hoopoe	*Upopa epops*	Least Concern
32.	Shikra	*Accipiter badius*	Least Concern
33.	Asian Koel	*Eudynamys scolopaceus*	Least Concern
34.	Greater Coucal	*Centropus sinensis*	Least Concern
35.	Red-vented Bulbul	*Pycnonotus cafer*	Least Concern
36.	Common Stonechat	*Saxicola torquatus*	Least Concern
37.	Oriental Magpie Robin	*Copsychus saularis*	Least Concern
38.	Indian Robin	*Saxicoloides fulicatus*	Least Concern
39.	Common Pigeon	*Columba livia*	Least Concern
40.	Indian Bushlark	*Mirafra erythroptera*	Least Concern
41.	Oriental Skylark	*Alauda gulgula*	Least Concern
42.	House Sparrow	*Passer domesticus*	Least Concern
43.	Indian Jungle Crow	*Corvus culminatus*	Least Concern
44.	House Crow	*Corvus splendens*	Least Concern
45.	Plain Prinia	*Prinia inornata*	Least Concern
46.	Rose-ringed Parakeet	*Psittacula krameri*	Least Concern
47.	Common Tailorbird	*Orthotomus sutorius*	Least Concern
48.	Yellow Wagtail	*Motacilla flava*	Least Concern
49.	White-browed Wagtail	*Motacilla maderaspatensis*	Least Concern
50.	White Wagtail	*Motacilla alba*	Least Concern
51.	Jungle Babbler	*Turdoides striata*	Least Concern
52.	Asian Pied Starling	*Gracupica contra*	Least Concern
53.	Black Drongo	*Dicrurus macrocercus*	Least Concern
54.	Common Koel	*Eudynamys scolopaceus*	Least Concern

Image 42 : Indian Silverbill [*Euodice malabarica*] Near Floodplain Lake~Majhoua

Image 43 : Paddyfield Pipit [*Anthus rufulus*] Sighted Near Ganga River At Haibatpur, Ballia

Image 44 : Lesser Whistling Ducks [*Dendrocygna javanica*] & Aquatic Birds in Ganga, Ujjiar

11.0 Ganga Riverine Islands/Diaras In Ballia Distt.

11.1 The riverine fluvial islands are present in many major rivers and are defined as 'land masses within a river channel that are separated from the floodplain by water on all sides and exhibiting some kind of stability' [Osterkamp, 1998]. Such islands may not be permanent on the geologic time scale owing to the river meandering, climate change, etc. but can remain in place over decadal or century time scales and hence exhibit stability [Wyrick & Klingeman, 2011]. Many such islands are existent in the Ganga River stretch of throughout Bihar state which are locally referred to as *Diaras*. This term is derived from the word *Diya* (which means an earthen oil lamp) and has been coined for a land where a *Diya* is never lit [Udas *et al.*, 2018]. In local parlance in different parts of Bihar state, it symbolizes a village which is located outside the embankments of Ganga River floodplain. Some of the major *Diaras* surveyed in the study are described in this section.

11.2 Soon after crossing the Ballia-Buxar bridge near Ujjiar Ghat, Ganga river makes a north-eastwardly turn towards Ballia town during which it is bifurcated into two parts by the presence of a group of irregularly shaped *diaras* [Image 45]. Even though these diaras are devoid of any human habitation, most of their areas are exploited for agriculture by the residents of nearby villages in that part of Ballia Distt. During lean seasons, the flow of Ganga river stretch towards Ballia reduces considerably even drying up in some areas. Hence, residents from nearby villages can walk or even drive a two-wheeler upto these diaras while during monsoons, the use of boats is necessary. These diaras also harbor a luxuriant growth of floodplain grass – *Saccharum spontaneum* [Image 46] which is collected in dried form to make use for roof thatching and setting up temporary huts in floodplain agriculture fields.

Image 45 : A Group Of Irregularly Shaped Diaras Between Ujjiar And Ballia Town

Image 46 : One Of The Diaras As Seen Near Palia Khas Village In Ballia Distt.

11.3 Another group of irregularly shaped diaras can be observed in the Ganga river stretch between Kanspur Ganga ghat and Udaivant Chhapra village in Ballia Distt. [Image 47]. During this stretch, Ganga river again bifurcates into two parts with both of them falling in the study region. Similar to the other diaras, these are also under extensive crop cultivation by residents of nearby villages who access these diaras by boats. Apart from that wild and luxuriant growth of Kans grass is also observed in some parts. During the survey, part of these diaras were observed from the Beyasi-Ballia bridge during which a herd of nilgai was also observed foraging on agricultural crops [Images 48-49].

Image 47 : A Group Of Irregularly Shaped Diaras Between Kanspur And Udaivant Chhapra Village Of Ballia Distt.

