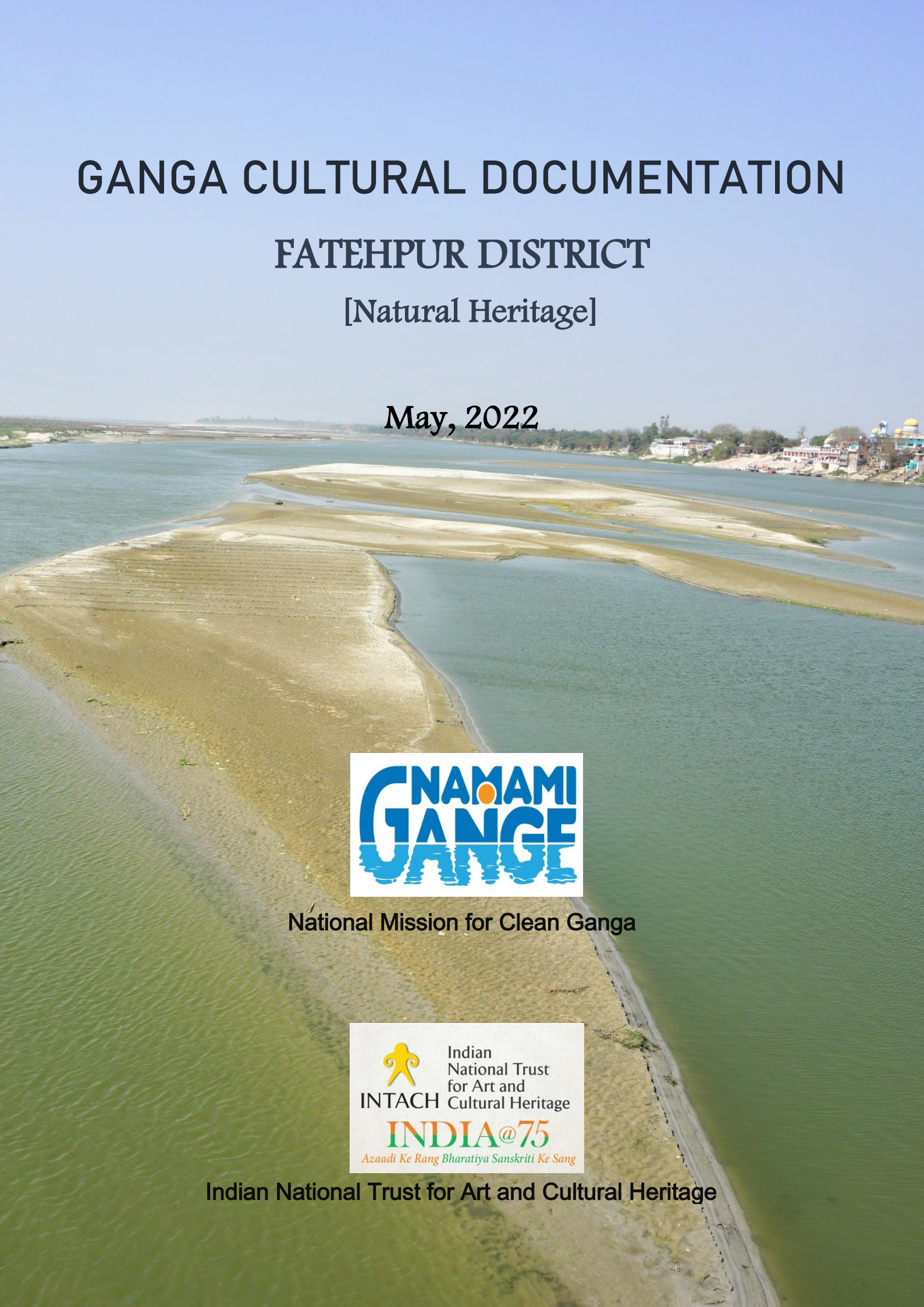
GANGA CULTURAL DOCUMENTATION

FATEHPUR DISTRICT

[Natural Heritage]

May, 2022



National Mission for Clean Ganga

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Front Cover : Ganga River In Fatehpur Distt.

Background : Radha-Krishna Temple Complex & Its Environ, Sheorajpur, Fatehpur Distt.

Back Cover : Ganga River Bank Near Om Ghat

Formatting And Design By : Abhishek Kumar Upadhyay

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FATEHPUR DISTRICT

May, 2022

Sponsored By:

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1.0 Introduction

1.1 Fatehpur Distt. is located between 25°26' and 26°16' north latitude and between 81°14' and 81°20' east longitude having an area of 4,152 Sq.Km. It is at a height of 110 meter from sea level. Fatehpur was setup on 1826 A.D. as a separate Distt., taking fertile land lying in between River Ganga & River Yamuna also known as 'Doab'. The Distt. name is traced to Fatehmand Khan who is supposed to have founded the town. It is based on a fragmentary inscription found at Denda Sai, in tahsil Khaga, to the effect that Fatehmand Khan, an officer of Sultan Ala-ud-din, obtained a Farman from him in 1519 A.D[1].

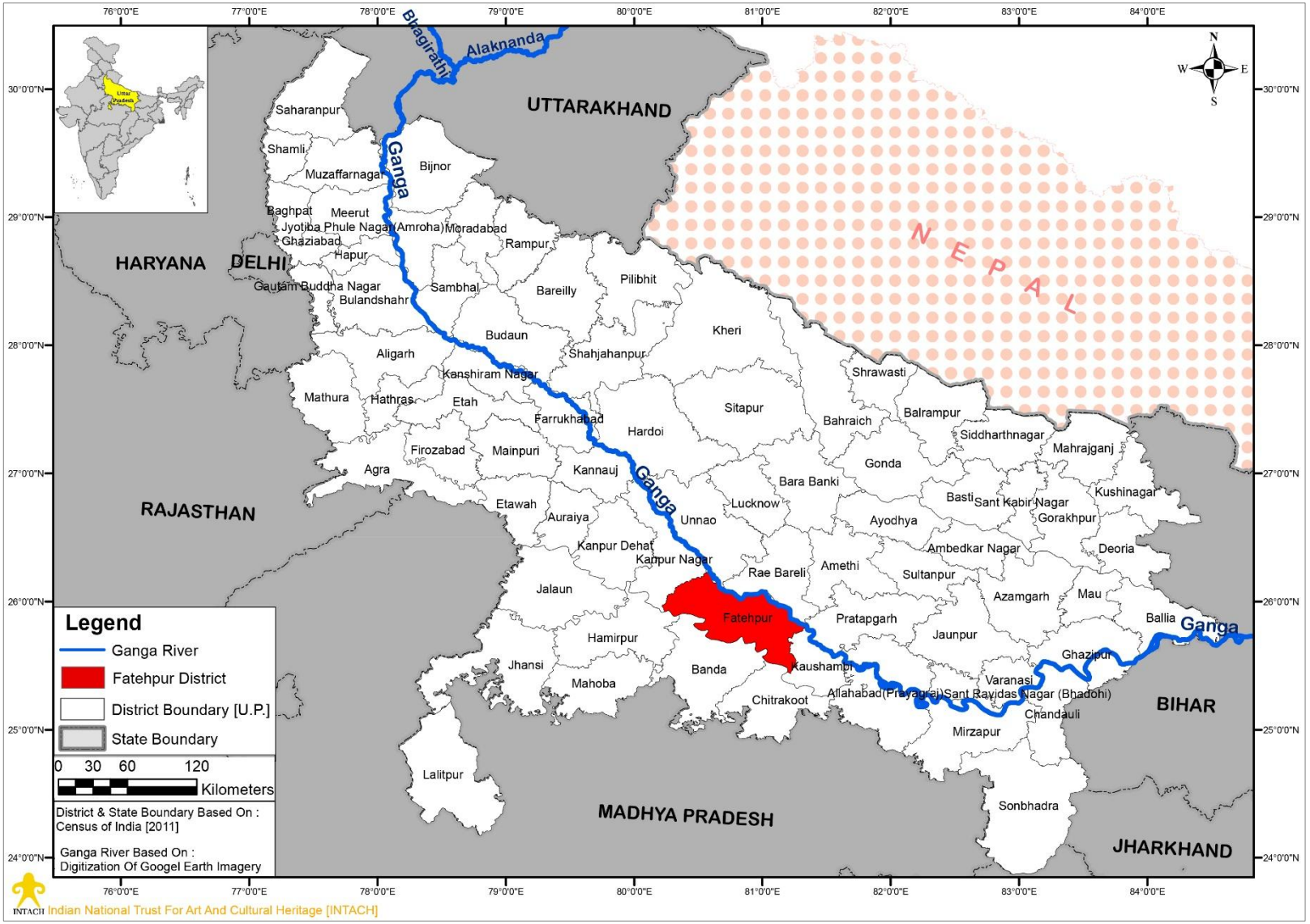
1.2 Fatehpur town is the Distt. headquarter for administrative purpose. The Distt. has been divided into 3 sub-divisions and further in 13 development blocks, 786 Gram Panchayats and 1350 revenue villages.

1.3 Fatehpur Distt. is situated between two important cities Prayagraj and Kanpur of Uttar Pradesh. It is well connected with those cities by rail network as well as by road network. The distance from Prayagraj is 117 KM and 76 KM from Kanpur. The district is surrounded by Ganga and Yamuna Rivers on the north and south boundaries and is bordered by Unnao, Raebareli and Pratapgarh (for a short length) from the north, Kaushambi Distt. from the east, Chitrakoot, Banda and Hamirpur Distt. from the south and Kanpur Nagar Distt. from the west [Refer Map No. 1].

1.4 According to the Census 2011, Fatehpur Distt. had a population of 26,32,733. The Distt. had a population density of 630 inhabitants per square kilometer. Its population growth rate over the decade 2001-2011 was 14.05%. Fatehpur had a sex ratio of 901 females for every 1000 males, and a literacy rate of 67.4%. Only 12.2% area of the Distt. is urbanized.

1.5 The climate of the Distt. is characterized by a hot summer and a pleasant winter. Average annual rainfall in the Distt. is 906.2mm. The rainfall varies from 870.3 mm at Fatehpur to 926.8 mm at Khaga. The highest rainfall 168% of the normal occurred in 1915 and lowest rainfall 60% of the normal occurred in 1918.

[1] Fatehpur District Profile [Website Accessed Dated 05.05.2022]
https://fatehpur.nic.in/history/



Map 1 : Location Of Fatehpur Distt. On Right Bank of Ganga River

2.0 Ganga River In Fatehpur District

2.1 Ganga River enters Fatehpur Distt. at Latitude 26°13'42.96"N and Longitude 80°35'5.09"E near Benikhera Village (Devmai Block) after crossing Kanpur Distt. [Right Bank] and Unnao Distt. [Left Bank] [Refer Map No. 1 & 2 and Image No.1]. Length of Ganga River in Fatehpur Distt. is approximately 75 km, while its width varies between 0.3 Km [Between Garhi and Dalmau] to 2.0 km [near Khargupur Bargala]. The active floodplain of Ganga River in Fatehpur Distt. is under cultivation [mainly *Rabi and Zaid*] except few *Saccharum* and *babool* dominated riparian vegetation. The riverine islands are somehow intact having riparian grasses upto 2 metres.

2.2 The point where Ganga enters the district, it is joined by a river called Pandu Nadi. A channel of Pandu Nadi flows parallel to Ganga River; joins it near Gobindpur Village after flowing to a distance of approximately 13 Km. Flowing downwards, Ganga makes a slight concave turn further convex turn and reaches Dalmau [Left Bank]. Within this stretch the river continuously shifts its channel and forms fertile floodplain area having width of approximately 3.5 Km. Several riverine islands formed due to this fluvial action provides habitat to Nilgai [*Boselaphus tragocamelus]* and Indian wild boar [*Sus scrofa*]. Flowing easterly, the river makes few turns near Narulu Buzurg [26°0'23.38"N, 81°3'10.11"E], Budhera [25°55'51.84"N, 81°12'21.24"E], Naubasta [25°52'21.90"N, 81°12'48.94"E] and Manipuri Ghat [25°50'13.97"N, 81°16'22.46"E] and leaves the distt. after crossing Ekauna Garh Village.

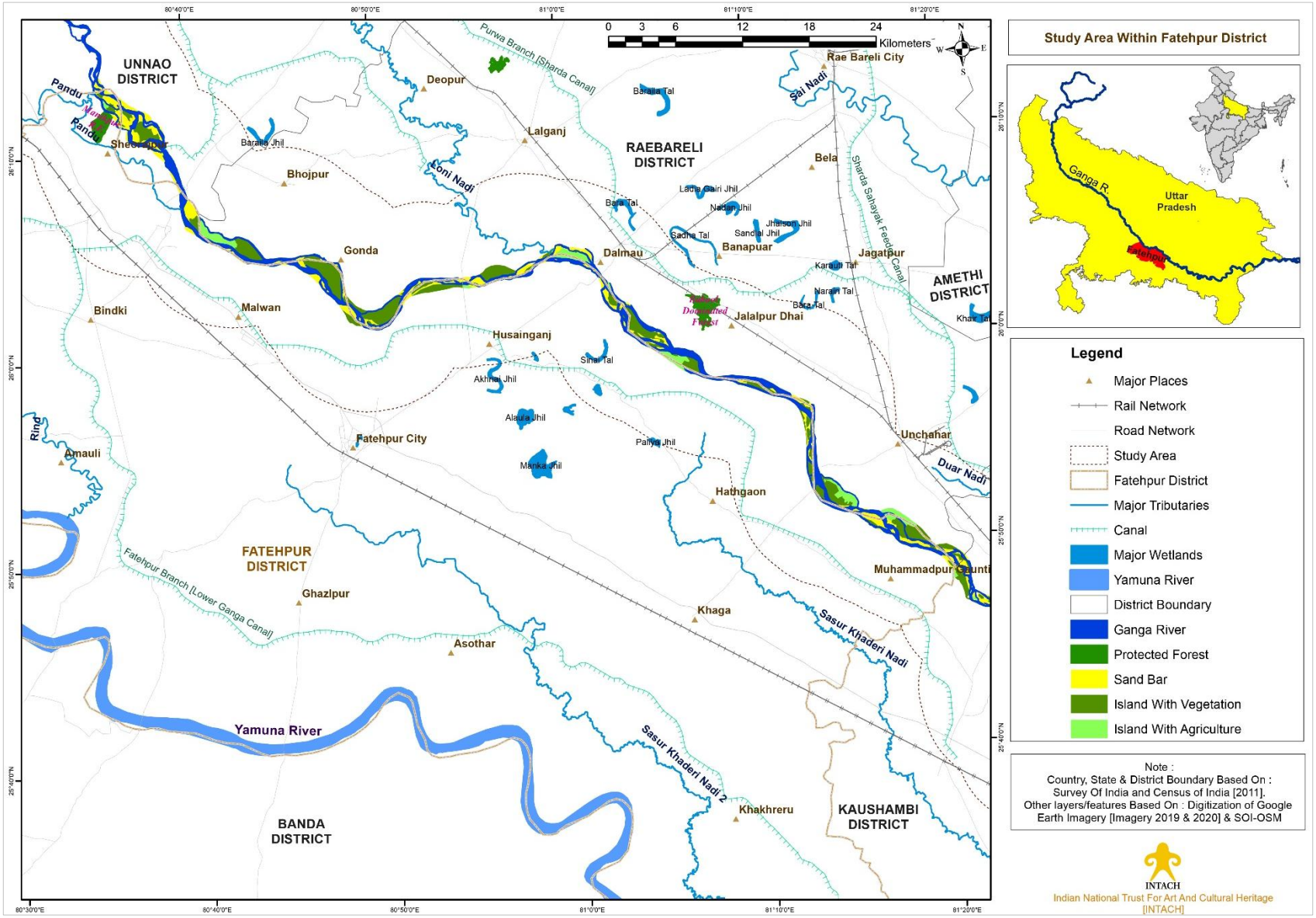
2.3 Along the Ganges [right bank] there is no such significant settlement except few villages [Sheorajpur (Radhe-Krishna Temple Complex), Bhitaura [Om Ghat], Asni [Mankameshwar Temple Complex], Matinpur [Chhoti Kuti, Badi Kuti] and Ekauna Garh (Nageshwar Dham Ashram)] which have sacred sites, temple complexes that used for pilgrimage for Generations.

2.4 A branch of Lower Ganga Canal named Allahabad Branch [Lower Ganga Canal] runs parallel to River throughout the distt. Somehow depicts the floodplain limits of the River[2] [Refer Image No. 2 & Map No. 2].

[2] Analysis based on Uttar Pradesh Flood Hazard Map
https://vai.bmtpc.org/map/floodmap/flood-up.pdf

Image 1 : View Of Ganga River From Om Ghat [Right Bank], Fatehpur Distt.

Image 2 : Allahabad Branch [Lower Ganga Canal]



Map 2 : Study Area In Fatehpur Distt.

3.0 Methodology

3.1 For carrying out surveys, a 7 km buffer [study area] of Ganga River in Fatehpur Distt. was marked having a total area of 837.91 sq.km. The study area was divided into grids of 5 × 5 km for field survey. Before carrying out surveys, the study area was analysed with the help of secondary literature, mythological records, available maps [Google Earth historical satellite data, SOI old toposheets, SOI-OSM sheets]. Based on that, key features were marked in Google Earth Pro and Kml files were generated. The Kml files were further transported to mobile based QGis field survey application. Key features were marked taking consideration of Natural Heritage documentation format.

3.2 The field survey in Fatehpur Distt. was carried out in March 2022. Various sites were visited within the study area wherein field data was collected along with interactions with stakeholders. The co-ordinates of all localities were taken by Garmin handheld GPS eTrex30 and the representative images of various parameters were taken with the help of Sony Digital Camera Cyber-shot DSC-HX300 with 50X optical zoom. Pre-marked Google Earth's Kml files and Google Maps were used for navigation. Scanned maps of the topographic map series of Army Map Services, U.S. Army [Map NG44-6 & NG44-11], Survey of India [SOI] Open Series Maps [OSM] and Google Earth Historical Imagery were obtained and analysed for preparation of Maps.

3.3 Field guides were used for flora and fauna identification. The diversity of avian species was recorded using binoculars and identified using field guides [Salim Ali, 2012; Grimmett et al., 2016]. The conservation status of the species was listed by using IUCN Red Data List. Information regarding groundwater, agriculture, forest and wetland were obtained through informal/formal interviews and discussion with Govt. officials of Forest Department, and farmers, fishermen, boatmen and other stakeholders.

4.0 Tributaries of Ganga River

4.1 Major tributaries within the district are – Yamuna River, Rind Nadi, Sasur Khaderi Nadi Sasur Khaderi Nadi 2 and Pandu Nadi. Pandu Nadi is only river which drains to River Ganga. Rind Nadi, Sasur Khaderi Nadi and Sasur Khaderi Nadi 2 [also called Bari Nadi, Maha Nadi and Bilanda Nadi] are the tributaries of Yamuna Nadi [Refer Map No. 3]. Details of the minor and major tributaries are discussed in this section and are presented in Map No. 3.

4.2 **Yamuna and its tributaries :** Yamuna River originates from Yamunotri glacier (60 km. away from Kedarnath) in Uttarakhand state and joins Ganga River in Prayagraj Distt. of Uttar Pradesh. The river enters Fatehpur Distt. from its southern side at 25°55'23.84"N, 80°14'6.45"E; forms southern boundary of the district with Hamirpur Banda and Chitrakoot Distt. respectively. In its journey of 1376 Km, the river drains approximately 163 km within Fatehpur Dist. and empties to Ganga River at *Triveni Sangam* near Allahabad Fort in Prayagraj Distt. [Refer Image No. 3]. Within this stretch, the rivers namely **Betwa** and **Ken** join from the right bank and **Rind** and **Sasur Khaderi Nadi 2** from the left bank.