Image 48 : A Part Of Diara As Seen From Beyasi-Ballia Bridge

Image 49 : A Herd Of Nilgai Foraging In A Mustard Field On The Diara

11.4 Two more comparatively smaller *diaras* can be observed in the remaining stretch of Ganga river in Ballia Distt. The first one is a roughly semi-circular shaped *diara* lying near Jagdeva village in the study region [Image 50]. Most of this *diara* is covered with wild vegetation dominated by *Kans* grass. Some parts of this *diara* are also cultivated by nearby villagers. The second *diara* is a small and roughly lens shaped island situated near Dalan Chhapra village of Ballia Distt. [Image 51]. It is less cultivated as compared to other sites in the study region and is dominated by wild vegetation growth.

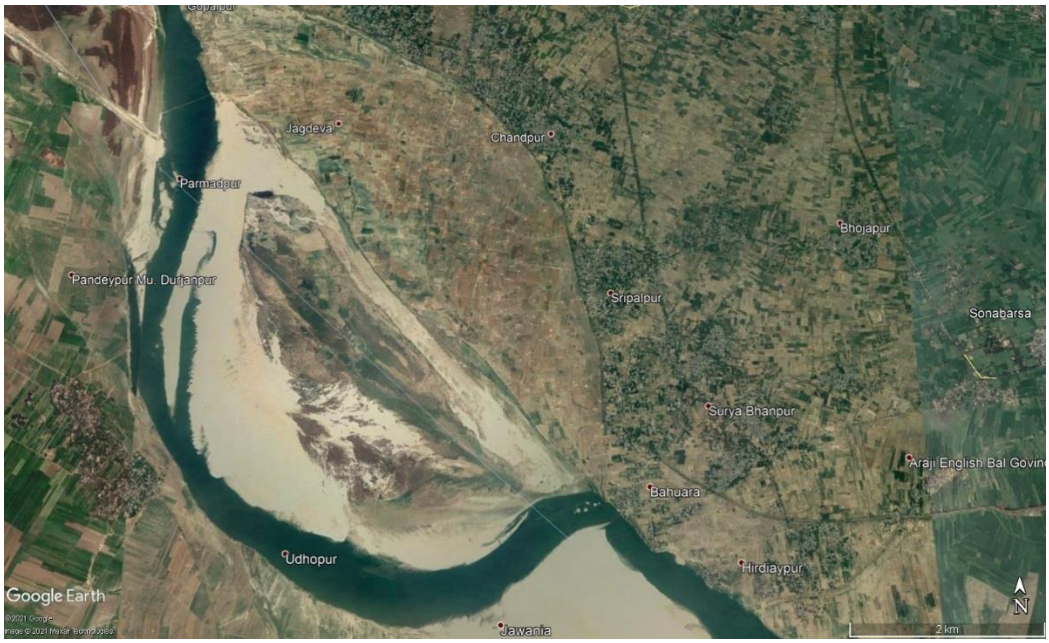


Image 50 : Diara Near Jagdeva Village In Ballia Distt.

Image 51 : Diara Near Dalan Chhapra Village In Ballia Distt.

12.0 Fishing In Ballia Distt.

12.1 Fish resources of Ganga river have been an important source of livelihood and food security for millions of people residing along its banks. Ganga river supports a diverse fish fauna with about 260 species reported for Indian waters (Sinha and Khan, 2001) among which about 35 species have been identified as having highest commercial value including carps (Cyprinidae), snakeheads (Channidae) and catfish (Siluriformes) (Islam et al., 2006). However, today these rich fish resources are threatened by various anthropogenic activities and resulting water pollution, accumulation of heavy metals, eutrophication, damming, alteration of hydrology and introduction of exotic species (Tripathi et al., 2017).

12.2 During the survey, fishing was found to be the second major source of livelihood after agriculture in Ballia Distt. Mostly the members of Mallah community were involved in fishing from Ganga river through their older generations. Small wooden boats made of Sekua wood (*Shorea robusta*) were used by these fishermen to reach different sites in river channel and place fine-sized plastic nets for catching fish [Image 52]. These nets were referred by them as 'Chaat Jaal' in local language. Apart from this, some fisherfolk also made use of rope-based drag nets for catching fish from the river [Image 53].

12.3 Majority part of the fish catch was sold in nearby markets such as in Ballia town and Hanumanganj while some part was also packed and transported to nearby major cities. The cost of fishes ranged from Rs. 200 – Rs. 350 per kg depending upon the species and the size of fish caught. Mostly the fish was sold in these markets during morning and evening times. The demand for fish as a food resource could be measured from the fact that most of the fish catch was sold within one-two hours of the market start. Apart from Ganga river, the fish caught from wetlands such as Suraha tal and some fish coming from other parts of the country were also sold in these markets.