Image 3 : Yamuna River As Viewed From New Yamuna Bridge [Near Triveni Sangam]

4.2.1 **Rind Nadi :** Rind rises from the low lying tract in Aligarh Distt. and flows through Hathras, Etah, Mainpuri, Etawah, Auraiya, Kanpur and Fatehpur. The river enters the Fatehpur distt. near Jarara Village at 26°8'25.55"N, 80°23'12.92"E; flows to a distance of 74 Km.s and empties to river Yamuna near village Azmatpur Dariyabad at 25°52'38.40"N, 80°32'51.58"E. The Fatehpur Gazetteer of 1900[3] describes the environ of Rind Nadi as:

"The whole country in its neighbourhood is a network of ravines formed by the numerous watercourses which cut their way through the hard calcareous soil to join the stream; but the watersheds on either side area so close to the river that it has no tributaries of any size. These ravines are often deep and covered with scrub jungle, which affords an excellent grazing-ground."

4.2.2 **Sasur Khaderi Nadi 2 :** The river also known as Bari Nadi, Maha Nadi and Bilanda Nadi. It originates from a pond at 25°54'49.74"N, 80°44'59.81"E near Rara village in Fatehpur Distt. and flows to a distance of 107 Km to meet Yamuna at 25°30'45.02"N and 81°7'32.96"E near Chananmau Village.

4.2.3 **Sasur Khaderi Nadi :** Sasur Khaderi Nadi is a tributary of river Yamuna, originates from Jagannath Jhil[4] of the Fatehpur distt. [Refer Image No.4]. The Jagannath Jhil is now a small pond; however, it was once a huge wetland having water spread area of 153 Hectares[5]. The river drains 42 Km in Fatehpur Distt. exits the distt. at latitude 25°44'50.30"N and longitude 81°14'39.92"E [Refer Image No. 5]. From this coordinate river enters Kaushambi Distt., drains almost parallel to Ganga River and joins Yamuna from its left bank near village Bakshi Mohda at latitude 25°24'14.41"N and longitude 81°48'27.80"E. Sasur Khaderi Nadi forms a central drainage channel of the Duab region [Region between Ganga-Yamuna] and is joined by Chhoti Kilnahi Nadi from its left bank near Fazlabad at latitude 25°26'0.64"N and longitude 81°31'33.83"E. During the rains the river carries large volume and dries in summer. In recent years river bed has been encroached and flattened in some areas for agricultural and construction purpose[6].

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[3] Fatehpur - A Gazetteer, District Gazetteers of the United Provinces of Agra and Audh, Volume XX, Printed by Govt. Press, United Provinces, 1900.

[4] One India Hindi, Article dated 25 November 2012 [Accessed in December 2021] *https://hindi.oneindia.com/news/2012/11/25/uttar-pradesh-bundelkhand-sasur-khaderi-river-going-to-die-224186.html*

[5] Based on analysis of U.S Army Maps [Complied 1953], NG44-11.

[6] Dainik Jagran Hindi Newspaper, Article dated 24 November 2018 [Accessed in December 2021] *https://www.jagran.com/uttar-pradesh/allahabad-city-sasur-khaderi-river-will-be-life-line-of-kaushambi-18676636.html*

Image 4 : Jagannath Jhil

[The Jagannath Jhil is now a small pond; however, it was once a huge wetland having water spread area of 153 Hectares]

Image 5 : Sasur Khaderi Nadi As Seen From River Bridge At 25°48'43.8"N, 81°08'49.7"E

4.3 **Pandu Nadi :** Pandu is the only tributary of River Ganga in the Distt [Refer Map No. 3 and Image 2 & 3]. It enters Fatehpur distt. near Kosa village [26°10'54.80"N, 80°28'9.50"E] and for a short distance it forms part of north-western boundary with Kanpur Distt.. The river joins Ganga near village Rambaksh Purwa; another channel runs almost parallel to river Ganga for a distance of approximately 13 Km.s empties near Gobindpur. During its short journey in Fatehpur the river drains 38 Km.s. The confluence of the Ganga-Pandu near Rambaksh Purwa has been developed in 2010. The satellite Imagery of 2002 and 2010 is showing the development of new Ganga-Pandu confluence near Rambaksh Purwa.

Image 6 : Satellite Imagery Of 2002 Showing Pandu Nadi
[Source : Google Earth Imagery, December 2002]

4.4 There are 13 minor streams identified within the study area which drains to river Ganga. Details of minor streams are provided in Table No.1. The lengths of identified streams range between 2.5 Km. to 17 Km. Documentation of these small streams is important because these streams serve as breeding ground to fishes. Dense riparian vegetation is still present along their banks and is continuously shrinking due to increasing anthropogenic activities.

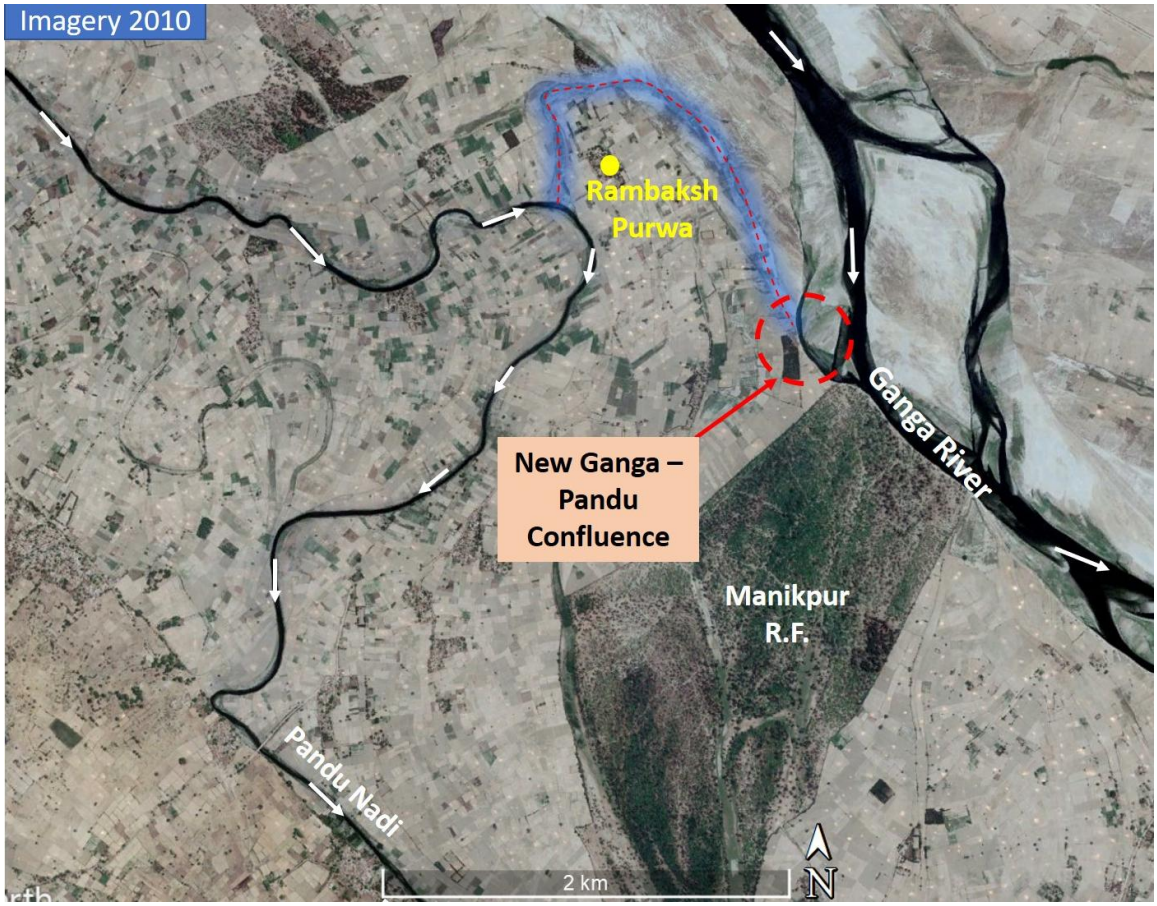


Image 7 : Satellite Imagery Of 2010 Showing Pandu Nadi

[Source : Google Earth Imagery, December 2010]

Image 8 : Pandu Nadi As Viewed From Pandu River Bridge Near Sheorajpur

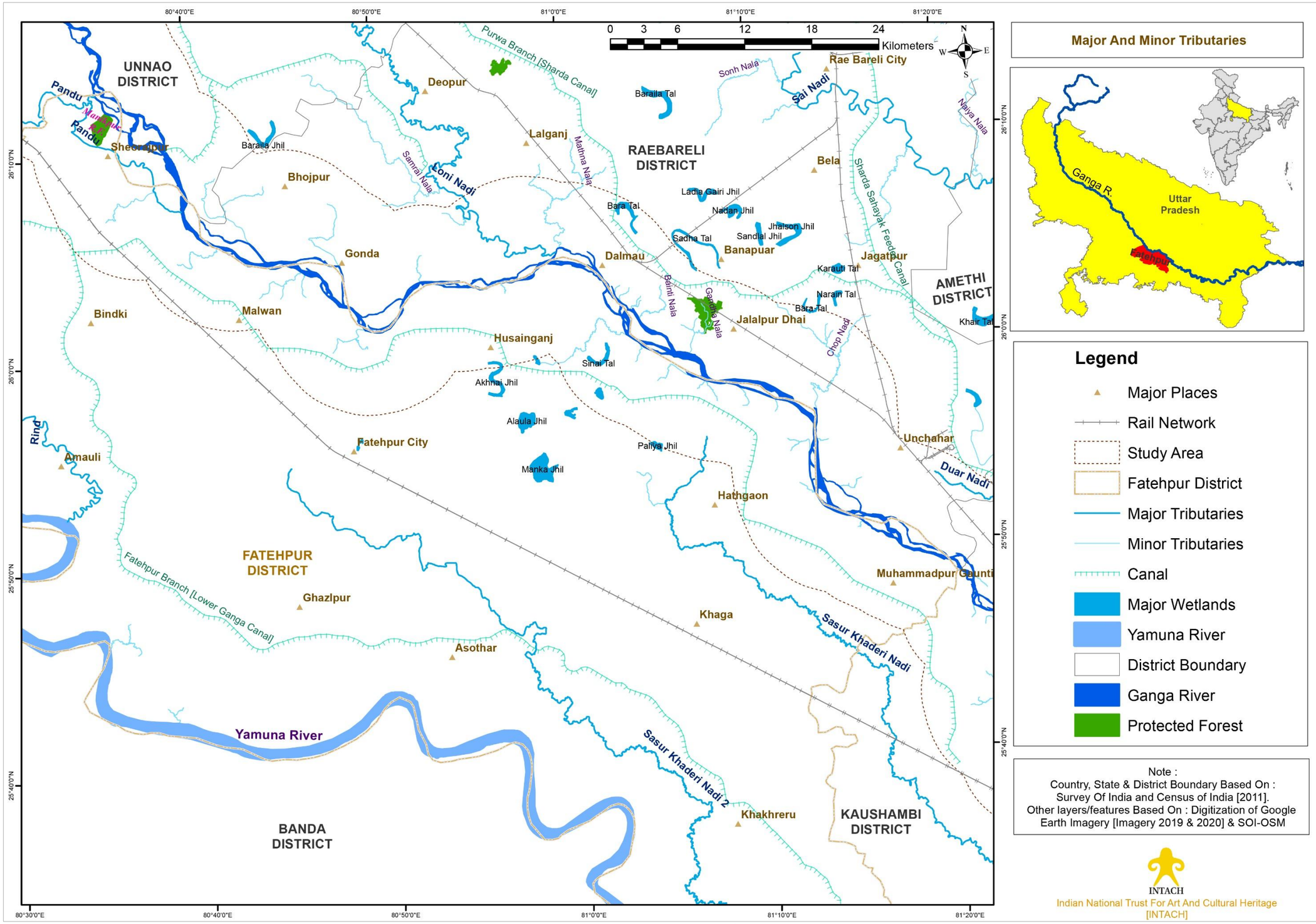
Image 9 : Pandu Nadi Near Ganga-Pandu Confluence

Image 10 : Image Showing Nara/Nala Near Samsahi [Ref. Table No.1]

Table 1 : Streams Within The Study Area

Stream	Confluence	Orign	Length and Potential Threat
Nara/Nala	Near Shiv Charan Ka Purwa [25°50'58.60"N, 81°15'14.49"E]	Diwara Village [25°48'9.59"N, 81°14'35.26"E]	Stream Length approximately 7.0 Km. Potential Threat : Extensive Agricultural Practices
Nara/ Nala	Near Naubasta [25°52'28.05"N, 81°12'46.05"E]	Near Muhammadabad [25°53'11.75"N, 81°11'22.77"E]	Stream Length approximately 3 Km Potential Threat : Extensive Agricultural Practices
Nara/ Nala	Near Chak Itaili [25°54'47.99"N, 81°10'29.33"E]	Near Kesoi [25°54'29.33"N, 81°12'37.80"E]	Stream Length approximately 5 Km Potential Threat : Extensive Agricultural Practices and constructions
Nara/ Nala	Near Samopur [25°57'39.73"N, 81° 9'5.61"E]	Near Akbarpur Chorain [25°56'48.67"N, 81° 9'8.83"E]	Stream Length approximately 3.0 Km Potential Threat : Extensive Agricultural Practices
Nara/ Nala	At 25°58'3.92"N, 81° 7'15.84"E	Near Paighambarpur [25°43'48.29"N, 81°24'27.26"E]	Stream Length approximately 2.69 Km Potential Threat : Extensive Agricultural Practices
Nara/ Nala	At [25°58'5.46"N, 81° 7'10.13"E	Near Chak Jagjiwan [25°57'32.41"N, 81° 6'29.10"E]	Stream Length approximately 3.5 Km. Potential Threat : Extensive Agricultural Practices & Loss of riparian vegetation
Nara/ Nala	Near Chak Miyan [25°58'22.46"N, 81° 6'21.76"E]	From Wetland Near Paharpur [25°58'10.58"N, 81° 3'53.50"E]	Stream Length approximately 6.0 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation

Nara/ Nala	Near Jafarabad [25°59'56.58"N, 81° 3'52.81"E]	Near Amalia Pal [25°59'3.52"N, 81° 3'28.50"E]	Stream Length approximately 2.5 Km. Potential Threat : Extensive Agricultural Practices
Nara/ Nala	From Wetland Near Rampur [25°59'13.07"N, 80°58'21.47"E]	Near Narauli Buzurg [26°0'28.30"N, 81° 3'6.40"E]	Stream Length approximately 17 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation
Nara/ Nala	Near Lakhpura [26° 3'13.34"N, 80°56'35.65"E]	Near Dhairon Purwa [26°1'50.91"N, 80°56'27.80"E]	Stream Length approximately 3.5 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation
Nara/ Nala	Near Hajipur Gang [26°1'17.36"N, 80°49'7.82"E]	Near Semarhta [25°59'49.27"N, 80°49'51.48"E]	Stream Length approximately 5.1 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation
Nara/ Nala	Near Samsahi [26°5'31.79"N, 80°41'25.55"E]	Near Subedar Khera [26°4'49.15"N, 80°39'18.40"E]	Stream Length approximately 7.67 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation
Nara/ Nala	Near Chak Khera [26°4'13.48"N, 80°45'51.46"E]	Near Kalhal [26°2'59.04"N, 80°43'35.33"E]	Stream Length approximately 6.53 Km Potential Threat : Extensive Agricultural Practices and loss of vegetation



Map 3 : Major and Minor Tributaries [Fatehpur Distt.]

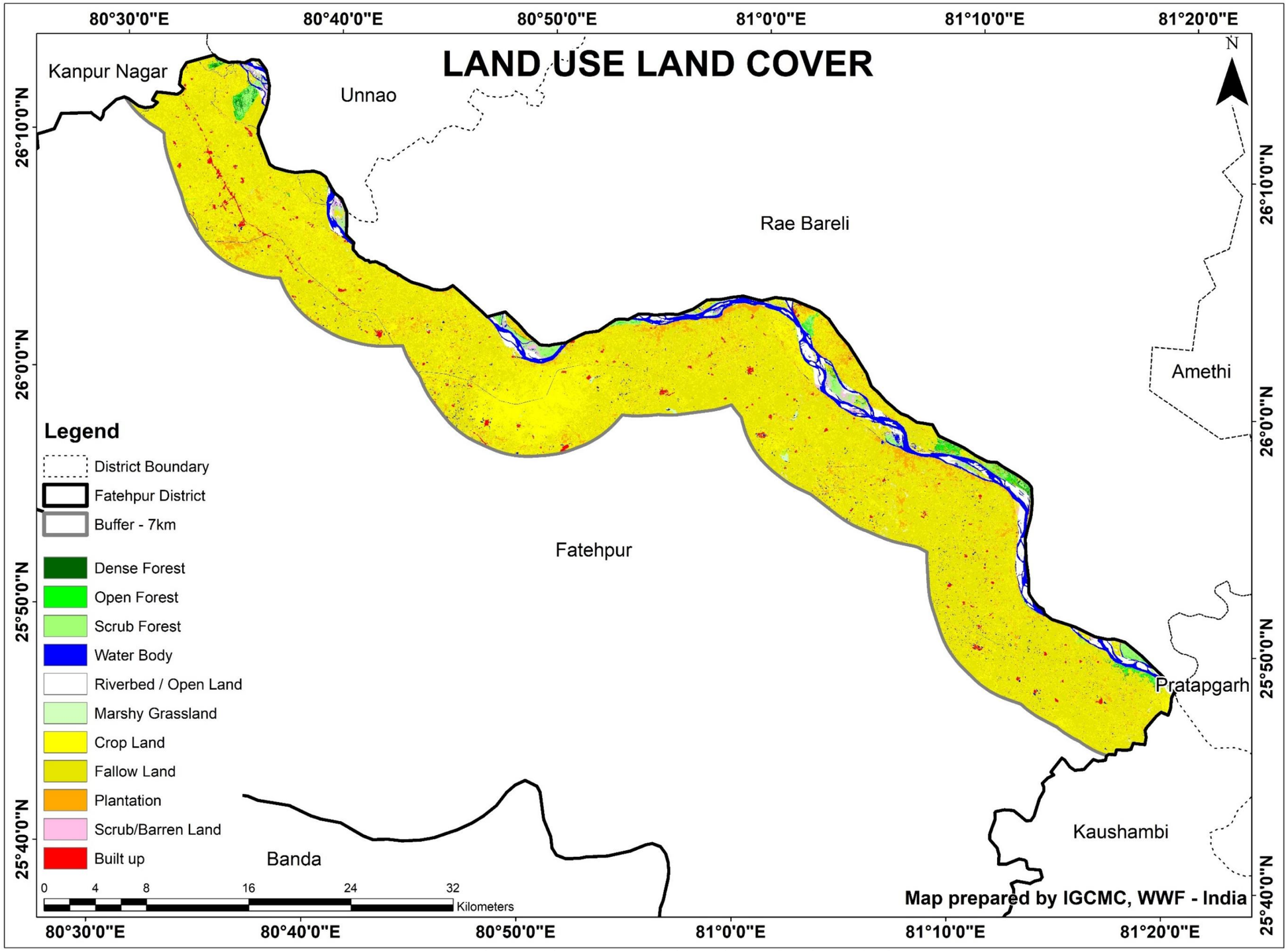
5.0 Land Use Land Cover [LULC]

5.1 Land Use Land Cover [LULC] map of the study area has been prepared from Landsat imagery for the year 2020 [Refer Table No. 2 & Map No. 4]. Using supervised classification system, 11 different classes were generated – Dense Forest, Open Forest, Scrub Forest, Water Body, Riverbed / Open Land, Marshy Grassland, Crop Land, Fallow Land, Plantation, Scrub/Barren Land and Built-up [Refer Map No. 4]. Study area constitutes 837.91 sq.km. covering right bank of River Ganga for which the following observations were drawn based on this classification:

- Forest area constitutes 2.66% of the study area and is classified into Dense Forest, Open Forest and Scrub Forest. Forest area is found in patches along Ganga and Pandu River, Manikpur Reserve Forest and at riverine islands. Fallow land has a distribution of 51.94%, which also includes agricultural fallow land.
- Water body [4.25%] and marshy grassland [0.22%] constitutes 4.47% of the study area. It covers lentic and lotic system of the study area.
- The built-up land constitutes 0.91% of the total study area. This class covers scattered settlements and newly developed settlements along National Highway.