Image 52 : Fishermen Placing Fishing Nets In Ganga River Near Ujjiar Ghat

Image 53 : Drag Net Based Fishing As Observed Near Ujjiar Ghat

12.3 Upon detailed interactions with some members of Mallah community in the study region, they expressed their concerns over the decreasing fish catch specially during post monsoon and summer seasons. They also stated that Hilsa fish used to be found in the Ganga river stretch of the study region until before the construction of Farakka dam. While the catch of fish such as rohu, catla and sidhari has decreased in the Ganga river, the population of exotic carps such as common carp (*Cyprinus carpio*) and silver carp (*Hypophthalmichthys molitrix*) has increased making them the major composition of fish catch. Other major fish species caught in the study region included barari (Wallago attu), tengara (*Mystus teng*ara) and garai (*Channa punctata*). The details of riverine fish recorded during the survey is provided in Table 6.

Table 6 : Riverine Fish Recorded In The Study Region

Sr. No.	Scientific Name	Common Name
1.	*Wallago attu*	Barari
2.	*Labeo catla*	Catla
3.	*Labeo rohita*	Rohu
4.	*Channa punctata*	Garai
5.	*Mystus teng*ara	Tengara
6.	*Puntius* sp.	Sidhari
7.	*Cyprinus carpio*	Common carp
8.	*Hypophthalmichthys molitrix*	Silver carp
9.	*Mystus* sp.	Palwa

13.0 Groundwater In Ballia Distt.

13.1 Ballia Distt. falls in Central Ganga alluvial plain where general topography is flat to gentle. The alluvial tracts of Ballia district are underlain by sands of various grades, gravels, silt, clay and have wide extension. All the three coarse, medium and fine sand types are good water bearing formations. Based on the borehole data by CGWB, three-tier system of aquifer known to exist in the district (Table 7). Ground water is known to occur under unconfined to semi-confined to confined conditions. Ground water is extracted through dug wells, bore wells, and state tube wells. There are old wells in some villages across the Distt. [Images 54-57]. During the field survey, such old wells were found at Keharpur village, Kontadih, and Bairiya village. At Keharpur, most of them have been restored by Gram Pradhan and are under use by villagers.

Table 7 : Three System Aquifers and Their Depth in Ballia District

S.No.	Aquifer	Western Part (Depth Range in meters)	Eastern Part (Depth Range in meters)
1.	Ist	40.0 – 100.0	Down to 90.0
2.	IInd	365.0 – 457.0	100.0-160.0
3.	IIIrd	515.0 – 540.0	180.0-340.0

Source : District Ground Water Brochure, Ballia [2007-2008] CGWB

13.2 Depth to water levels [2006/pre-monsoon] as available from district groundwater brochure [2007-2008], CGWB varied from 2.42 to 9.90 mbgl. In post monsoon period depth to water varied from 2.42 to 8.35 mbgl. Water level fluctuation varied from 0.85 to 3.65 meters. Shallow water level used to exist in Canal command area and deeper water level was reported in the bank of Ganga and Ghaghra River. Depth to water levels accessed from Ground Water Year Book of Uttar Pradesh [2015-2016] varied from 1.15 to 7.59 mbgl in August 2015 and from 1.56 to 8.97 mbgl in November 2015. This shows an improvement in minimum depth levels. Groundwater levels recorded during the survey in some of the villages is given in Table 8.

Table 8 : Groundwater Levels of Some Villages in Ballia Distt.

S. No.	Village	Coordinates		Depth to Water Table in Feet
		Lat.	Long.	
1.	Bagheji	25°44'55.28"N	84° 5'15.53"E	70-80 ft.
2.	Maldepur	25°45'0.07"N	84° 7'15.87"E	40 ft.
3.	Gaighat	25°45'35.24"N	84°20'25.73"E	30-40 ft.
4.	Daya Chhapra	25°46'21.53"N	84°25'57.70"E	20-25 ft.
5.	Ichchha Chaubey ka Pura	25°41'46.61"N	84° 2'34.53"E	80-90 ft.
6.	Sitab Diara	25°44'29.68"N	84°36'25.73"E	30 ft.

13.3 As per Uttar Pradesh's Dynamic Ground Water Resources Assessment , 2017, the total annual ground water extraction in Ballia district is 53014.74 ham with 45675.11 ham (86%) for irrigation use and 7339.63 ham (14%) for domestic and industrial use. The net ground water availability for future use is 29101.36 ham and stage of ground water extraction is 63.55%.

13.4 Ballia has been on the list of CGWB for the presence of arsenic in its ground water. In fact, this is the district where arsenic contamination was first reported in Uttar Pradesh after a survey of 25 villages in 2003. Later on, 20 districts in Uttar Pradesh were found to be affected by arsenic contamination and people suffering from arsenical skin lesions.

13.5 It was reported that people used to draw water from hand pump operated tube wells which tap water from shallow aquifers with 20-30 m depth. The report also notes that that all the arsenic affected districts in Uttar Pradesh and 12 districts in Bihar are aligned along the Ganga River. Arsenic concentration values were found to be exceeding the permissible limit of 10 µg/L as per WHO standards in 46.5% of the 4780 wells tested in Varansi, Ballia and Ghazipur [as stated by Department of Science and Technology, MoS&T]. The District Ground Water Brochure of Ballia [2007-2208] by CGWB also mention about the arsenic contamination in the ground water. In 72 samples collected from the dug wells, private hand pumps, and India mark II hand pumps, the value of arsenic was found to be above 50 ppb in 52 samples.

Image 54 : Defunct Old Well In Keharpur, Village, Ballia

Image 55 : Inside Photo of the Well. Ferns And Other Vegetation Growth Has Taken Over

Image 56 : A Defunct Old Well At Korantadih Dak Bunglow, Ballia

Image 57 : Borewell Pumphouse At Sitab Diara, Ballia

14.0 Ganga River Bank Erosion In Ballia Distt.

14.1 Weathering of soils by natural forces is both constructive and destructive. Erosion is the chief agent responsible for the natural topographic cycles as it wears down higher elevations, banks (lateral erosion) and deposits sediments in the plains. However, erosion gets aggravated due to human interventions through change in land use, excessive grazing, extensive farming, cultivation without taking proper conservation measures, destruction of forest and riparian vegetation. It is well known that exposed soil may erode rapidly (Singh et al., 2004).

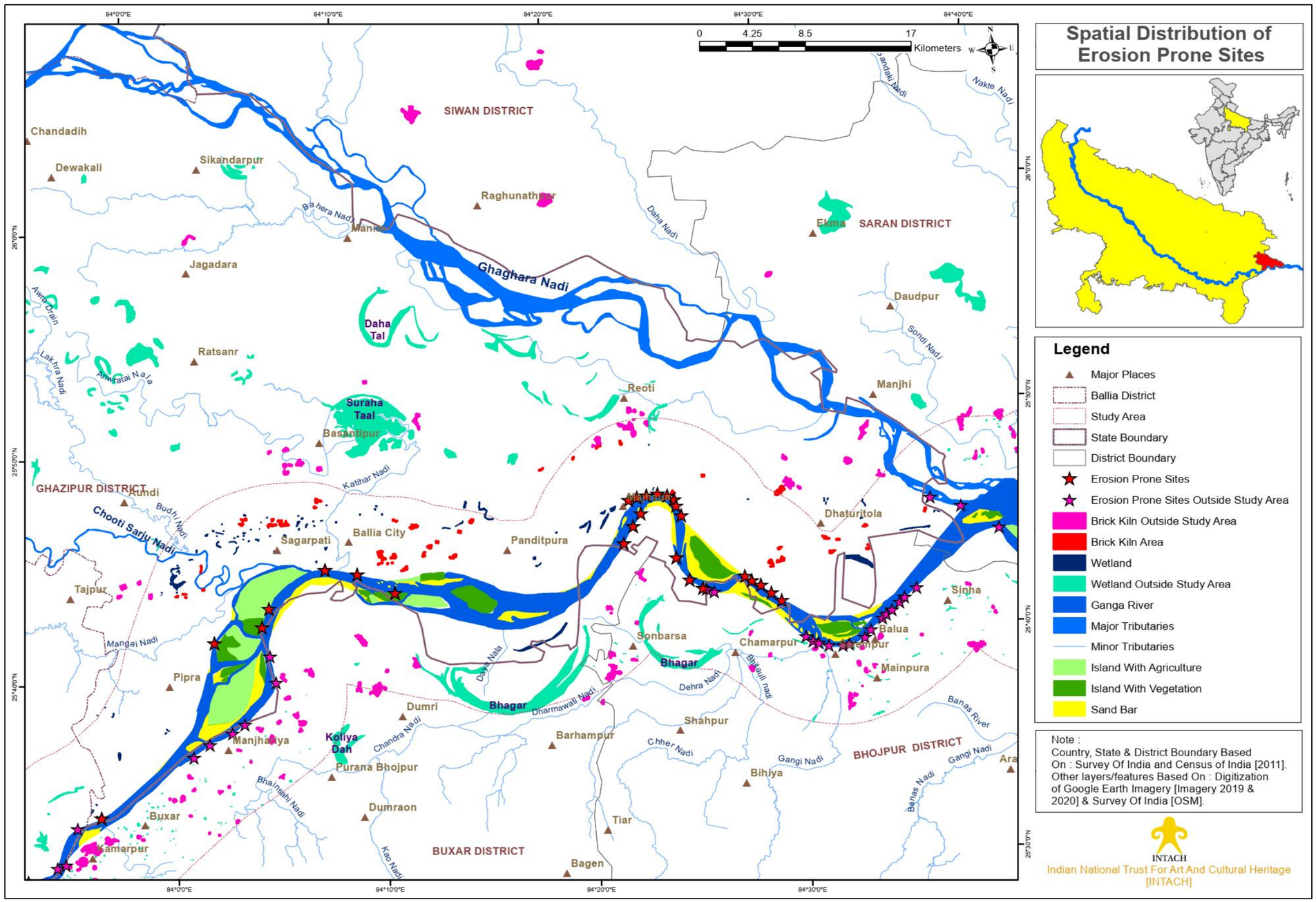
14.2 During this survey, high erosion prone sites were observed in areas such as Maldepur, river bank near Panchrukhiya Ghat, Kanspur Ganga Ghat, Daya Chhapra, Jagdishpur, Iccha Chaubey Pura, Palia Khas and near Ujjiar Ghat. Map 7 depicts the erosion prone sites recorded along Ganga river in Ballia Distt. In some sites, the intense rainfall accompanied by torrential flow of water in Ganga river resulted in lateral bank erosion [Images 58-61]. Upon interacting with local residents, they reiterated that many villages at the sites mentioned above suffered the brunt of erosion in terms of their agricultural fields being washed away. This led to losses in their income out of farming and also resulted in migration to further inland areas. At some sites, the use of sand bags and stone boulders were observed for controlling bank erosion. However, except these few sites most other areas were exposed due to incomplete work which was recorded as the main concern for local residents. They also claimed that no kind of compensation or assistance was available for their losses and the local authorities were often negligent in completing the bank protection work in various areas. Various factors such as unchecked sand mining along Ganga river, decrease in riparian vegetation and land use changes are believed to be the major factors in contribution to this severe erosion in the study region.