Table 2 : Land Use Land Cover of Study Area In Fatehpur Distt. [2020]

Class	Area (Ha)	Area (%)
Dense Forest	178.08	0.2125
Open Forest	527.14	0.6291
Scrub Forest	1524.72	1.8197
Water Body	3565.21	4.2549
Riverbed / Open Land	2217.24	2.6461
Marshy Grassland	187.06	0.2232
Crop Land	25374.9	30.2834
Fallow Land	43524.3	51.9436
Plantation	5222.13	6.2323
Scrub/Barren Land	705.13	0.8415
Built up	765.47	0.9135
Total	83791.38	100



Map 4 : Land Use Land Cover Map Of The Study Area [Fatehpur Distt.]

6.0 Palaeochannels Within Study Area

6.1 Palaeochannels 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 river or stream migrate their courses and form new ones. Palaeochannels are important to understand geology, old river routes, sediment deposition and are considered suitable areas for ground water recharge. In Fatehpur Distt. factors such as encroachment, extensive agricultural practices, high silt load and loss of vegetation act as a catalyst for the fading of river channels and wetlands. Loss of vegetation allows the soil to erode easily, which finally ends up in filling of the wetlands and accelerate the rate of migration of river.

6.2 In order to identify paleo-channels, paleo-wetlands and threatened river channels in the study region, Survey of India (SOI) toposheets from 1925-1931 to 2005-2006 and Google Imagery upto November 2021 were analysed [Refer Map 5 & 6]. Further, ground truthing carried out in November 2021. Based on that, it has been found that :

- River channel of Ganga in Fatehpur Distt. has migrated between 1925-1931 to 2005 - 2006 [Ref. Map No. 5].

- Major migration was recorded between Benikhera [26°12'53.25"N, 80°34'36.32"E (Near Kanpur-Fatehpur border)] and Semraha Purwa [26° 7'53.64"N, 80°37'59.86"E] and between Deomai Purwa [26° 5'50.23"N, 80°43'8.78"E] and Sarai [26° 5'17.84"N, 80°47'7.95"E]. [Refer Map No. 5]

- In recent years it has been observed that the channel of Ganga River is faded between Senpur [26°3'28.90"N, 80°59'44.73"E], Firozpur [26°2'43.87"N, 81°0'23.91"E] Deoranar [26°1'59.72"N, 81°1'16.19"E] and Narauli Buzurg [26°0'20.07"N, 81°2'45.83"E] in Fatehpur Distt. [Right Bank] [Refer Image No. 13]. Also, near Raebareli-Unnao border area [Left Bank] the river channel is dried between Baksar [26° 8'14.84"N, 80°40'1.78"E], Gahrauli [26° 6'58.62"N, 80°43'57.45"E] and Gonda [26° 4'29.18"N, 80°47'55.51"E] [Refer Image No. 14]. The drying of river channel may trigger lateral erosion at opposite banks.
- Apart from this there are several wetlands which are completely faded and converted into agricultural fields. Lack of riparian vegetation and siltation are main reason behind the faded wetlands. A wetland named Chop Jhil is located at 25°59'48.57"N, 80°57'51.04"E [near Paharpur Village] has completely faded. **The wetland has once**

water spread area of 47 Hectares has now completely lost its identity [Refer Image No. 11 & 12].

Image 11 : Survey Of India Map Showing Chop Jhil
[Source : SOI-OSM [G44O13] of the year 2010 based on the modern survey 1971-1972 and Major Updates in the year 2005-2006, Scale-1:50,000]

Image 12 : Satellite Imagery Showing Dried Chop Jhil
[Source : Google Earth Pro, Imagery Dated, April 2021]

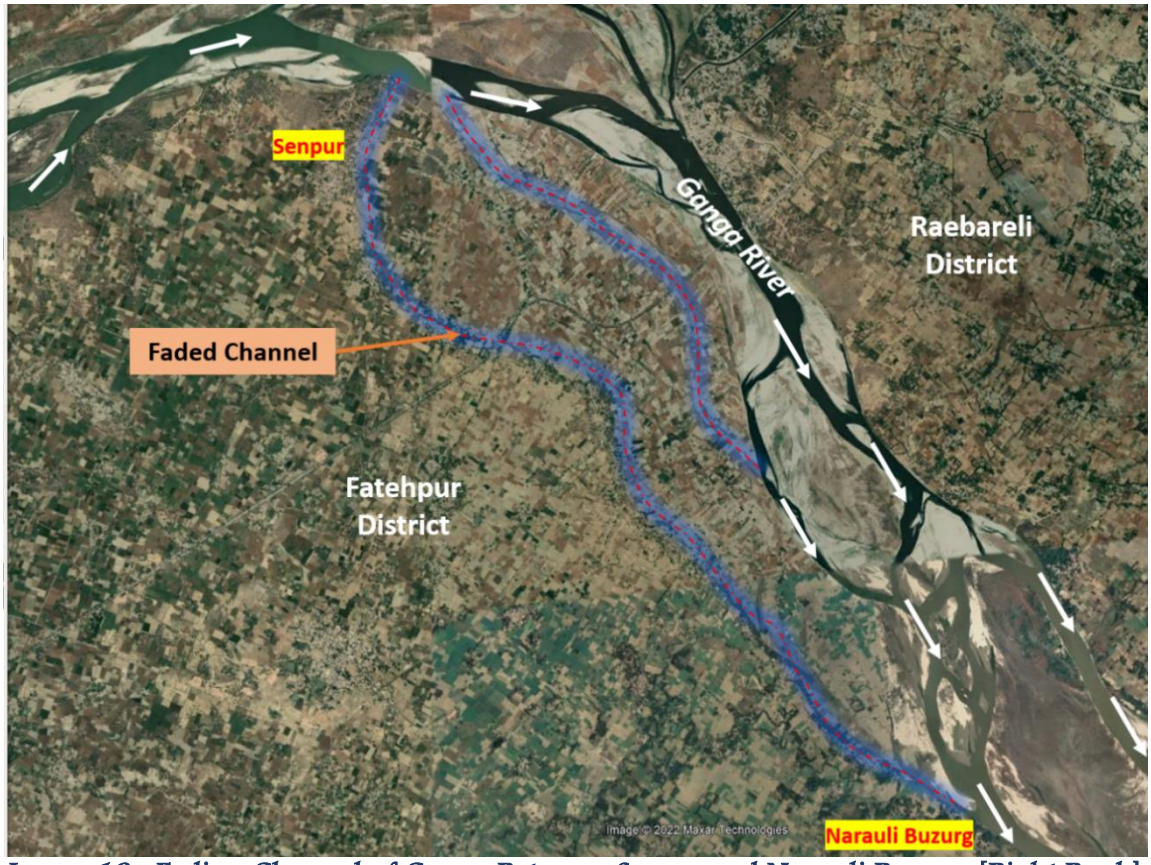


Image 13 : Fading Channel of Ganga Between Senpurand Narauli Buzurg [Right Bank]
[Source : Google Earth Pro, Imagery Dated, December 2021]

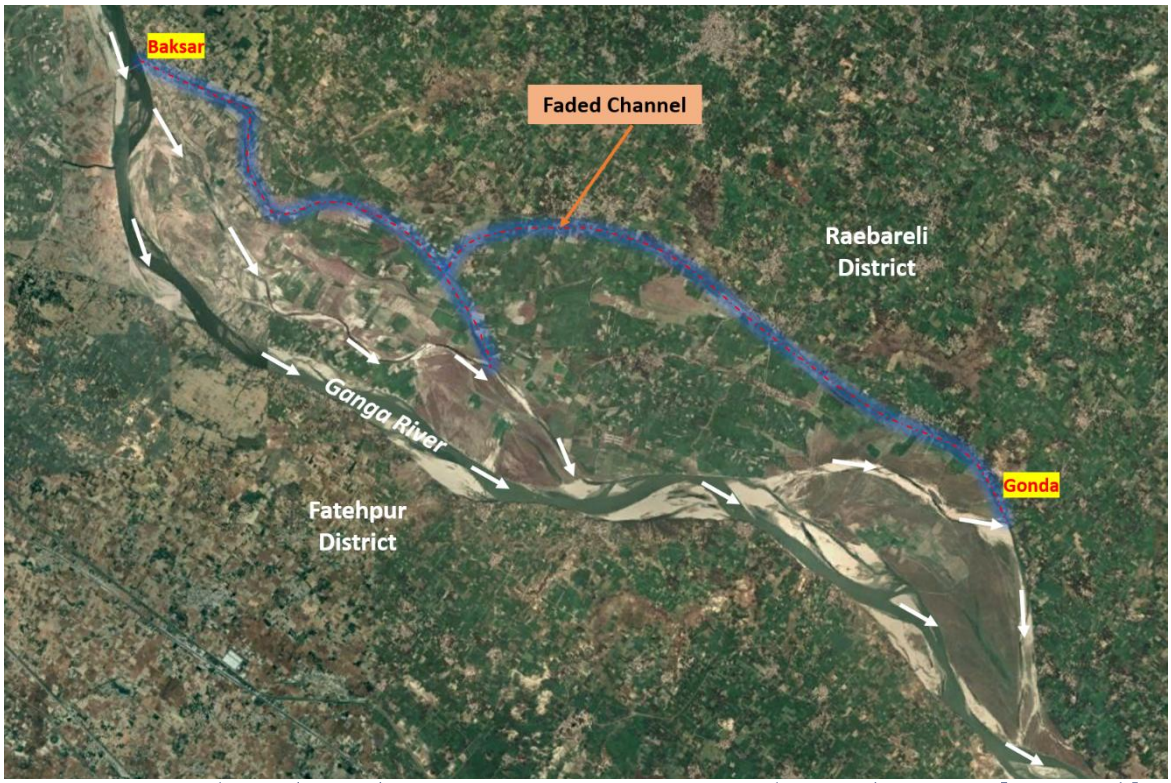
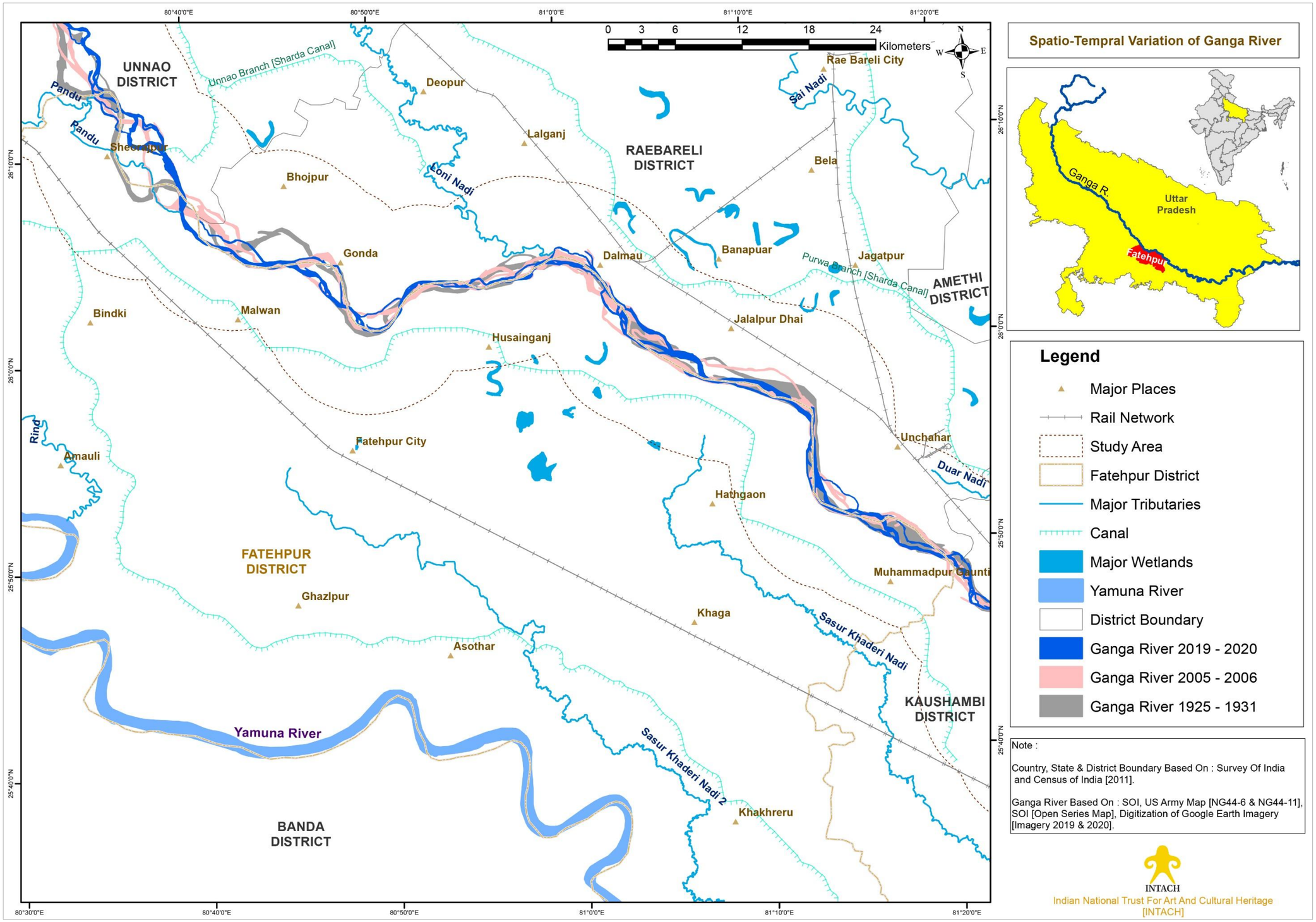
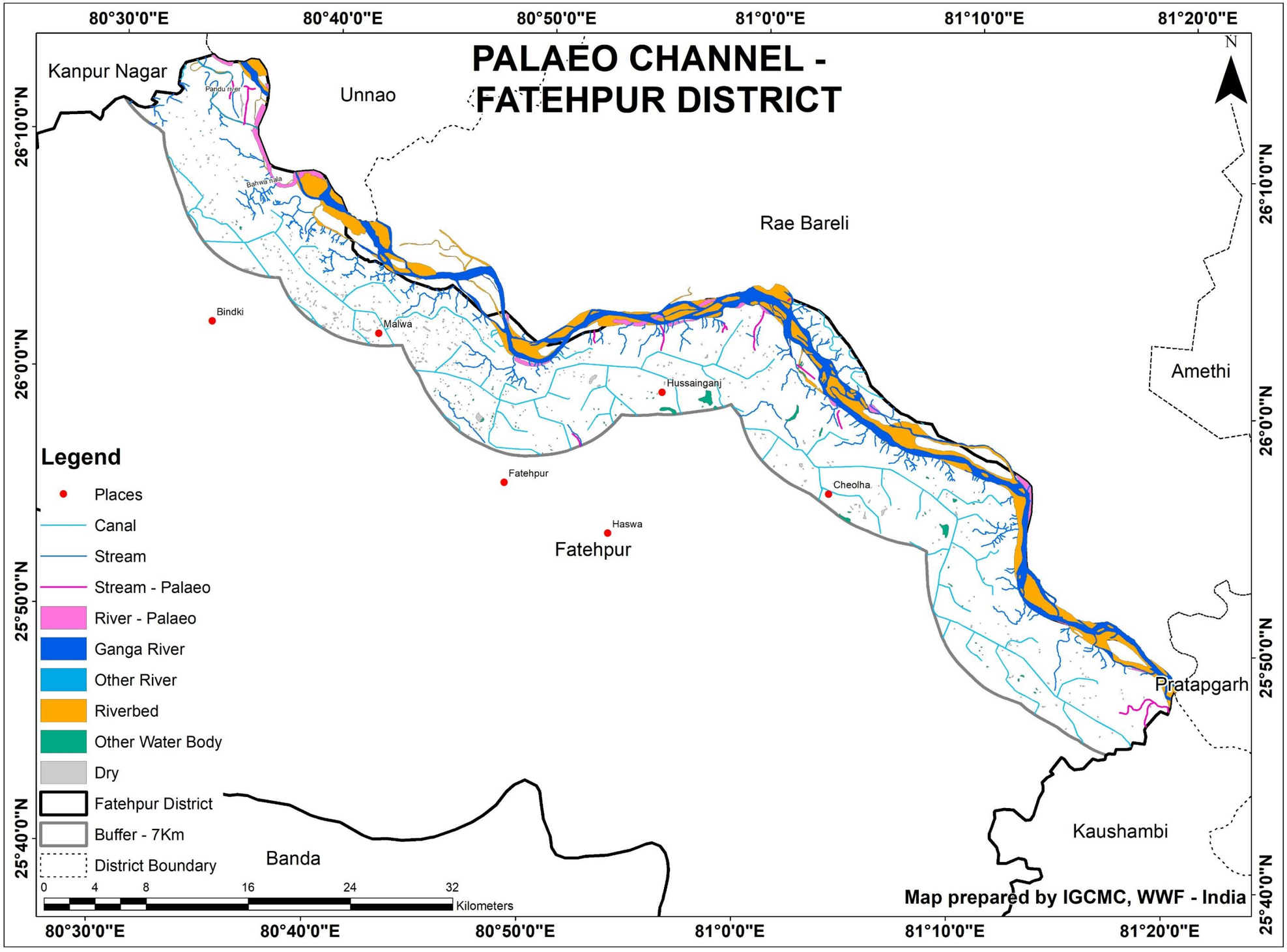


Image 14 : Fading Channel of Ganga Between Senpurand Narauli Buzurg [Left Bank]
[Source : Google Earth Pro, Imagery Dated, December 2021]



Map 5 : Spatio-Temporal Variation Map of Ganga River [Fatehpur Distt.]



Map 6 : Paleochannels Within Study Area [Fatehpur Distt.]

7.0 Floodplain Of Ganga River In Fatehpur District

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 floodplain 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, 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 Distt.s, where it passes through, for agricultural purposes.