Image 58 : Lateral Bank Erosion As Observed Near Maldepur

Image 59 : Lateral Bank Erosion As Observed Near Iccha Chaubey Pura

Image 60 : Lateral Bank Erosion As Observed Near Kanspur Ganga Ghat

Image 61 : Bank Erosion Prone Site Near Daya Chhapra

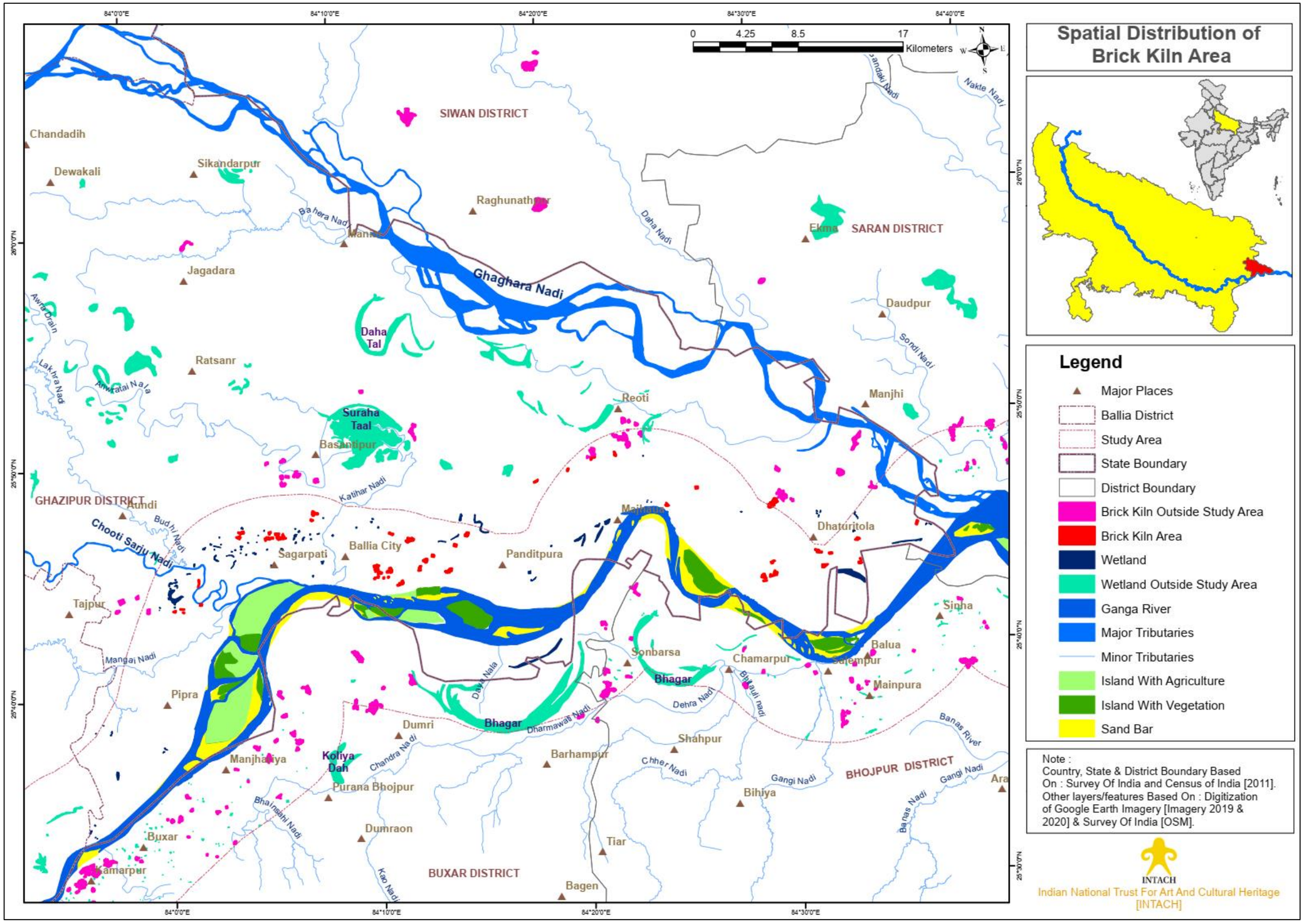


Map 7 : Spatial distribution of erosion prone sites in the study region

15.0 Brick Kilns In Ballia Distt.

15.1 **Brick Kilns :** An important economic activity in the Distt. is production of bricks in the brick kilns. With rapid urbanization, bricks have become an important building material for construction activities. Brick kilns in the study area provide livelihood opportunity to the local community. However, this industry has posed current and potential future threats to the soil, air, biota and water system of the region. The brick kilns were distributed throughout the study region with their main presence being in areas such as surroundings of Ballia town, Sonabarsa area and near Sitab diara. Many of these brick kilns fell within the active floodplain region of Ganga river. The distribution of these brick kilns is presented in Map 8 while Image 62 depicts one such kiln as seen during the survey.

Image 62 : Brick Kiln As Observed Near Janari In Ballia Distt.



Map 8 : Spatial Distribution Of Brick Kilns In The Study Region

16.0 Boatmaking In Ballia Distt.

16.1 Boats play an important role in the livelihoods of riparian habitats in Ballia Distt. They are mainly used for two purposes – fishing and transportation. The fishing boats are generally smaller in size, non-mechanized and locally made using the Sekua (*Shorea robusta*) wood [Image 63]. The cost of constructing these boats ranges from Rs. 1-1.5 lakhs and are made by the members of Mallah community who are also the main population involved in fishing activities. The other type of boats constructed in this region are big sized and mechanized boats usually made of wood or tin/iron [Images 64-65]. These boats are involved in ferrying people and goods from Ganga river bank in Ballia Distt. to opposite bank in Buxar and Bhojpur distts. The cost of constructing these boats ranges from Rs. 5-10 lakhs depending upon the size and material involved. These boats are constructed with the help of '*Mistry*' (carpenters) who have significant expertise in this work.

Image 63 : Small-Sized Fishing Boat Being Constructed By Mallah People Near Nasirpur Math Village In Ballia Distt.

Image 64 : Construction Of A Big-Sized Mechanized Wooden Boat For Transportation Near Ujjiar Ghat In Ballia Distt.

Image 65 : Big-Sized Mechanized Boats Made Of Tin And Iron At Ujjiar Ghat In Ballia Distt.

17.0 Sacred Trees In Ballia Distt.

17.1 **Sacred Tree in Daya Chhapra [25°46'19.69"N, 84°25'40.98"E]:** A banyan tree (*Ficus benghalensis*) believed to be more than 200 years old was found to be associated with Ganjahwa Baba temple [Image 66] on the main road near Daya Chhapra village in Ballia Distt. This is believed to be one of the very few oldest trees in this Distt. which has been protected owing to its association with the temple. Upon interacting with the priest managing this sacred site, it was recorded that Ganjhwa Baba was a local saintly figure who was respected and believed by local residents. Upon his death, a samadhi containing his mortal remains was set up at this site associated with the Banyan tree. Eventually a small temple was constructed at this site encompassing the tree and thereby protecting it from any kind of destruction despite being on the main highway connecting Ballia town. Residents of nearby villages often come to this temple for praying during auspicious occasions and give offerings in cash/kind mode which becomes the major source of maintaining this site. However, the priest of this site reiterated the need for government intervention in order to ensure the safety of this old and sacred tree in near future.

Image 66 : Old And Sacred Banyan Tree Associated With Ganjahwa Baba In Daya Chhapra Village

17.2 **Sacred trees associated with Veer Lorik Durga temple [25°46'35.41"N, 84°11'19.05"E]:** Two old and sacred peepal trees (*Ficus religiosa*) were found to be associated with Veer Lorik Durga Temple situated amidst extensive agricultural landscape about 5-6 kms from Ballia town [Image 67]. According to mythology and local folklore, Lorik is remembered as a great ancestor of historical heroes and Ahirs. It is also called the 'Ramayana' of the Ahir caste. This story is famous in Chhattisgarh under the name Lorik-Chanda; it is a love story of Lorik-Chanda. The saga is based on the love affair of a married princess Chanda and married Ahir Lorik. The saga is very popular and has several versions of it. The prominent one is that Lorik was born at Ballia and there is a place called Lorik Dih here which is the testimony of the great saga. This temple signifies this popular belief and is one of the important worship places in Ballia Distt. Its importance can be noted from the fact that these trees have been protected owing to the sanctity of this place in the otherwise agriculture dominated landscape and thus, emphasize the need to ensure their continued protection in coming time as well.