7.2 Fatehpur Distt. is part of Upper Indo-Gangetic Plains and physiographically, it represents a fairly level plain, of which nearly every part is equally fertile and well cultivated. The study area is predominantly agrarian and agriculture is a main source of livelihood. Geo-morphologically, the area along Ganga River has a narrow alluvium strip of varying widths, the distance between the rivers and the high banks in some cases being as much as 8 Km. Along the slope of the Ganga River the soil is mainly bhur, which contains a large portion of sand. Moving away from the Ganga, the soil mainly changes into loam or dumat. The soil of jhils and marshes are mainly clay, this clay is known as *matihar*. *Zaid and rabi* crops are mainly cultivated within active floodplain areas [Refer Image No. 15].

7.3 The Fatehpur Gazetteer of 1980[7] describes the Khadar and recent alluvium regions along Ganga River as :

"The tracts occurring on the bank of the Ganga under the influence of watersheds, comprise the Ganga Khadar and the recent alluvium regions, and occupy an area of about 50,000 hectares. These tracts usually take the form of a narrow belts about 5 Km

[7] Mishra Parmanand (1980), Uttar Pradesh District Gazetteers – Fatehpur, Published by Govt. of Uttar Pradesh (Department of District Gazetteers, U.P, Lucknow) and Government Press Allahabad, U.P.

wide, spread over the entire west-east span of the district as continuation of similar tracts in the adjoining districts."

Image 15 : Agricultural Activities In Active floodplain Of Ganga River

[Image showing Wheat fields (Rabi Crop) and Zaid crops protected with Saccharum grass]

7.4 Agricultural produce of the Distt. include-

- **Cereals and Millets :** Bajra (Spiked Millet), Barley, Jowar (Great Millet), Maize, Ragi (Finger Millet), Paddy, Sawan, Wheat.
- **Pulses :** Arhar (Tur), Cowpea (Lobia), Gram (Chikpea), Masoor (Lentil), Moong (Green Gram), Peas, Urad (Black Gram).
- **Oilseeds :** Linseeds (Flaxseed), Mustard and Sesamum.
- **Vegetables :** Ash Gourd (Petha/Bhatua), Bitter Gourd, Bottle Gourd, Brinjal, Cabbage, Carrot, Couliflower, Green Chillies, Guar Seed, Jhigni or Tori (Ridge Gourd), Okra, Onion, Parwal, Pumpkin, Tomato and Potato.
- Gooseberry (Amla), Lemon, Banana [Refer Image No. 17], Guava, Jackfruit, Muskmelon, Watermelon, Ber, monkey jack (Badhar), Papaya and Mango.

Image 16 : Watermelon Field In Gobindpur Village

Image 17 : Banana Field

8.0 Wetlands Within Study Area In Fatehpur District

As per the Wetlands (Conservation and Management) Rules, 2017 - "Wetland means an area of marsh, fen, peatland or water; whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters, but does not include river channels, paddy fields, human-made water bodies/ tanks Specifically constructed tor drinking water purposes and structures specifically constructed for aquaculture, salt production, recreation and irrigation purposes.''

8.1 Wetlands are highly productive ecosystems and help in maintaining ecological balance by providing food and habitat to large number of living organisms. They also help in controlling floods, recharging groundwater, nutrient recycling, climate stabilization and carbon sequestration. According to National Wetland Atlas [Uttar Pradesh], Wetlands constitute 5.16% geographic area of the Uttar Pradesh state and 4.92% area of the Fatehpur district. The majority [62.10 %] area within the wetlands covered by the lotic system i.e., River/stream. The remaining 37.9% area is covered by Lakes/Ponds [5.51%], Ox-bow lakes/ Cut-off meanders [0.94%], Riverine wetlands [1.30%], Waterlogged [18.52%] and Tanks/Ponds [1.91%],

8.2 In the current exercise, 158 wetlands have been mapped in the study area with the help of Google Earth satellite imagery and SOI-OSM available maps. Total area of the mapped wetlands is 627.89 ha i.e., 0.74% of the study area. The area of identified wetlands ranges between 0.30 ha to 137.92 ha. Out of 158 wetlands, the area of 64 wetlands is less than 1 ha, 50 wetlands have area between 1 ha and 2.5 ha and 44 wetlands have area greater than 2.5 ha. Area of the five largest wetlands constitutes 54% of the total study area. The list of identified wetlands is provided in Table No. 3 and their spatial distribution is shown in Map No. 7.

Table 3 : Wetland Within The Study Area

Sr. No.	Wetland Name/Wetland No.	Latitude	Longitude	Area
1	1	26.180695	80.535145	0.60
2	2	26.163116	80.537748	0.62

3	3	26.17022	80.54794	0.44
4	4	26.170597	80.568215	0.75
5	5	26.163533	80.553126	1.27
6	6	26.167723	80.551871	0.66
7	7	26.142098	80.545455	0.79
8	8	26.146625	80.543782	0.64
9	9	26.146045	80.54557	0.61
10	10	26.147607	80.54281	0.50
11	11	26.158409	80.555112	0.78
12	12	26.156365	80.578985	0.75
13	13	26.152695	80.570481	1.13
14	14	26.149794	80.5671	0.55
15	15	26.147937	80.569002	0.40
16	16	26.147243	80.567044	0.54
17	17	26.148348	80.565225	0.54
18	18	26.146575	80.569343	0.33
19	19	26.129451	80.551718	0.79
20	20	26.146707	80.588861	1.02
21	21	26.135591	80.590102	1.16
22	22	26.1383	80.594711	1.01
23	23	26.10308	80.59487	2.93
24	24	26.089071	80.618766	1.10
25	25	26.073283	80.66394	0.76
26	26	26.05009	80.66223	3.36
27	27	26.059976	80.671266	1.25
28	28	26.035649	80.695501	6.97
29	29	26.032297	80.703875	1.78
30	30	26.034828	80.706321	0.91
31	31	26.033349	80.710296	2.43
32	32	26.034224	80.713654	1.06
33	33	26.035353	80.709326	0.97
34	34	26.03791	80.743976	4.52
35	35	26.044639	80.755625	4.79
36	36	26.014646	80.738056	5.33
37	37	26.015222	80.744341	1.65

38	38	25.999096	80.797011	1.79
39	39	25.976773	80.789942	4.56
40	40	25.974924	80.795714	5.33
41	41	25.997366	80.807254	1.93
42	42	26.00918	80.83314	0.98
43	43	25.980736	80.819236	1.97
44	44	25.983892	80.821563	0.77
45	45	25.972512	80.816038	1.72
46	46	25.971788	80.818511	0.94
47	47	25.955053	80.818169	1.57
48	48	25.987194	80.835349	0.61
49	49	25.982212	80.849485	1.58
50	50	26.003667	80.878887	4.65
51	51	26.008069	80.873261	11.27
52	52	25.978379	80.886134	2.37
53	53	26.017738	80.915735	1.29
54	54	26.005308	80.91845	0.95
55	55	26.032358	80.929232	1.39
56	56	26.006016	80.935991	3.32
57	Akhnai Jhil	25.976787	80.93451	137.92
58	58	26.036701	80.957332	1.076
59	59	26.028738	80.961619	2.82
60	60	25.990597	80.971288	20.94
61	61	26.057381	80.993925	0.73
62	62	26.036832	80.99078	1.53
63	63	26.035386	80.992012	0.30
64	64	26.017675	80.994678	0.99
65	65	26.018927	80.99193	1.84
66	66	25.991776	80.994551	0.73
67	67	26.030912	81.009024	0.74
68	68	26.022384	81.013672	0.57
69	69	26.012814	81.010865	1.29
70	70	25.974594	81.003087	4.91
71	71	25.97515	81.009108	4.35
72	72	25.972603	81.006011	0.94

73	73	25.972319	81.010213	0.81
74	Sinai Tal	25.991896	81.027501	86.6
75	75	25.96155	81.025494	47.01
76	76	25.950313	81.028538	0.67
77	77	25.979072	81.054243	10.18
78	78	25.936319	81.058488	2.74
79	79	25.942525	81.058924	6.72
80	80	25.955971	81.062978	1.83
81	81	25.961538	81.079172	0.79
82	82	25.959559	81.082984	0.63
83	83	25.932589	81.070103	6.48
84	84	25.934121	81.06284	2.35
85	Paliya Jhil	25.917289	81.074299	47.44
86	86	25.923417	81.078931	2.21
87	87	25.926863	81.0799	2.66
88	88	25.930787	81.083821	0.97
89	89	25.928898	81.083063	0.61
90	90	25.934489	81.078213	0.81
91	91	25.938695	81.076567	2.75
92	92	25.921191	81.090811	10.63
93	93	25.923993	81.104793	5.75
94	94	25.946104	81.103433	0.68
95	95	25.94831	81.105881	2.53
96	96	25.91274	81.10526	0.52
97	97	25.940493	81.127347	3.37
98	98	25.925441	81.13893	3.12
99	99	25.9233	81.139805	0.43
100	100	25.923615	81.135851	0.95
101	101	25.935268	81.160682	2.60
102	102	25.878968	81.141676	0.36
103	103	25.926487	81.161897	1.06
104	104	25.945292	81.182483	0.58
105	105	25.934952	81.178447	1.01
106	106	25.932681	81.1754	1.10
107	107	25.919958	81.171279	0.78

108	108	25.917882	81.167262	1.00
109	109	25.887986	81.157516	0.70
110	110	25.8768	81.158335	2.02
111	111	25.875366	81.161125	2.11
112	112	25.898288	81.165987	2.69
113	113	25.910763	81.183343	0.64
114	114	25.900797	81.185424	0.41
115	115	25.886198	81.178277	0.89
116	116	25.844966	81.164512	1.37
117	117	25.857797	81.171063	1.27
118	118	25.880229	81.186879	2.89
119	119	25.874859	81.191494	1.36
120	120	25.860939	81.180258	0.75
121	121	25.847193	81.178487	1.04
122	122	25.820791	81.172736	2.91
123	123	25.825197	81.174151	0.90
124	124	25.826925	81.175286	0.95
125	125	25.829858	81.178007	0.74
126	126	25.831368	81.180402	0.73
127	127	25.833739	81.178707	2.61
128	128	25.835753	81.181542	1.55
129	129	25.845173	81.183264	2.93
130	130	25.848265	81.18581	1.19
131	131	25.849365	81.184134	0.79
132	132	25.853393	81.192911	0.68
133	133	25.842865	81.187913	1.20
134	134	25.833064	81.184818	3.48
135	135	25.830751	81.184234	1.62
136	136	25.811139	81.17941	1.25
137	137	25.818832	81.191966	2.13
138	138	25.848337	81.204151	0.97
139	139	25.842513	81.206001	1.491
140	140	25.839079	81.208261	0.73
141	141	25.811544	81.200694	2.56
142	142	25.821157	81.208187	0.78

143	143	25.818333	81.206982	1.59
144	144	25.849284	81.225951	0.90
145	145	25.810365	81.216206	3.10
146	146	25.81342	81.220299	1.60
147	147	25.85017	81.234686	1.26
148	148	25.847197	81.236522	0.82
149	149	25.801731	81.228291	3.19
150	150	25.804416	81.229991	2.24
151	151	25.802334	81.23245	2.67
152	152	25.811335	81.248247	0.93
153	153	25.821159	81.263548	1.30
154	154	25.78073	81.24844	0.88
155	155	25.797958	81.283329	2.56
156	156	25.776237	81.2904	1.033
157	157	25.792742	81.326748	3.81
158	Bhuyyan Talab	25.949948	81.136848	2.59
	Total Area [Hectares]			627.89

8.3 Among identified wetlands, the Akhnai Jhil, Sinai Jhil and Paliya Jhil were selected for sample survey. These three wetlands constitute 43.31% of the total area of wetlands within the study corridor. The identified wetlands are under threat due to encroachment, agricultural pressure, decrease in riparian vegetation and high silt load. The details of wetlands surveyed in Fatehpur Distt. are provided below :

8.3.1 Akhnai Jhil : It is a huge wetland located near Mohiuddinpur, Falsi, Patariya and Kamalpur village at latitude 25°58'19.53"N and longitude 80°56'13.04"E [Refer Map 7, Table No. 3 (Wetland No. 57) & Image No. 18-20]. As per the satellite imagery of 2020-2021, the water spread area of Akhnai Jhil is around 137.92 hectares. The depth of the wetland is around 15-20 feet. The northern and southern edge of the wetland is covered with Water Hyacinth [*Eichhornia crassipes*]. Currently, wetland is used for fishing and to grow *Trapa natans*, locally called *Pani Fal*. The wetland gets its water from rainfall and runoff from the surrounding areas. The wetland is connected with Chop Jhil and Alaula Jhil through a canal.

The water spread area of wetland is analysed from the U.S. Army Map, Survey of India Toposheets and the recent satellite imagery. It has been found that the area of wetlands in

year 1925-1931 is 222 hectares followed by 179 hectares and 137.92 hectares in year 2005-2006 and 2020-2021 respectively. This is showing a gradual decrease in the wetland area. This may be due to siltation, lack of riparian vegetation and utilization of wetland area for agricultural purpose.

The wetland is a major site for the migratory, local migratory and the resident avian species. However, their number and diversity has decreased in recent years due to lack of fishes, eutrophication and hunting. The current and potential threats to the wetland include – Agricultural runoff, lack of riparian vegetation, lease of wetland area for the agricultural activities, sewage discharge, encroachment and dumping of solid waste and dead bodies of domestic animals.

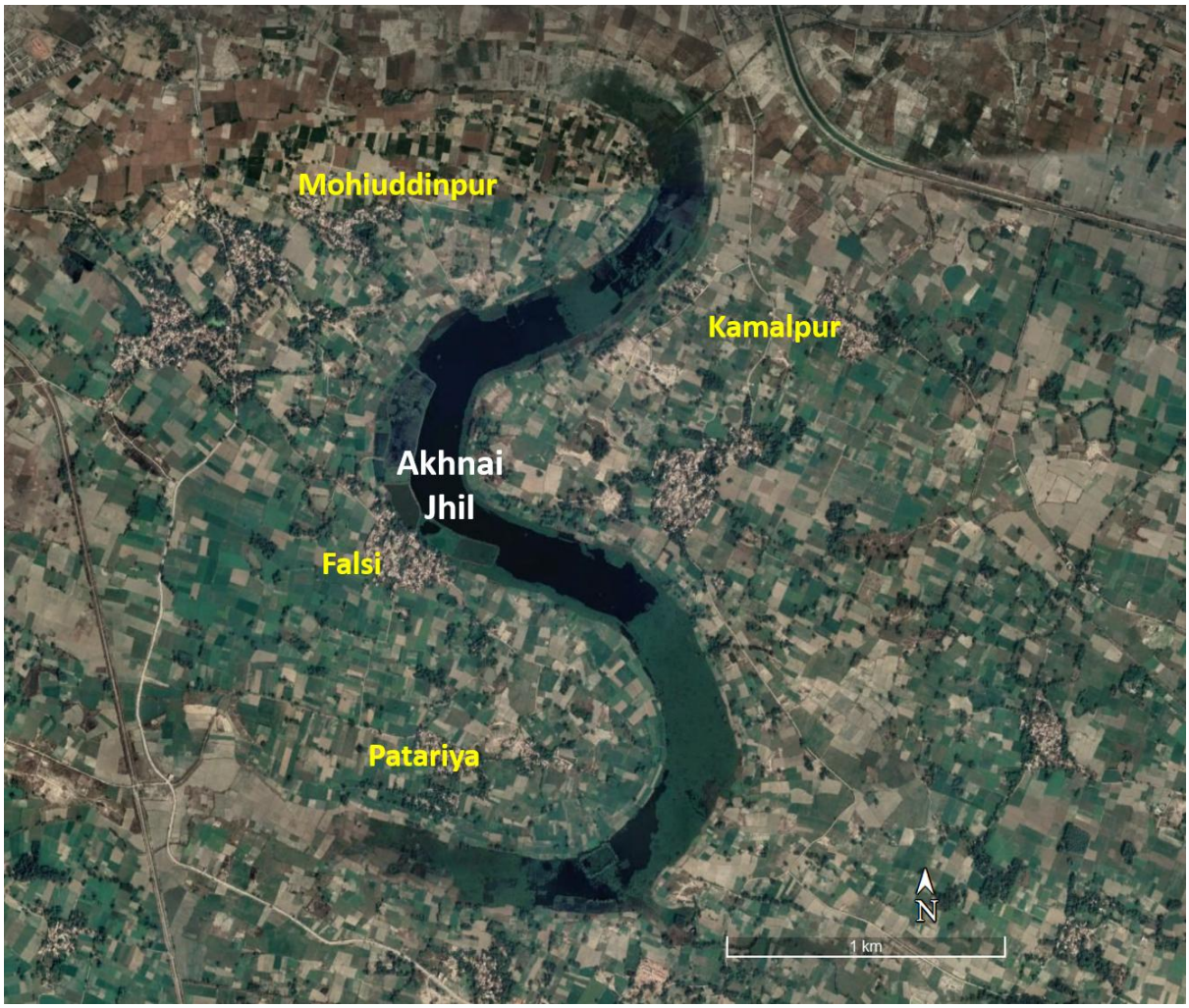


Image 18 : Satellite Imagery Showing Akhnai Jhil
[Source : Google Earth Pro, Imagery Dated, December 2021]

Image 19 : Akhnai Jhil [Looking South]

Image 20 : Eichhornia Infested Northern Edge Of Akhnai Jhil [Looking North]

8.3.2 Sinai Jhil: Wetland is located near Thari, Keshopur, Chak Raza and Rehmat Daulatpur village at latitude 25°59'22.66"N and longitude 81°1'58.37"E [Refer Map 7, Table No. 3 (Wetland No. 57) & Image No. 21-22]. As per the satellite imagery of 2020-2021, the water spread area of Sinai Jhil is around 86.6 hectares. The depth of the wetland is around 6-10 feet. Wetland is completely covered with wetland grasses especially Water Hyacinth [*Eichhornia crassipes*]. The wetland gets its water from rainfall runoff from the surrounding areas and sewage discharge.

Currently, wetland is used for fishing. During field visit, it is found that the wetland area is on lease for agricultural activities and for fish farming. It has been also reported that during *Rabi* season farmers uses pump to remove water from the wetland to sow their crops. At present the wetland is intermittent; but it was once a perennial wetland and its water was used for drinking purposes.

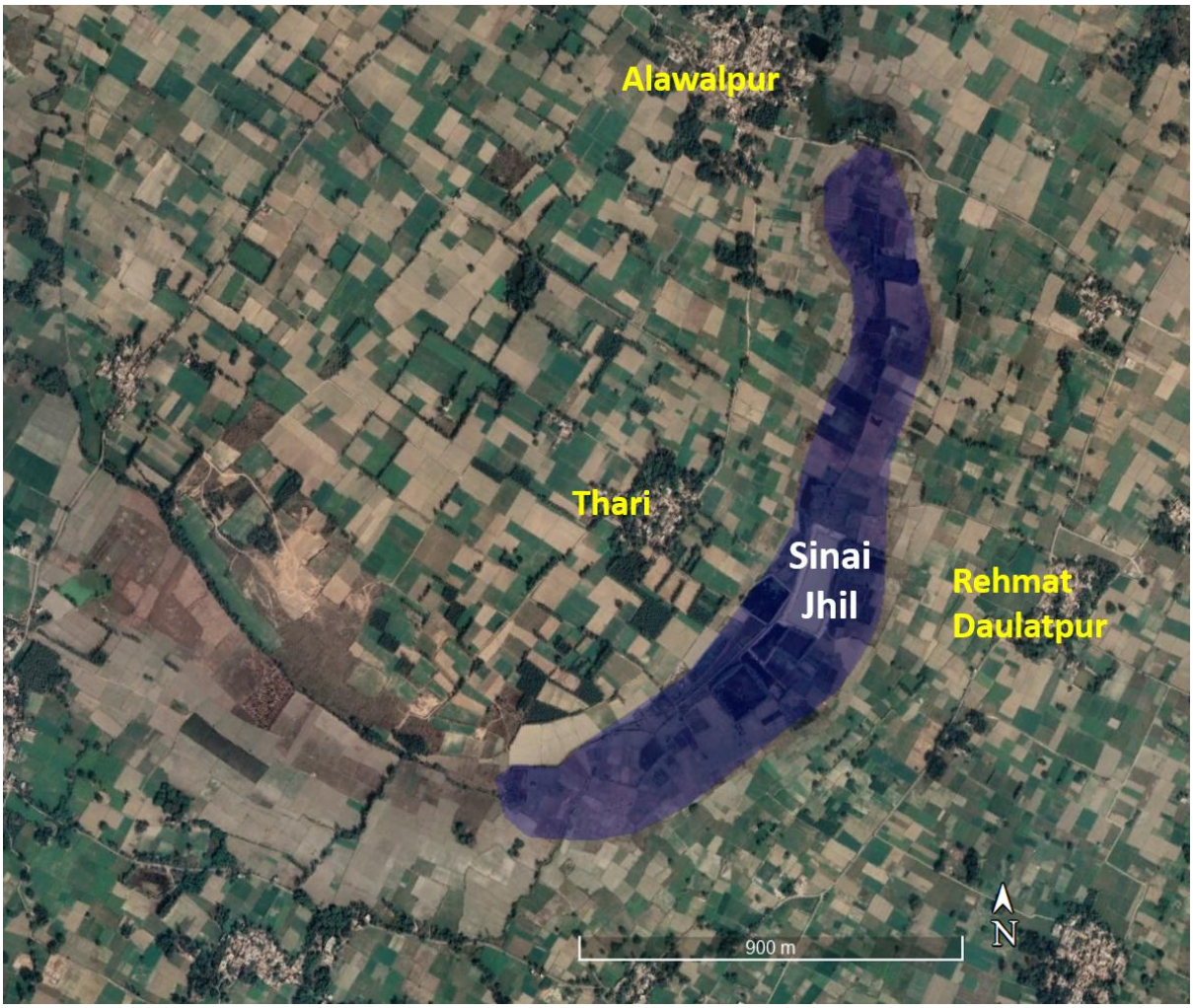


Image 21 : Satellite Imagery Showing Sinai Jhil
[Source : Google Earth Pro, Imagery Dated, December 2021]

Image 22 : Sinai Jhil [Looking North]

8.3.3 Paliya Jhil : Wetland is located near Semra Manpur village at latitude 25°55'2.37"N and longitude 81°4'30.70"E [Refer Map 7, Table No. 3 (Wetland No. 85) & Image No. 23-24]. As per the satellite imagery of 2020-2021, the water spread area of Paliya Jhil is around 47.44 hectares. The water spread area of the wetland was around 55 hectares in year 2005-2006. The wetland area is gradually decreasing due to encroachment of wetland area for agricultural activities. Lack of riparian vegetation has induced the siltation in the wetland. The depth of the wetland is around 8-10 feet.

Wetland is completely covered with wetland grasses and is one of the major habitats for Sarus crane [*Grus Antigone*]. Currently part of the wetland is used for fish farming. Fish species found in the wetland includes – Rohu [*Labeo rohita]*, Catla [*Labeo catla]*, Brigid, Silver carp, Padhina, Bhakur and Tengra [*Mystus tengara].*

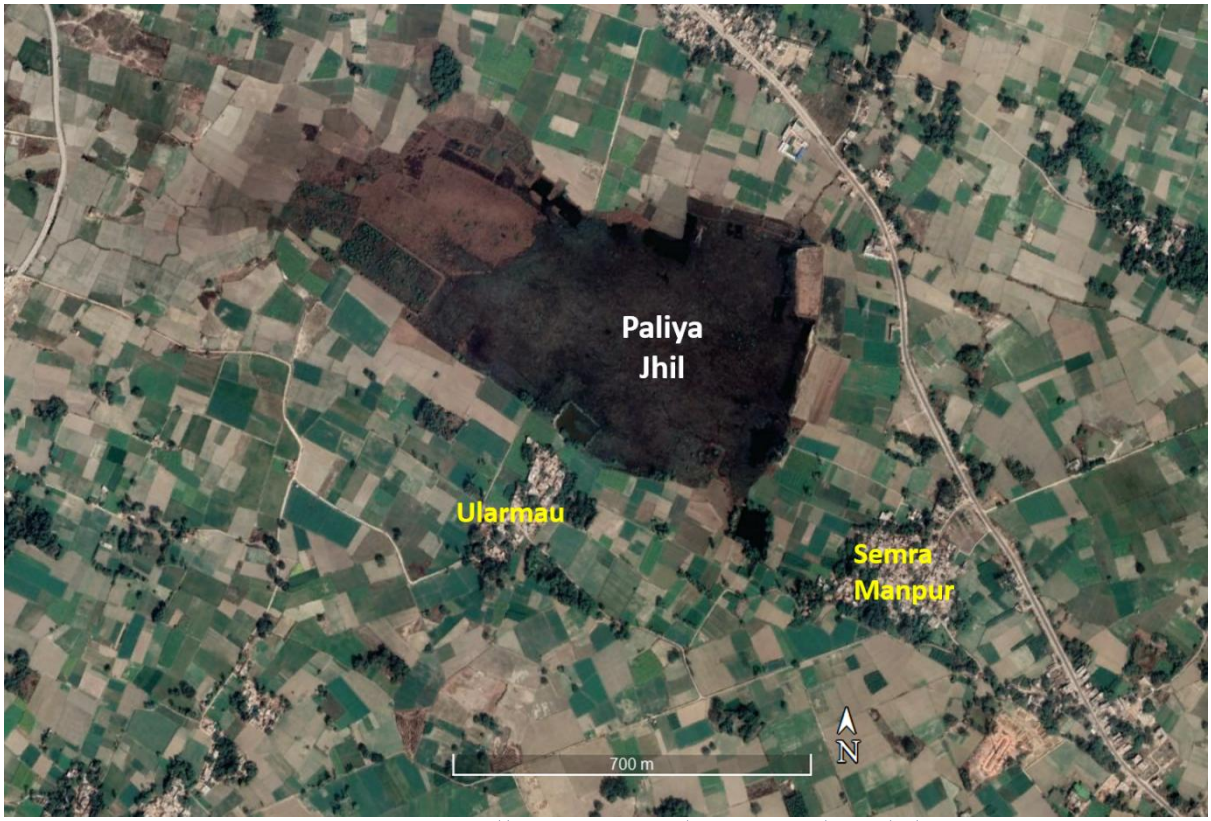
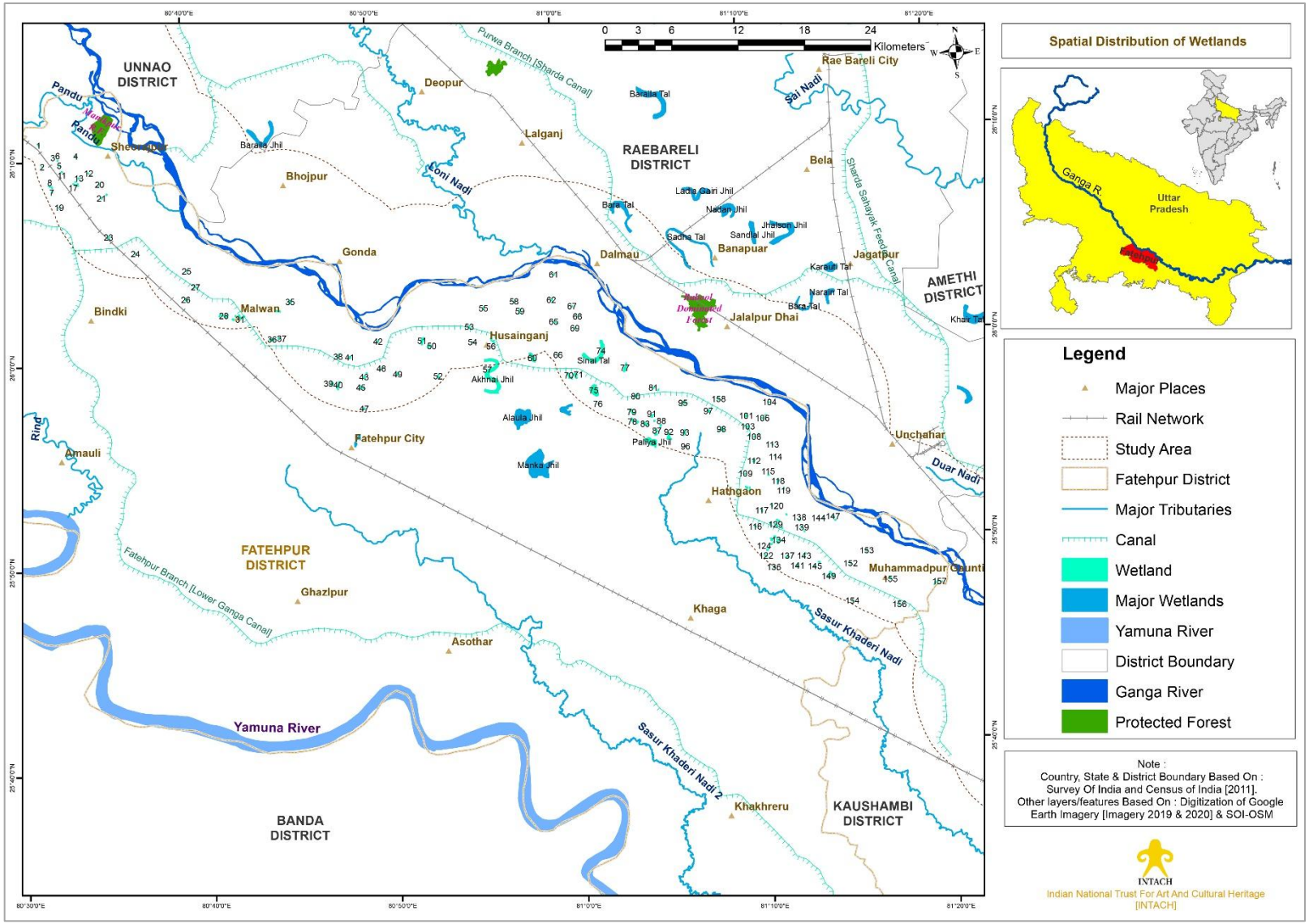


Image 23 : Satellite Imagery Showing Paliya Jhil
[Source : Google Earth Pro, Imagery Dated, December 2021]

Image 24 : Paliya Jhil [Looking North West]



Map 7 : Spatial Distribution Of Wetlands [Fatehpur Distt.]

9.0 Riparian Flora Along Ganga River In Fatehpur District

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 harbour 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, harbouring faunal diversity and providing livelihood resources [Groffman et al., 1990; Castelle 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 Auden [1941], Gupta [1960], Bhattacharyya and Goel [1982], Groffman et al. [1990], Krishanmurti [1991], Castelle al. [1994], Shyam [2008], Gangwar and Joshi [2006] and Gangwar and Gangwar [2011] which have explored the biodiversity of Ganga River basin. In addition, 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 [Bengal].

9.3 The pattern of riparian vegetation in Fatehpur distt. is similar to the adjoining districts – Kanpur, Raebareli, Kaushambi and Pratapgarh. The Fatehpur Gazetteer of 1900 describes the Vegetation within the study area as –

- *"The district is well wooded, but there are no forests properly so called. A considerable area of dhak jungle is to be found along the interior depression, while in the neighbourhood of the Ganges, Jamuna (Yamuna), Rind and Nun rivers area patches of scrub jungle containing babul, rionj, chhenkar [Prosopis cineraria], as well as an abundance of small thorny shrubs such as the hingot and Karaundha. The babul is the most valuable product, but yet as no attempt has been made to grow it for its bark for which there is a strong demand in the Cawnpore (Kanpur) market. The Dhak jungles are found in comparatively barren clay soils, and have a tendency to encroach on cultivation."*
- *"In the Khadir of the Ganges are the large tract covered with sarpat and other coarse grasses, interspersed with occasional trees of babul and dhak."*

9.4 Currently the *Dhak* dominated jungle has been mostly transformed into the agricultural fields and plantation area. The existing patches of riparian vegetation along Ganga River is mostly dominated by *Saccharum spontaneum* L, *Saccharum munja* Roxb., Babool [*Acacia nilotica*], Wild Ber [*ziziphus mauritiana]* and opportunistic & invasive species like *Prosopis juliflora* and *Lantana camara*. The plantation area mainly dominated by – Mango [Mangifera indica], Mahua [*Madhuca longifolia], Emli [Tamarindus indica], Teak [Tectona Grandis]*, Eucalyptus [Eucalyptus alba], Banyan [*Ficus benghalensis*] and Peepal [*Ficus religiosa*].

9.5 A patch of riparian vegetation named Manikpur Reserve Forest; mainly dominated by babool [*Acacia nilotica*] and *prosopis juliflora* is a major riparian vegetation site in the district [Refer Image No.]. Other significant riparian sites are located in Mawaiya Village [26° 6'50.62"N, 80°39'8.77"E], Deomai [26° 4'31.42"N, 80°42'31.95"E], Rawatpur [26° 4'18.10"N, 80°44'43.62"E], Along Nara in Nasirpur [26°0'57.29"N, 80°47'37.32"E], Mauzamabad [26° 3'0.77"N, 80°56'6.76"E], Gopalpur [26°3'18.79"N, 80°58'16.01"E], Barchanpur [25°59'21.46"N 81°3'50.36"E], Deokali [25°57'40.70"N, 81°7'13.62"E] and Rampur [25°54'56.58"N, 81°12'7.88"E].

Image 25 : Babool And Kikar dominated Manikpur Reserve Forest Along Ganga River

Image 26 : Mahua [*Madhuca longifolia*] Plantation

9.6 Some riparian grasses are economically valuable in the district. *Saccharum spontaneum* and Saccharum *munja* are used for making huts, basket and ropes. Ropes [locally called Juda] made of Saccharum *spontaneum* are more durable. A bundle of rope of nearly 1.5 Kg weight costs around 30 rupees and is sold at local market.

Image 27 : Group of Women Processing Saccharum For Rope

9.7 During the survey, total 48 species were recorded throughout the study corridor and is provided in Table No. 4.

Table 4 : Recorded Riparian Plant Species Within Study Area

Sr. No.	Botanical Name	Family	Common Name
01	*Acacia nilotica* (L.) Delile	Fabaceae	Babool
02	*Aegle marmelos* (L.) Corrêa	Rutaceae	Bel Patra
03	*Azadirachta indica* A. Juss.	Meliaceae	Neem
04	*Bombax ceiba* L.	Bombacaceae	Semal
05	*Dalbergia sissoo* DC.	Fabaceae	Shisham
06	*Delonix regia (Hook.)* Raf.	Fabaceae	Gulmohar
07	*Ficus benghalensis* L.	Moraceae	Banyan
08	*Ficus religiosa* L.	Moraceae	Peepal
09	*Ficus virens* Aiton	Moraceae	Pakad
10	*Holoptelea integrifolia* Planch.	Ulmaceae	Chilbil
11	*Madhuca longifolia* var. latifolia (Roxb.) A.Chev.	Sapotaceae	Mahua
12	*Peltophorum pterocarpum* (DC.) K.Heyne	Fabaceae	Peela Gulmohar
13	*Polyalthia longifolia* (Sonn.) Thwaites	Annonaceae	False Ashok
14	*Tectona grandis* L.f.	Lamiaceae	Teak
15	*Calotropis gigantea* (L.) Dryand.	Apocynaceae	Safed Aak
16	*Calotropis procera* (Aiton) Dryand.	Apocynaceae	Aak
17	*Lantana camara* L.	Verbenaceae	~~~~~
18	*Lippia alba* (Mill.) N.E.Br. ex Britton &P.Wilson	Verbenaceae	~~~~~
19	*Malvastrum coromandelianum* (L.) Garcke	Malvaceae	False Mallow
20	*Ocimum tenuiflorum* L.	Lamiaceae	Tulsi

21	*Polygonum glabrum* Wild.	Polygonaceae	Common marsh buckwheat
22	*Ricinus communis* L.	Euphorbiaceae	Arandi
23	*Ziziphus nummularia* (Burm.f.) Wight &Arn.	Rhamnaceae	Wild Ber
24	*Achyranthes aspera* L.	Amaranthaceae	Chirchira
25	*Amaranthus spinosus* L.	Amaranthaceae	Prickly Amaranth
26	*Ammania baccifera* L.	Lythraceae	~~~~~~
27	*Croton bonplandianus* Baill.	Euphoriaceae	Ban Tulsi
28	*Justicia* sp.	Acanthaceae	~~~~~~
29	*Leucas aspera* (Willd.) Link	Lamiaceae	~~~~~~
30	*Parthenium hysterophorus* L.	Asteraceae	Congress grass
31	*Rumex dentatus* L.	Polygonaceae	Jungli Palak
32	*Solanum xanthocarpum* Schrad. & H. Wendl.	Solanaceae	Kateli
33	*Tephrosia purpurea* (L.) Pers.	Fabaceae	Sharpunkha
34	*Tridax procumbens* (L.) L.	Asteraceae	~~~~~
35	*Xanthium strumarium* L.	Asteraceae	Chhota Dhatura
36	*Cyperus difformis* L.	Cyperaceae	~~~~~
37	*Cyperus rotundus* L.	Cyperaceae	Nut grass
38	*Dicanthium annulatum*	Poaceae	~~~~~
39	*Saccharum spontaneum* L.	Poaceae	Kaans
40	*Saccharum munja* Roxb.	Poaceae	Munj
41	*Cynodon dactylon*	Poaceae	Dhoob/Durva grass
42	*Ipomea aquatica Forsk.*	Convolvulaceae	Water Morning Glory
43	*Butea monosperma*	Fabaceae	Pal
44	*Cassia fistula*	Fabaceae	Amaltas
45	*Bauhinia variegata*	Fabaceae	Kachnar

46	Tamarix gallica var. indica *(Willd.) Ehrenb*	*Tamaricaceae*	*Jhau or Tamarisk*
47	*Tamarindus indica*	Fabaceae	Emli
48	*Melia azedarach*	Meliaceae	Bakain

Image 28 : A patch Of Riparian Vegetation Along River Ganga

10.0 Faunal Diversity Along Ganga River In Fatehpur District

10.1 *Saccharum* and *babool* dominated riparian vegetation along Ganga, Pandu and Saur Khaderi Nadi provides the habitat to Fox [*Vulpes bengalensis*], Hare [*Lepus ruficaudatus*], Indian Porcupine [Hystrix leucura], Golden Jackal [*Canis aureus*], Nilgai [*Boselaphus tragocamelus],* Indian wild boar [*Sus scrofa*], Indian mole rat [*Bandicota bengalensis],* Common mongoose [*Herpestes edwardsii*], *Rhesus macaque* [*Macaca mulatta*] and Langur [*Semnopithecus spp.*]. Fatehpur Distt. Gazetteer mentioned the presence of leopards, wolfs and hyaenas in the ravines along Yamuna, Rind and Bari Nadi. These species were also found along river Ganga.