Image 67 : Sacred Peepal Trees Associated With Veer Lorik Durga Temple In Ballia

17.3 **Peepal Dev near Daya Chhapra [25°45'30.27"N, 84°25'35.42"E]**: An old and sacred peepal tree (Ficus religiosa) having majestic canopy and believed to be more than 100 years old was observed en route Ganga river bank near Daya Chhapra village. Locally known as '*Peepal Dev*' (Peepal God), this is a lone sacred tree protected in this otherwise agriculture dominated landscape [Image 68]. Upon interactions, the local residents reiterated the importance of worshipping this tree which has passed down from their past 2 generations. This tree is worshipped specially on auspicious occasions before taking a holy bath in Ganga river.

Image 68 : Old And Sacred Peepal Tree Near Daya Chhapra Village In Ballia

17.4 **Sacred Peepal tree in Trilokpur Mathia Village [25°43'42.91"N, 84°15'30.65"E]:** A sacred peepal tree was observed on the bank of a Ganga river floodplain wetland in Trilokpur Mathia village of Ballia Distt. This tree was planted and worshipped in remembrance of a local saintly figure known as 'Aacchi Baba' by the residents here. The idols of various Gods such as Lord Shiva and Lord Hanuman were placed in small temples on a podium constructed at the base of this tree [Image 69]. This tree was worshipped by the women of this village every week and by all the residents during auspicious occasions.

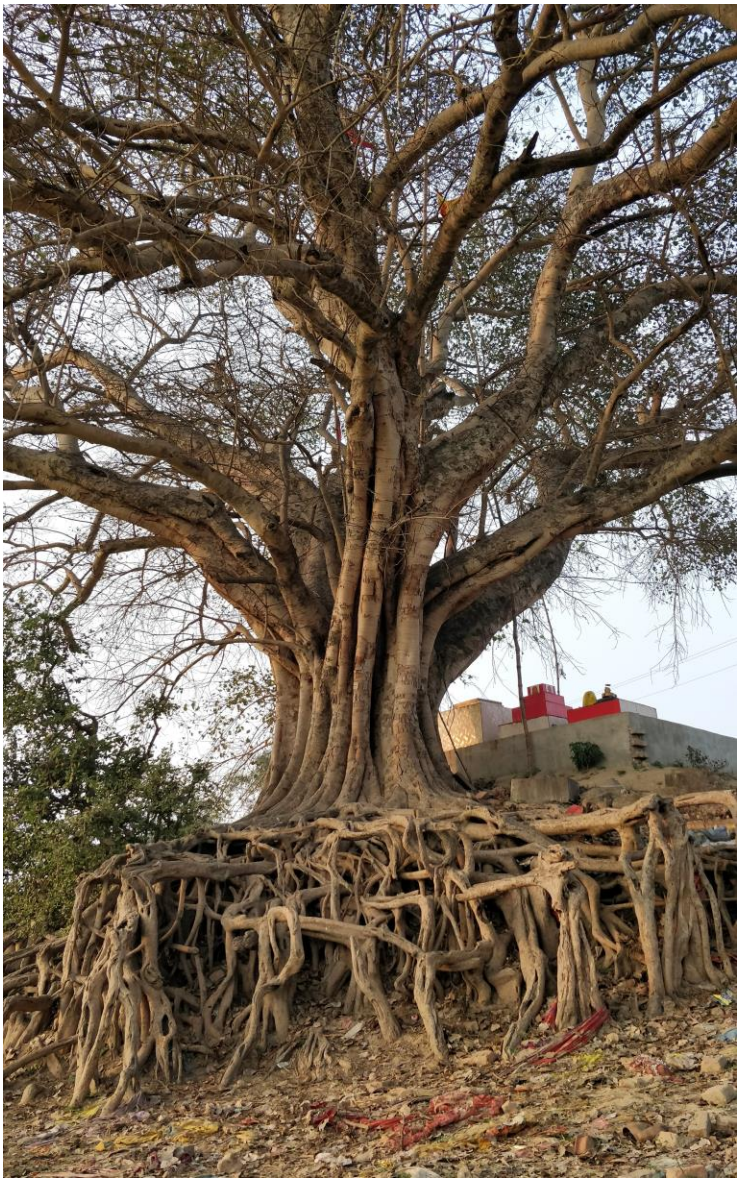


Image 69 : Sacred Peepal Tree In Trilok Mathia Village Of Ballia Distt.

17.5 Some other prominent old and sacred trees recorded during the survey in study region are depicted as follows:

Image 70 : Old And Sacred Peepal Tree Observed Near Shukla Chhapra Village

Image 71 : Old And Sacred Peepal Tree At Ujjiar Ghat

18.0 Inland Navigation In Ballia Distt.

18.1 The use of large boats and steamers for ferrying goods and transporting people to different parts along Ganga river is mentioned in the Ghazipur district gazetteer (). Since early 19th century, Ganga river served as an important navigation route connecting different places of Uttar Pradesh, Bihar and West Bengal states. It used to generate revenue for the govt. authorities as well as private zamindars who invested in construction and maintenance of large boats/steamers. However, the challenges faced in navigation included shifting of the sand banks and sand bars, obstruction caused at various points by reefs of kankar, drying up of river during summer seasons and reduction of water level in the river due to extensive irrigation in nearby villages.