10.2 Details of faunal species sighted within the study corridor are provided below :

10.2.1 **Turtles:** River Ganga is home to 13 freshwater turtle species of total 24 species found in the freshwaters of India. Turtles are unique reptilian creatures having distinct ecological niche, adapted to specialized environmental conditions, slight alteration in the habitat can make the species extinct from the region. Poaching, habitat loss, pollution and over fishing are major threats to the turtles. Pristine riverine islands in the distt. provides favourable habitat to the turtles. During the survey **Indian Roofed Turtles** [*Pangshura tecta*]; Vulnerable was sighted at riverine islands. Use of chemical fertilizer for sowing of zaid crops at rivering islands may pose a threat to turtles.

10.2.2 **Nilgai :** Nilgai [*Boselaphus tragocamelus*] or Blue bull has become one of the major threats in crop production, leading to human-wildlife conflict in various regions of the country. Usually prefer open grasslands, open scrublands, woodlands and agricultural fields as habitat. The population of Nilgai has increased drastically over the years due to prolonged breeding activity and lack of potential predators and has become locally overabundant in states of Gujarat, Bihar, Uttar Pradesh, Haryana, Punjab, Rajasthan, Madhya Pradesh and Delhi (Meena, 2017). The entire Gangetic plain is prone to crop raiding by the animal creating human-wildlife conflict across the region. During the survey, significant population was spotted across the district.

10.2.3 **Gangetic Dolphin** : Declared as National declared as the National Aquatic Animal by the Govt. of India in 2010, the Gangetic Dolphin [*Platanista gangetica*] is one of the three fresh water dolphins found in the world. Found in Ganga-Brahmaputra- Meghna and Sangu–Karnaphuli river systems in India, Nepal, and Bangladesh. The Gangetic Dolphin falls under "Endangered" category of IUCN's Red Data List, the population of these species has been decreased since the last century due to habitat loss, habitat

fragmentation, diversion of water, over fishing and hunting (Sinha & Kannan, 2014; Abdul Wakid, 2005). During the survey, we did not have any direct sighting of the mammalian creature. Upon interaction with the Mallah community, it is found that there is a sparse population of dolphin present at Ganga Pandu confluence. Most of the fishermen stated that the dolphins are commonly sighted in monsoon and post monsoon season.

10.2.4 **Wild Boar :** Wild Boars [*Sus scrofa* L.] are one of the most widely distributed species in the world. Their highly adaptive behaviour and wide range of habitat have led the species' population to flourish. In recent years, wild boar has become a regular menace for farmers, causes crop damage right from planting till the maturity of the crop [Vasudeva Rao et. al., 2015]. Famous for attacks on human, the wild boars are usually nocturnal species. During the survey, the locals stated that the boars are responsible for destroying the Zaid crops at river bank. The tall riparian grasses serve as habitat for them, during the night the wild boars use to come out and feed on the crops and vegetables. Historically the *Dhak* dominated Jungles along the river were reported as habitat of wild boars.

10.3 **Avian Diversity :** Fatehpur Distt. has a rich diversity of avian species yet is relatively understudied. The avian diversity survey was conducted in March-April 2022. The diversity was recorded using binoculars and identified using field guides (Salim Ali, 2012; Grimmett et al., 2016). The conservation status of the species was listed by using IUCN Red Data List. List of recorded avian species is provided in Table Below -

Table 5 : List Of Recorded Avian Species Within Fatehpur Distt.

Sr. No.	Common Name	Scientific Name	Conservation Status
1.	White throated Kingfisher	*Halcyon smyrnensis*	Least Concern
2.	Pied Kingfisher	*Ceryle rudis*	Least Concern
3.	Cattle Egret	*Bubulcus ibis*	Least Concern
4.	Little Egret	*Egretta garzetta*	Least Concern
5.	Intermediate Egret	*Ardea intermedia*	Least Concern
6.	Great Egret	*Ardea alba*	Least Concern
7.	Indian Pond Heron	*Ardeola grayii*	Least Concern
8.	Grey Heron	*Ardea cinerea*	Least Concern
9.	Purple Heron	*Ardea purpurea*	Least Concern
10.	Common	*Actitishy poleucos*	Least Concern

	Sandpiper		
11.	Asian Openbill	*Anastomus oscitans*	Least Concern
12.	Little Cormorant	*Microcarbo niger*	Least Concern
13.	Indian Cormorant	*Phalacrocorax fuscicollis*	Least Concern
14.	Great Cormorant	*Phalacrocorax carbo*	Least Concern
15.	White breasted - Waterhen	*Amaurornis phoenicurus*	Least Concern
16.	Black-headed Gull	*Larus ridibundus*	Least Concern
17.	Brown-headed Gull	*Larus brunnicephalus*	Least Concern
18.	Purple Swamphen	*Porphyrio porphyrio*	Least Concern
19.	**River Tern**	***Sterna aurantia***	**Vulnerable**
20.	Whiskered Tern	*Chlidonias hybrida*	Least Concern
21.	Common Greenshank	*Tringa nebularia*	Least Concern
22.	Black-winged Stilt	*Himantopus himantopus*	Least Concern
23.	Bronze-winged Jacana	*Metopidius indicus*	Least Concern
24.	**River Lapwing**	***Vanellus duvaucelii***	**Near Threatened**
25.	Red-wattled Lapwing	*Vanellus indicus*	Least Concern
26.	Black Drongo	*Dicrurus macrocercus*	Least Concern
27.	Common Myna	*Acridotheres tristis*	Least Concern
28.	Bank Myna	*Acridotheres ginginianus*	Least Concern
29.	Asian Pied Starling	*Gracupica contra*	Least Concern
30.	Brahminy Starling	*Sturnia Pagodarum*	Least Concern
31.	Paddyfield Pipit	*Anthus rufulus*	Least Concern
32.	Common Stonechat	*Saxicola torquatus*	Least Concern
33.	Pied Bushchat	*Saxicola caprata*	Least Concern
34.	Oriental Skylark	*Alauda gulgula*	Least Concern
35.	Common Babbler	*Argya caudata*	Least Concern
36.	Jungle Babbler	*Argya striata*	Least Concern
37.	Large Grey Babbler	*Argya malcolmi*	Least Concern
38.	White Wagtail	*Motacilla alba*	Least Concern
39.	White-browed	*Motacilla*	Least Concern

	Wagtail	*maderaspatensis*	
40.	Indian Silverbill	*Euodice malabarica*	Least Concern
41.	Common Tailorbird	*Orthotomus sutorius*	Least Concern
42.	**Alexandrine Parakeet**	***Palaeornis eupatria***	**Near Threatened**
43.	Rose-ringed Parakeet	*Psittacula krameri*	Least Concern
44.	House Sparrow	*Passer domesticus*	Least Concern
45.	Indian Jungle Crow	*Corvus culminatus*	Least Concern
46.	Oriental Magpie Robin	*Copsychus saularis*	Least Concern
47.	Indian Robin	*Saxicoloides fulicatus*	Least Concern
48.	Common Pigeon	*Columba livia*	Least Concern
49.	Barn Swallow	*Hirundo rustica*	Least Concern
50.	Asian Plain Martin	*Riparia chinensis*	Least Concern
51.	Brown-headed Barbet	*Psilopogon zeylanicus*	Least Concern
52.	Coppersmith Barbet	*Psilopogon haemacephalus*	Least Concern
53.	Ashy Prina	*Prinia socialis*	Least Concern
54.	Plain Prinia	*Prinia inornata*	Least Concern
55.	Asian Koel	*Eudynamys scolopaceus*	Least Concern
56.	Greater Coucal	*Centropus sinensis*	Least Concern
57.	Red-whiskered Bulbul	*Pycnonotus jocosus*	Least Concern
58.	Red-vented Bulul	*Pycnonotus cafer*	Least Concern
59.	Shikra	*Accipiter badius*	Least Concern
60.	Common Kaestral	*Falco tinnunculus*	Least Concern
61.	Black-winged kite	*Elanus caeruleus*	Least Concern
62.	Green Bee-eater	*Merops orientalis*	Least Concern
63.	**Pallas's Fish Eagle**	***Haliaeetus leucoryphus***	**Endangered**
64.	Scaly-breasted Munia	*Lonchura punctulata*	Least Concern

65.	Indian Peafowl	*Pavo cristatus*	Least Concern
66.	Spotted Dove	*Spilopelia chinesis*	Least Concern
67.	Eurasian Collared Dove	*Streptopelia decaocto*	Least Concern
68.	Laughing Dove	*Spilopelia senegalensis*	Least concern
69.	Red Collared Dove	*Streptopelia tranquebarica*	Least concern
70.	Yellow-crowned Woodpecker	*Leiopicus mahrattensis*	Least concern
71.	Black Redstart	*Phoenicurus ochruros*	Least concern
72.	Grey Fancolin	*Ortygornis pondicerianus*	Least concern
73.	Yellow-footed Green-pigeon	*Treron phoenicopterus*	Least concern
74.	Rufous Treepie	*Dendrocitta vagabunda*	Least concern
75.	Purple Sunbird	*Cinnyris asiaticus*	Least concern
76.	Indian Roller	*Coracias benghalensis*	Least concern
77.	Indian Grey Hornbill	*Ocyceros birostris*	Least Concern
78.	Black Headed Ibis	*Threskiornis melanocephalus*	**Near Threatened**
79.	Red Naped Ibis	Pseudibis papillosa	Least Concern
80.	African Comb Duck	*Sarkidiornis melanotos*	Least Concern
81.	Sarus Crane	*Grus Antigone*	**Vulnerable**

Image 29 : Sarus Crane *[Grus Antigone]*

Image 30 : African Comb Duck *[Sarkidiornis melanotos]* In paliya Tal

11.0 Ganga Riverine Islands In Fatehpur District

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]. 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].

11.1 Riverine Island is present throughout the stretch of River Ganga Within Fatehpur-Raebareli Distt.. There are six major islands identified and documented within the district. Jurisdiction of the riverine islands lies in Fatehpur Raebareli and Unnao Distt.. The species – *Saccharum spontaneum*, Saccharum munja and Ziziphus spp. dominates the riparian flora of the island. Details of the riverine island are provided in Table No. 6.

Table 6 : Details Of The Riverine Island Within Fatehpur District

Sr. No.	Nearest Settlement	Coordinates		Status
		Latitude	Longitude	
1	Near Akhri and Tahirpur [Left Bank] [Refer Image No. 32]	25°57'28.68"N	81°10'15.13"E	Area approx. 2.11 Sq. Km. Jurisdiction : Fatehpur and Raebareli Distt. Land Use : Agriculture Vegetation: Mainly *Saccharum spontaneum*, Saccharum munja
2	Near Ikdala [Left Bank] and Narauli Buzurg [Right Bank] [Refer Image No. 33]	26° 0'16.71"N	81° 4'5.55"E	Area approx. 4.33 Sq. Km. Jurisdiction : Fatehpur and Raebareli Distt. Land Use : Nil. Vegetation : Mainly *Saccharum spontaneum*, Saccharum munja
3	Near Dalmau [Left Bank] and Senpur	26° 4'10.80"N	81° 0'51.83"	Area approx. 2.53 Sq. Km. Jurisdiction : Fatehpur and Raebareli Distt.

	[Right Bank] [Refer Image No. 34]			Land Use : Agriculture Vegetation : Mainly *Saccharum spontaneum*, Saccharum munja
4	Near Sardarganj [Left Bank] and Haji Ganj [Right Bank] [Refer Image No. 35]	26° 1'43.69"N	80°50'10.98"E	Area approx. 4.73 Sq. Km. Jurisdiction : Fatehpur and Raebareli Distt. Land Use : Nil Vegetation : Mainly *Saccharum spontaneum*, Saccharum munja
5	Near Datpura [Left Bank] and Dubkhi [Right Bank] [Refer Image No. 36]	26° 3'55.31"N	80°47'20.57"E	Area approx. 6.0 Sq. Km. Jurisdiction : Fatehpur and Raebareli Distt. Land Use : Agriculture has started recently Vegetation : Mainly *Saccharum spontaneum*, Saccharum munja
6	Near Chandrapur [Left Bank] and Sheorajpur [Right Bank] [Refer Image No. 37 & 38]	26°11'6.89"N	80°37'48.07"E	Area approx. 8.41 Sq. Km. Jurisdiction : Fatehpur and Unnao Distt. Land Use : Agriculture has started recently Vegetation : Mainly *Saccharum spontaneum*, Saccharum munja

11.2 Apart from the identified islands there are several sand bars and emerging islands present within the district [Refer Image No. 31]. These islands are not stable and changes continuously. Area of most of the sand bar is under cultivation for *Zaid crops* and vegetables and wheat [in few areas].

Image 31 : Emerging Island Near Rawatpur

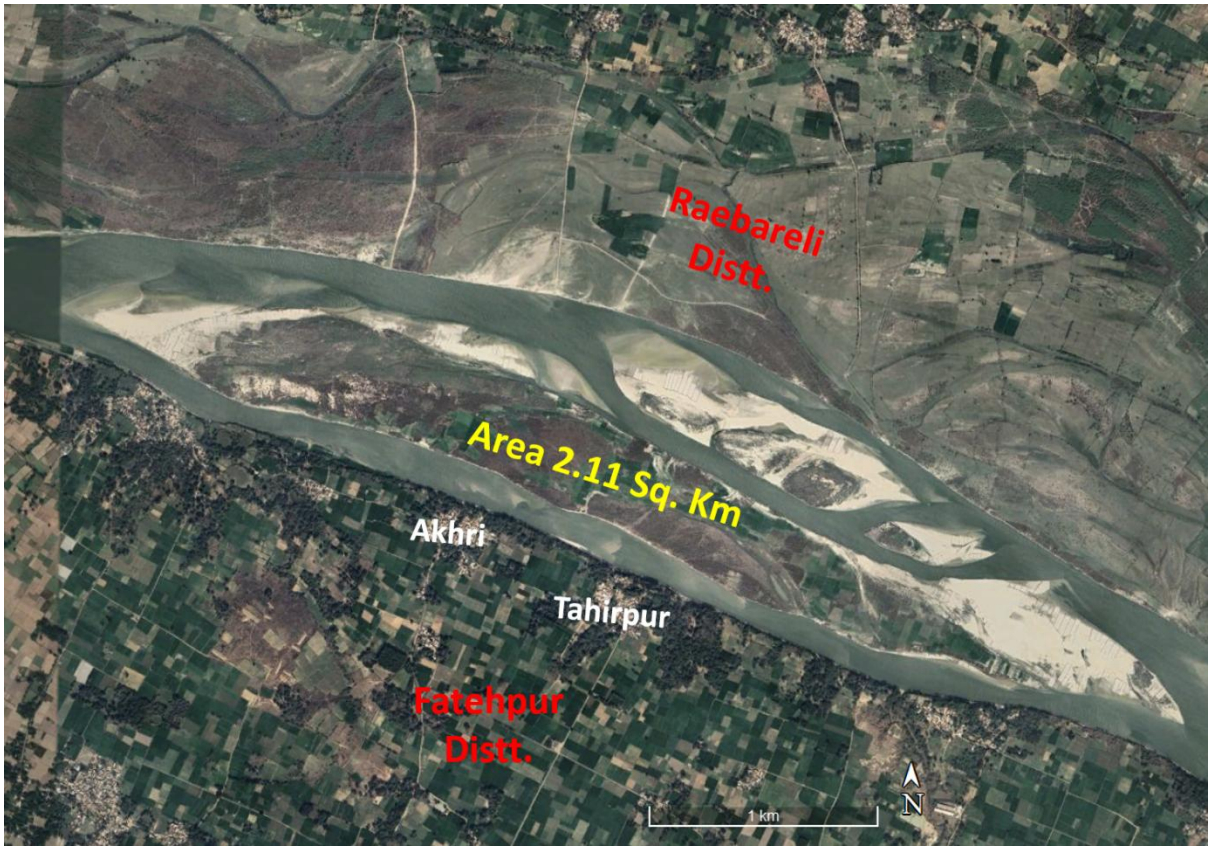


Image 32 : Satellite Imagery Showing Riverine Island Near Akhri And Tahirpur

[Source : Google Earth Imagery, December 2021]

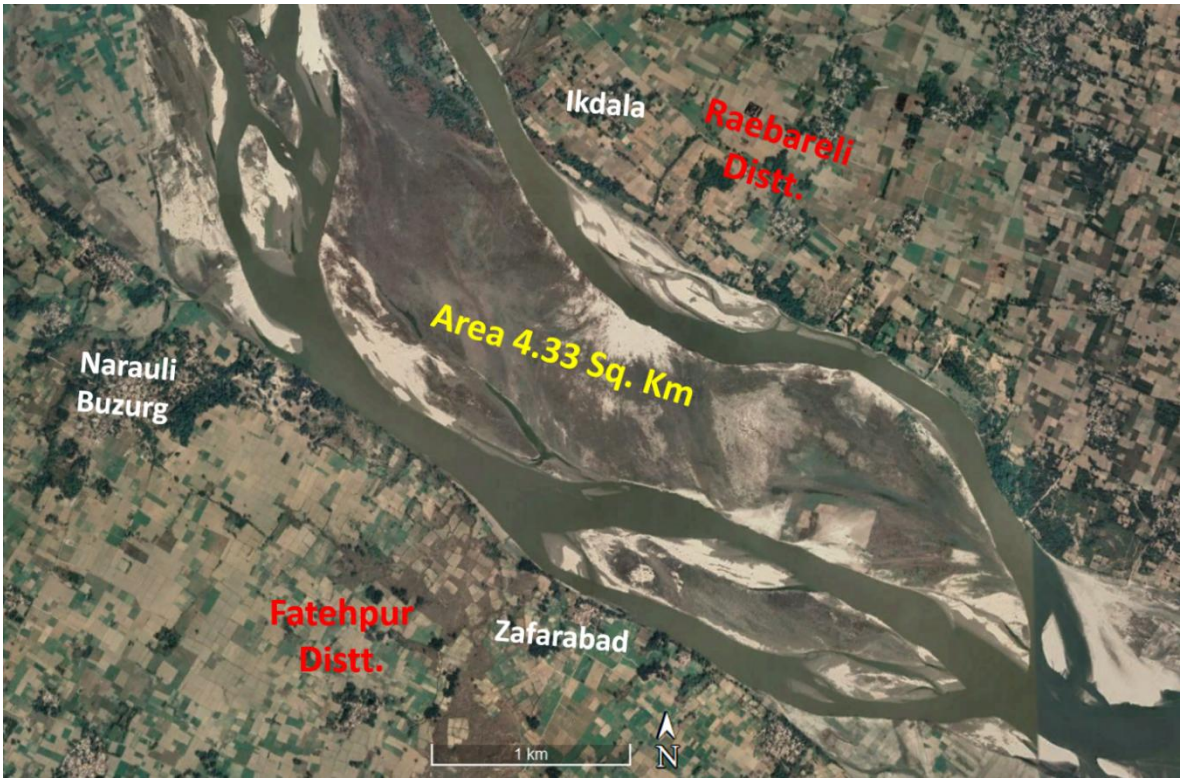


Image 33 : Riverine Islands Near Ikadala And Narauli Buzurg

[Source : Google Earth Imagery, December 2021]

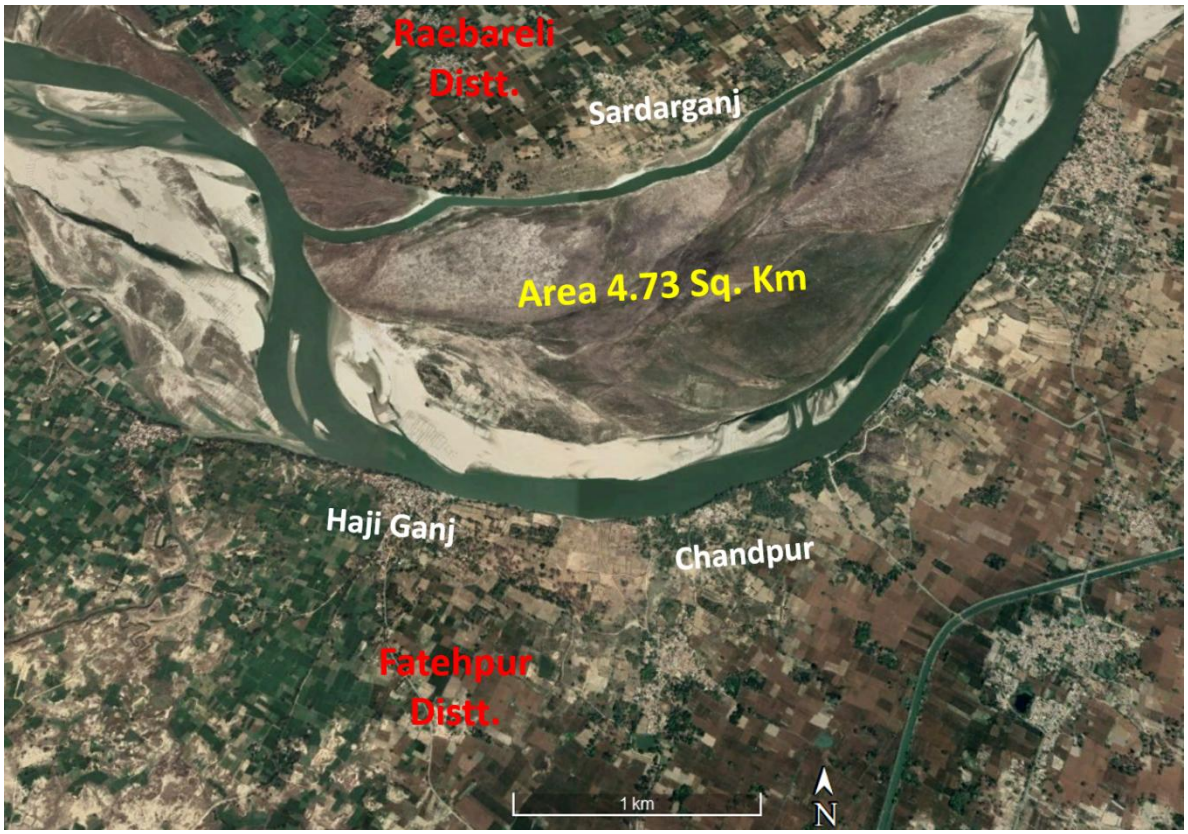


Image 34 : Satellite Imagery Showing Riverine Island Near Dalmau And Senpur

[Source : Google Earth Imagery, December 2021]

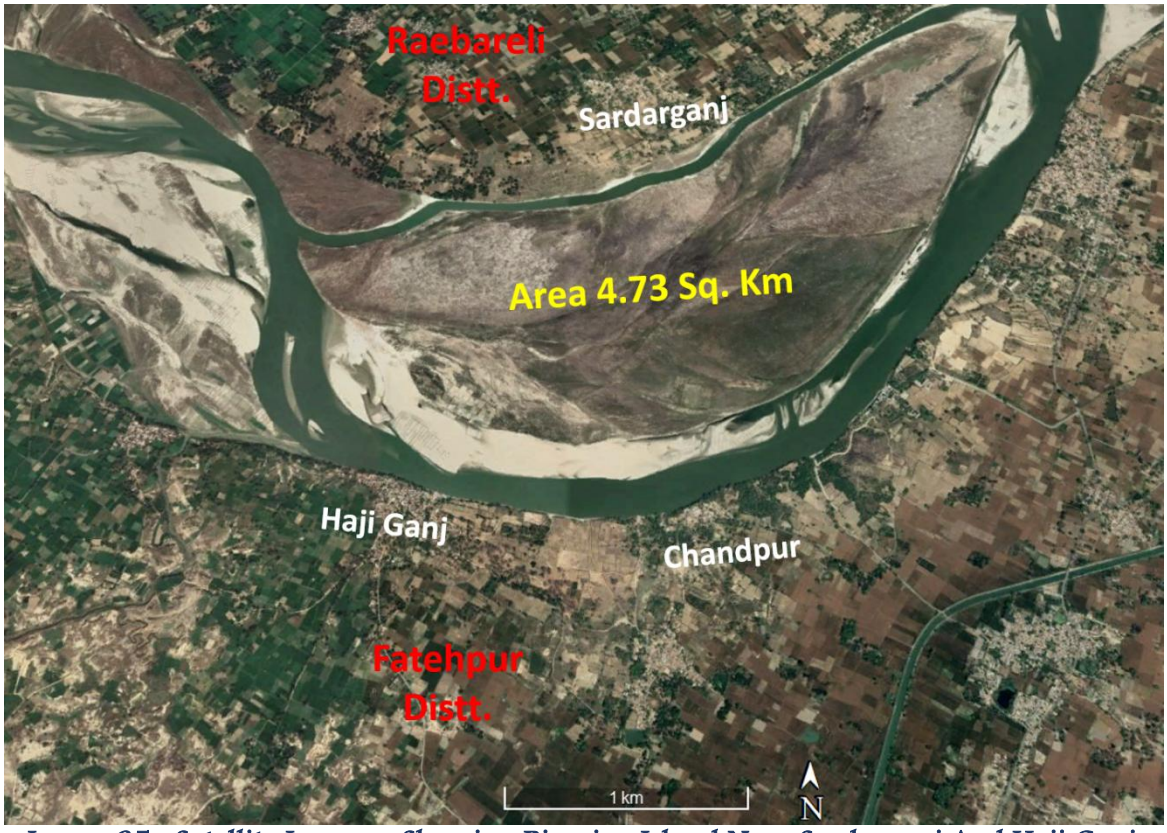


Image 35 : Satellite Imagery Showing Riverine Island Near Sardarganj And Haji Ganj

[Source : Google Earth Imagery, December 2021]

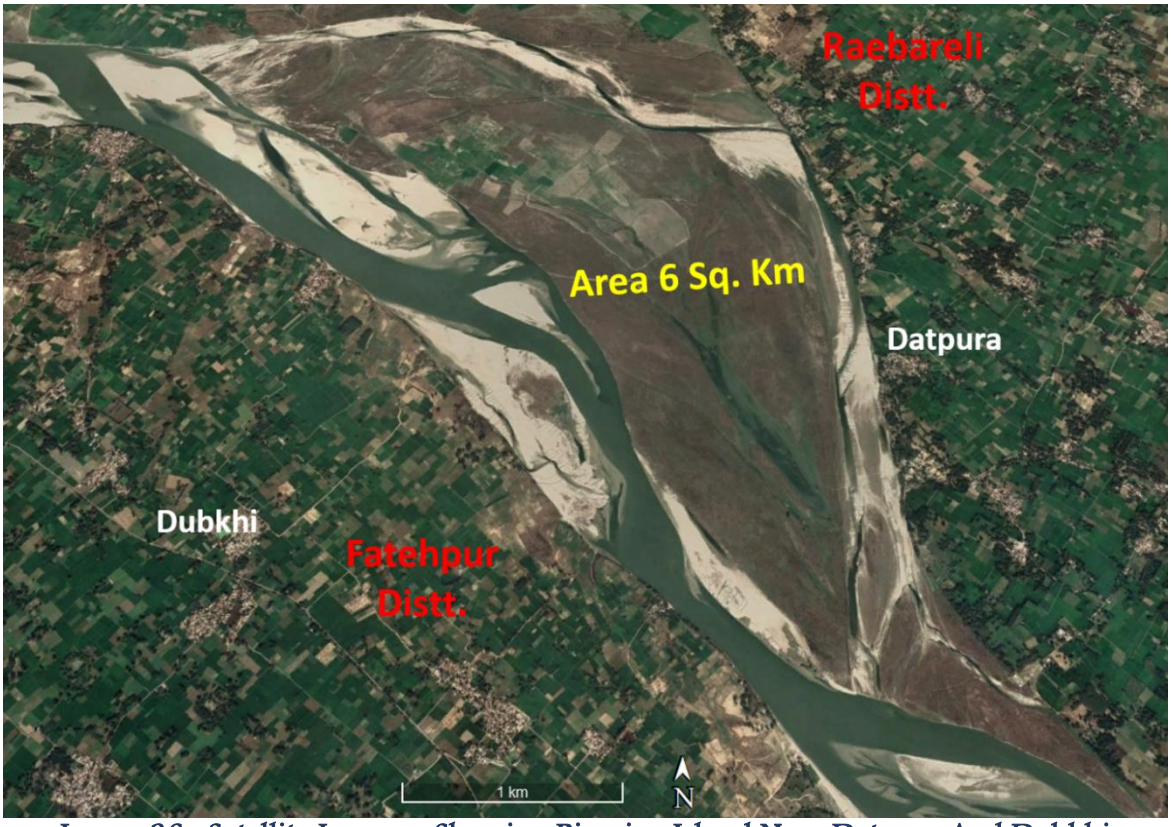


Image 36 : Satellite Imagery Showing Riverine Island Near Datpura And Dubkhi

[Source : Google Earth Imagery, December 2021]

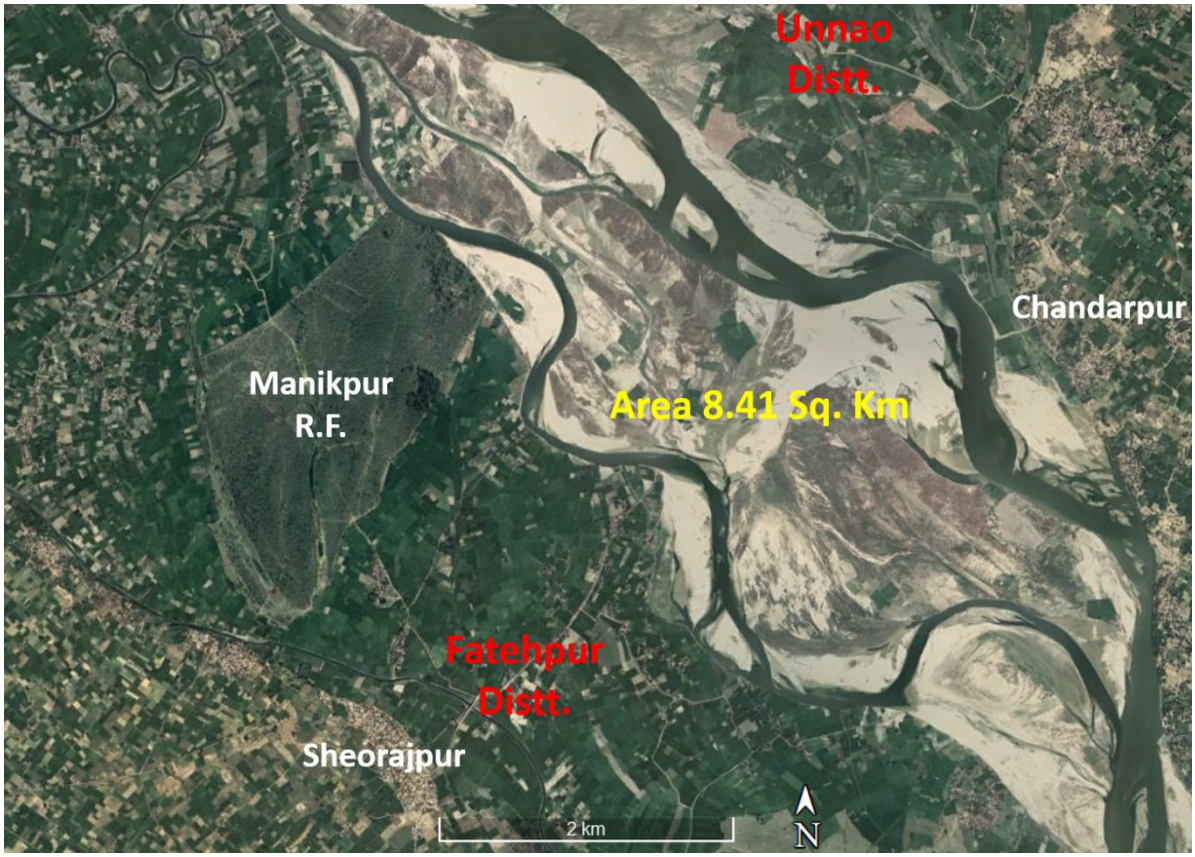


Image 37 : Satellite Imagery Showing Riverine Island Near Chandarpur And Sheorajpur
[Source : Google Earth Imagery, December 2021]

Image 38 : Riverine Island Near Sheorajpur Village

12.0 Fishing In Fatehpur District

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). In recent years, the diversity and population of the fish resources have declined due to various anthropogenic factors. The factors are – deterioration of water quality, damming, introduction of exotic species, alternation in migratory routes of fishes and use of small mesh sizes of fishing nets.

12.2 In the district, the Mallah community is mainly involved in the fishing activity throughout the Ganga stretch [Refer Image No. 39 & 40]. The hook and line, drag net and cast net is common fishing gears among fishermen in the district. According to fishermen community they get a good catch in post- monsoon season. Fishing activity mainly stops during pre-monsoon. This is because of the decrease in fish catch and for sowing of Zaid crops. Most of the fishermen in the distt. stated that the fish population has decreased drastically in the last 15-20 years by 60% to 70%. This significant decrease in fish population has adversely affected the livelihood of the Mallah community forcing them to seek alternate source of income. During the survey total 15 species of fishes were recorded which are listed below.

Table 7 : List of Fish Species Recorded In Stretch Of Ganga River Falls In Jurisdiction Of Fatehpur-Raebareli Distt.

Scientific Name	Common Name
Labeo rohita	Rohu
Labeo catla	Catla/Bhakur
Wallago attu	Buari/Barari
Mystus tengara	Tengara
Cyprinus carpio	Common/Chinese carp
Channa punctata	Garai
Eutropiichthys vacha	Bachwa
Anguilla bengalensis	Baam
Cirrhinus mrigala	Naini

Mastacembelus armatus	Gaichi
Cabdio morar	Chepua
Heteropneustes fossilis	Singhi
Bagarius yarrelli	Goonch
Puntius chola	Pothiya
Sperata seenghala	Singhara

Image 39 : Fishing In Ganga River Near Asni Village

Image 40 : Fishing In Paliya Tal

13.0 Groundwater Conditions In Fatehpur District

13.1 Ground water characteristics of a particular area are subject to several natural factors like precipitation, drainage, topography, lithology and hydrogeological conditions of the region. It is also influenced by human induced factors like groundwater withdrawal and changes in land use pattern. Fatehpur Distt. occupies a part of Central Ganga Alluvium Plain and is underlain by the unconsolidated sediments of Quaternary to Recent periods which comprises of silt. Clay, sands of various grades or gravel and kankar in varying proportions. The unconsolidated sediment deposited over the undulating surface of the basement granite Vindhyan sand stone rocks. It exhibits the existence of thick succession of granular and clastic formations. The depth of basement along Ganga River is 300 to 450 mbgl. The groundwater is being extracted from a three-tier aquifer system [Groundwater Brochure, Fatehpur (2013)].

13.2 Based on groundwater resource utilization, Central Ground Water Board (CGWB) has assessed the block wise ground water resource throughout the country. The assessment for year 2009, 2011, 2013, 2017, and 2020 for the blocks of Fatehpur district, which lies within study area is provided in the Table No.8. According to partially ground water contaminated area study of CGWB, ground water of Fatehpur distt. is contaminated with Fluoride (above 1.5 mg/l), Iron (above 1.0 mg/l) and Nitrate (above 45 mg/l)[8]. NAQUIM report of Fatehpur Distt. (2018-19) highlighted the higher value of Chloride, Sodium, Fluoride and Uranium in Malwan, Asothar and Mahua Block[9].

Table 8 : Block Wise Groundwater Resource Assessment [Study Area Only]

Block Within Study Area	2009 Assessment [10]	2011 Assessment[11]	2013 Assessment [12]	2017 Assessment[13]	2020 Assessment [14]
Devmai	Semi-	Semi-	~~~~	~~~~	~~~~

[8] States Wise Details of Partly Affected Districts with Select Contaminants in Ground Water of India, CGWB, http://cgwb.gov.in/WQ/Districts%20contamination.pdf

[9] National Aqufer Mapping and Management Plan (NAQUIM) Fatehpur District, Government of India Ministry of Jal Shakti Central Ground Water Board Northern Region Lucknow, Uttar Pradesh

[10] Dynamic Ground Water Resources of India, CGWB (As on 31 March 2009).

[11] Dynamic Ground Water Resources of India, CGWB (As on 31 March 2011).

[12] Dynamic Ground Water Resources of India, CGWB (As on 31 March 2013).

[13] Dynamic Ground Water Resources of India, CGWB (As on 31 March 2017).

[14] Dynamic Ground Water Resources of India, CGWB (As on 31 March 2020).

	Critical	Critical			
Malwan	Critical	Over Exploited	Critical	Semi-Critical	Semi-Critical
Teliyani	Semi-Critical	Over Exploited	Critical	Semi-Critical	Semi-Critical
Bhitaura	~~~~		Over Exploited	Over Exploited	ver Exploited
Hathgaon	Critical	Critical	Semi-Critical	Semi-Critical	~~~~
Airaya	Semi-Critical	Critical	Critical	Semi-Critical	Semi-Critical

13.3 During field visits, the survey team has interacted with local communities throughout the study corridor. The situation is similar to the ground water conditions of study area within adjoining districts. It has been observed that the use of dug well is declined in last few years. One major cause of this is drying of dug wells in summer season and lack of maintenance and increase in number of hand pumps. The abandoned dug wells should be restored and may be used for groundwater recharge. Major interaction sites for groundwater observations are – Sheorajpur, Dulikhera, Kumaharan Goda, Samsahi, Matinpur and Narauli Buzurg. The groundwater observations were noted and are presented in Table No. 9.

Table 9 : Water Levels In Dug Wells (Based on interactions with local communities)

Location	Coordinates	GW Level (in feet)	
		Post-Monsoon	Pre-Monsoon
Sheorajpur Village	26°10'11.0"N, 80°35'54.4"E	80	90
Dulikhera Village	26°9'11.90"N, 80°37'15.88"E	80-85	90-100
Kumaharan Goda	26°07'26.6"N, 80°38'42.5"E	80	90
Samsahi	26°05'28.2"N, 80°41'29.6"E	50-60	~~~~
Matinpur	26° 3'59.20"N,	70-80	~~~~

	80°59'14.62"E		
Narauli Buzurg	26° 0'19.97"N, 81° 2'42.17"E	70-80	~~~~

Image 41 : Dugwell In Dulikhera Village

Image 42 : Dugwell In Samsahi Village

14.0 Ganga River Bank In Fatehpur District

14.1 Ganga River bank in Fatehpur district may be classified on the basis of land use and land cover. The possible classes could be – Built-up area [Settlements, Temple Complexes, cremation sites and burial ground], Vegetation [Plantation and riparian vegetation patches] and agricultural fields. Out of three classes, the vegetation area especially the riparian vegetation area along the River Ganga and streams/ Nara are decreasing day by day due to conversion of riparian zone into the agricultural fields and cutting of trees and shrubs for fuel wood and for cremation. During interaction with the local communities, it has been observed that the river bank area which has riparian vegetation is now provided to the farmers on lease [locally called patta] for agricultural activities. Illegal occupation is also a major concern. The newly developed agricultural fields can be easily seen along Ganga River near Adampur, Chandpur, Garhi, Ram Nagar and Chak Pure. River bank area, which has recently converted into agricultural fields, is prone to lateral erosion. Rills and gullies may also develop in such areas. The river bank which is vegetated is stable compared to agriculture and built-up dominated area [Refer Image No. 43].