18.2 Nonetheless, inland navigation in Ganga river still remains one of the important transportation sources in the region at several sites. One such important site surveyed in the study region was Ujjiar Ghat where large-sized wooden boats and metal steamers find their existence serving as an important connecting link between Ballia and Buxar/Bhojpur distts. [Images 72-73]. The most prominent route was connecting Ujjiar Ghat with Ram Rekha Ghat in Buxar. Upon interactions, it was found that people often used this route in order to save time taken by road journey to travel from this part of Ballia Distt. to Buxar town and back. Besides commercial boats, some villagers also had small non-mechanized boats which served both for fishing as well as transportation of few known people along with some luggage across Ganga river. While the wooden boats could carry about 50-70 people along with some luggage, the steamers were able to accommodate about 150 people along with luggage making it an important mode of transport specially during festivities and important occasions in the region. The charges for transportation included anywhere between Rs. 10 – Rs. 50 per person depending upon the distance, demand and type of boat used.

Image 72 : Mechanized Wooden Boats And Steamers At Ujjiar Ghat

Image 73 : Small-Sized Non-Mechanized Wooden Boats Transporting People From Ram Rekha Ghat In Buxar To Ujjiar Ghat In Ballia

19.0 Key Observations And Recommendations

19.1 One important Hindu ritual associated with Ganga river throughout India is cremation of dead bodies as it is widely believed that by immersing your burnt remains in the holy Ganga water, the person will attain 'Moksha'. This practice was also found to be present in few places along Ganga river bank in Ballia Distt. One such example is depicted in Image 74 which highlights the remains of cremation rituals on the river bank near Daya Chhapra village. Hence, it is recommended in this report to take this matter into consideration and develop appropriate cremation facilities for the local residents little away from Ganga river in order to prevent further pollution and ecosystem damage.

Image 74 : Remains Of Cremation Rituals Seen Near Daya Chhapra Village

19.2 The riparian ecosystems are of high conservation priority owing to the rich biodiversity they support and the large-scale ecosystem services they provide. However, the cultivation of crops such as mustard up to the current flow of Ganga river [Image 75] in many parts of this Distt. has already impacted the riparian vegetation communities which is evident from the sparse growth and low species diversity of riparian plants recorded during this survey. This in turn impacts the associated faunal diversity as well as bank stability often leading to severe erosion during flood situation. Hence, it is recommended through this study to take up measures for checking the limit of

agriculture in riparian areas of Ganga River in order to allow the natural biota to flourish.

Image 75 : Cultivation Of Mustard Up To The Current Flow Of Ganga River

19.3 One important concern often raised during the survey was large scale crop destruction caused by mainly wild boar and nilgai specially in the floodplain agricultural fields. Though the farmers never retaliated violently towards the nilgai, they did admit to kill wild boar as it is equally dangerous to local residents in this region. Nonetheless, both these animals are known to cause huge losses to the farmers who claimed to receive no compensation or help of any kind from the authorities. Hence, this important issue in the study region needs to be mitigated by creating awareness among the local people, ensuring sufficient compensation for their losses and incorporating non-violent techniques to keep these animals away from the fields.

19.4 Another very important observation in the study region is severe bank erosion caused by the floods which lead to destruction of riparian settlements and even cause shifts in the villages from one side to the other. This issue has impacted floodplain farmers mainly as their agricultural fields are cut and washed away during floods. This has also led to shifting of agricultural pressure on riverine islands in the study region. Though erosion preventive measures are being taken in some parts of the Distt., they are yet to

benefit many other parts. Hence, it is recommended to identify erosion prone and impacted sites throughout the Distt. along with developing suitable remedies for its control such as extensive plantation of trees, shrubs and grasses having strong root system to bind the soil.

19.5 Many wetlands surveyed in the Distt. served as important sources for fish catch, irrigation of surrounding fields as well as excellent habitats for birds. Despite this, there is not much information or any efforts to know about these wetlands and maintain them. Hence, it is strongly recommended to take up initiatives for well-being of such water bodies in conjunction with various local stakeholders.

19.6 The fisherfolk dependent mainly on fish resources from Ganga river had raised their concerns about the sharp decline in fish catch and yield owing to various reasons such as changes in river flows, climatic alterations and increasing water pollution. Hence, it is imperative to carry out awareness cum training programs with these communities regarding fish availability, its importance and sustainable fishing. Along with that alternate livelihoods need to be developed for fishermen communities such as promoting them for building different boats and involving in eco-tourism activities.

19.7 The Ganga river stretch of Ballia Distt. is also an important habitat for IUCN Red Listed and Schedule-I (Wildlife Protection Act, 1972) species – Gangetic dolphin. It is recommended to carry out more surveys for identifying their tentative population and presence status in this region. The local Forest department should also carry out awareness activities for sensitizing people directly associated with Ganga River.

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