Image 43 : Stable Bank Near Om Ghat

14.3 Strong local beliefs and rituals act as catalyst for the protection of riparian patches in some areas. Apart from the riparian patches, there are several temple complexes and

ghats along the river bank which play a vital role in the bank stability as there are several trees found to be associated with these temples [Refer Image No. 44].

Image 44 : Mankamneshwar Temple Complex At River Bank In Asni Village

14.4 Cremation Ground Along Ganga River Bank In Fatehpur District

14.4.1 Ganga River Banks are used for cremation and burial ground for generations. There are six major cremation sites identified within distt. along the river. Out of that, four are cremation sites and two is cremation and burial sites. Burial in Hindu religion is common in Fatehpur Distt. [Major site near Sheorajpur], Kaushambi Distt. [Afzalpur Saton], Prayagraj Distt. [Sringverpur] and Bhadohi District. During field visits it has been observed that burial ground is not restricted to particular site and can been done at any sand bar of the Ganga River [Refer Image No. 45]. This is because Ganga River and its active floodplain is considered as sacred and burial within the region is equivalent to the cremation.

14.4.2 For cremation of a body requires approximately 250-300 kg wood depending on the body weight. The wood of mango *[Mangifera indica]* is preferred for the cremation. During unavailability of mango wood use of *acacia nilotica, prosopis juliflora, Saccharum munja Saccharum spontaneum, Desmostachya bipinnata* and cow

dung cake is common. Depending upon the availability, other riparian grasses are also used to cremate. The cost of the wood ranges Rs. 300-400 per quintal. The overall cost of each cremation goes upto 1500-2000 rupee. The cost of cremation maybe higher for the poor families belongs to local communities. Thus, some of them prefer to go for burial rather than cremation. Burials are also done to the dead bodies of kids, teens and sages. Burials are usually done at Ganga River sand at a depth of 5-6 feet.

Image 45 : Cremation And Burial Site Along Ganga River Near Sheorajpur
[Site Lacking Cremation Infrastructure]

Table 10 : Cremation And Burial Sites In The Study Area

Site	Location		Burial Site/ Cremation Site
	Latitude	Longitude	
Sand Bar Near Sheorajpur	26°11'11.36"N	80°36'56.15"E	Burial and Cremation Site
Kotiya Village	26° 4'23.05"N	80°44'20.65"E	Cremation Site
Bhitaura Ghat	26° 2'29.13"N	80°51'33.57"E	Burial and Cremation Site
Ganga River Bridge, Dalmau	26°03'14.8"N	81°02'01.4"E	Cremation site

Naubasta	25°52'16.46"N	81°12'44.36"E	Cremation Site
Mainpuri Ghat	25°50'7.44"N	81°16'34.24"E	Cremation Site

Image 46 : Abandoned Cremation Infrastructure Along Pandu River Near Sheorajpur

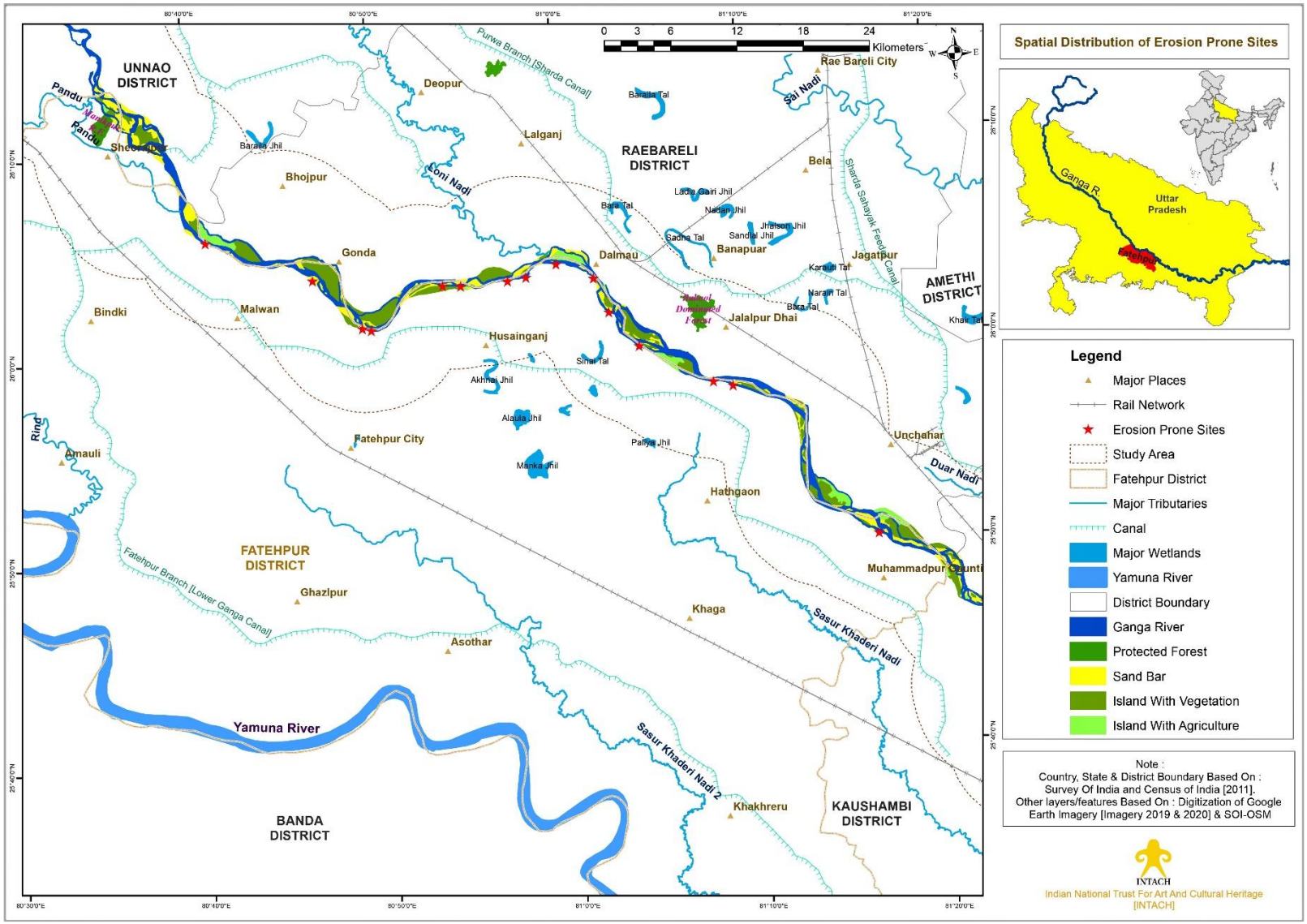
Image 47 : Cremation Site Near Ganga River Bridge

14.5 Ganga Bank Erosion In Fatehpur Distt.

14.5.1 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 land use change, excessive grazing and farming, removal of riparian vegetation and construction brick kilns in flood plain area. It is well known that exposed soil may erode rapidly (Singh et al., 2004).

14.5.3 There are 15 lateral erosion sites marked within the study area with the help of satellite imagery [2020-2021]. lateral erosion sites are found near – Mainpuri [25°50'8.43"N, 81°16'34.94"E], Samopur [25°57'39.52"N, 81°9'5.17"E], Jafrabad [25°59'46.85"N, 81°4'6.30"E], Near Mahewa [26°1'29.97"N, 81°2'33.36"E], Near Matinpur [26°3'57.34"N, 80°59'49.52"E], Near Gopalpur [26°3'22.53"N, 80°58'9.23"E], Near Lakhpura [26°3'13.91"N, 80°57'9.83"E], Near Matipura [26°3'4.92"N, 80°54'37.26"E], Near Alampur Narhi [26°3'8.50"N, 80°53'38.42"E], Near Chak Khera [26° 3'39.61"N , 80°46'37.27"E] and Nenuakhera [26° 5'42.56"N, 80°40'53.97"E].

Image 48 : Eroded Bank near Matinpur



Map 8 : Spatial Distribution Of Erosion Prone Sites [Fatehpur Distt.]

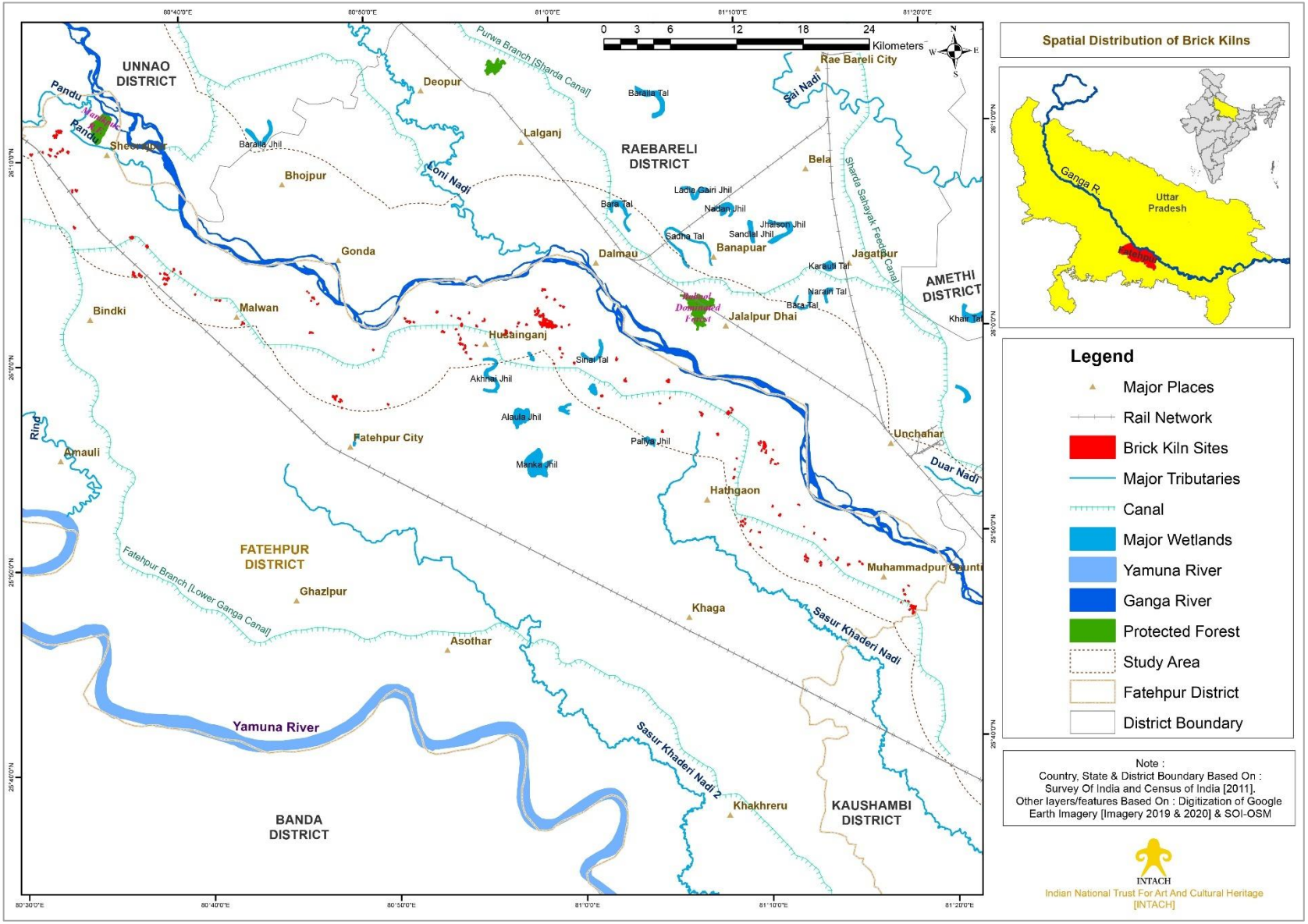
15.0 Sand Mining And Brick Kilns Within Study Area

15.1 **Sand Mining :** Sand is one of the major minerals resource extracted from the Ganga River and its tributaries. The demand is ever increasing due to rapid expansion of settlements and their upgradation across the country. Often carried out illegally and excessively to earn large profits, sand mining is altering rivers' overall health. Excessive sand mining results in the destruction of aquatic and riparian habitats and poses threat to bridges, river banks and nearby structures[15]. Sand mining from Ganga River within the district is not reported during the field visit.

15.2 **Brick Kilns:** With rapid development bricks have become one of the important building materials 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 clay digging process deteriorates the soil quality and productivity of the soil because the bricks are made from the top soil. It has been found that brick kiln sites in floodplain areas increases the rate of soil erosion.

15.3 Brick kiln sites within study area are located in – Hajipur, Ashapur, Rampur, Jalala, Barauri, Maksudankhera, Bipatiyakhera, Malwan, Dubkhi, Daudpur, Maloni, Sangaon, Bhagwansibgh Ka Purwa, Hussainganj, Jamrawan, Chak Mobin, Sithaura, Shahpur, Sultanpur Ghaus and Umarpur Gaunti Village .Brick kiln sites are one of the reason behind shrinkage of riparian vegetation in the region. Spatial distribution of brick kiln sites along Ganga River are depicted in Map No. 9.

[15] Impacts of Sand Mining, ENVIS Centre on Environmental Problems of Mining, IIT Dhanbad, Jharkhand



Map 9 : Spatial Distribution Of Brick kiln Sites [Fatehpur Distt.]

16.0 Boatmaking In Fatehpur District

16.1 Boat making is not a popular or a profit-making profession in Fatehpur or nearby districts. Small sized boats (locally known as *Dongi*) are common for fishing activities. Medium sized boats having capacity of 10-15 people are used for ferry. Boats are mainly made up of Sal (locally known as Sekhua) wood [*Shorea robusta*] as it is very durable. However, the smaller *dongis* were also made from Babool (*Acacia nilotica*) and mango (*Mangifera indica*) wood which was readily available throughout the Distt. Now these days, iron boats are taking place of traditional boats. This is because iron boats area cheaper than traditional boats and are leak proof and easy to repair.

16.2 Boat making expenditures are same in Pratapgarh, Fatehpur, Raebareli, Kaushambi and Prayagraj District. Small boats [Dongi] made from iron costs around 60,000-70,000 and Similar sized iron boat with motor costs around 1,00,000-1,50,000. Traditional Dongi without motor costs around 2,00,000-2,50,000. Medium sized tradition boats cost around 7,00,000-8,00,000.

17.0 Inland Navigation Within Study Area In Fatehpur District

17.1 National Waterway [NW-1] is restricted upto Prayagraj District. The river is not navigable for major boats. However, ferrying is a crucial livelihood activity of the Mallah community within the distt.. People of Mallah community in Fatehpur District have been ferrying passengers for generations. There are 9 ferry sites reported between different villages of Fatehpur and Raebareli Distt.. Out of 9 sites, there are 2 site where pontoon bridge has been constructed and ferry service is operated only during removal of pontoon bridge [Monsoon season]. Details of Ferrying sites are provided in the table no. 11.

Table 11 : Details of Ferry Sites And Status Within The Study Area

Latitude	Longitude	Nearest Settlements	No. of Boat & Ferry Season
25°51'10.29"N	81°14'33.60"E	Between Ajaura Khurd and Kalyani	Two Boats (October to June)
25°53'17.15"N	81°12'24.07"E	Between Pure Gangapur and Tirka Purwa	Four Boats (October to June) **Ferry service operates**

			only during removal of pontoon bridge
25°52'20.69"N	81°22'3.25"E	Between Naubasta and Tirka Purwa	Two Boats **Ferry service operates only during removal of pontoon bridge**
25°56'49.48"N	81°11'30.84"E	Between Paharpur and Manjhlepur	Two Boats (October to June)
25°57'39.99"N	81° 8'59.20"E	Between Samopur and Chandanihan	Two Boats (October to June)
25°58'52.49"N	81° 5'28.46"E	Between Kotla and Jaihi Ka Purwa	Two Boats (October to June)
26° 2'19.49"N	80°51'21.71"E	Between Bhitaura and Babatpura	~~~~~~~
26° 4'21.10"N	80°45'31.92"E	Between Rawatpura and Shukarwa Ka Purwa	Two Boats (October to June)
26° 4'17.41"N	80°44'2.93"E	Between Kutia and Devmai Purwa	Two Boats (October to June)

Image 49 : Ferrying Between Naubasta and Tirka Purwa

18.0 Old And Sacred Trees In Fatehpur District

18.1 Plant species *Ficus benghalensis* [Bargad], Ficus *religiosa* [Peepal], *Ficus virens* [Pakad] *Mangifera indica* [Aam] and *Azadirachta indica* [Neem] are considered as sacred and is found in association with ashrams, ghats, cremation sites and temple complexes across the study corridor. Out of all sacred trees, Ficus *religiosa* [Peepal] is most sighted species, generally found to be associated with temple. Peepal tree is also used to perform different rituals after cremation. List of sacred and old trees recorded within the study area are provided in Table No. 12.

Table 12 : List of Sacred And Old Trees Recorded Within The Study Area

Plant Species	Location and Nature of Tree	Coordinates	
		Latitude	Longitude
Peepal *[Ficus religiosa]*	Old Peepal Tree in Sai Village	26°08'06.0"N	80°35'29.6"E
Peepal *[Ficus religiosa]*, *Neem [Azadirachta indica]*, Bargad *[Ficus benghalensis]*	Group of sacred trees in a temple complex	26° 6'32.37"N	80°35'56.14"E
Mahua [*Madhuca longifolia]*	Old Mahua Tree in Malwan Village	26° 5'22.81"N	80°41'3.86"E
Peepal *[Ficus religiosa]*, *Neem [Azadirachta indica]*, Bargad *[Ficus benghalensis]*, Pakad *[Ficus virens]*	Sacred Trees in Shriram Temple complex	26°01'04.9"N	80°50'00.1"E
Peepal *[Ficus religiosa]*, *Neem [Azadirachta indica]*, Bargad *[Ficus benghalensis]*, Pakad *[Ficus virens]*, Mahua [*Madhuca longifolia]*	Group of Sacred Trees at Om Ghat, Bhitaura	26° 1'26.96"N	80°50'42.94"E
Peepal *[Ficus religiosa]*	Sacred Peepal Tree	26° 1'25.96"N	80°51'14.25"E
Peepal *[Ficus religiosa]*	Sacred Peepal Tree	26°01'26.0"N	80°51'12.1"E
Peepal *[Ficus religiosa]*	Old Peepal Tree at Samsan Ghat	26° 2'32.70"N	80°51'36.39"E
Bargad *[Ficus benghalensis]*	Old Bargad Tree at Samsan Ghat	26°02'33.4"N	80°51'38.0"E

Bargad *[Ficus benghalensis]*	Old Bargad Tree	26° 3'30.00"N	80°59'37.22"E
Peepal *[Ficus religiosa]*	Sacred Peepal Tree	26° 3'31.89"N	80°59'38.87"E
Peepal *[Ficus religiosa]*, *Neem [Azadirachta indica]*, Bargad *[Ficus benghalensis]*, Pakad *[Ficus virens]*	Group of sacred trees in Badi Kuti	26°04'00.7"N	81°00'01.6"E

Image 50 : Old Bargad Tree In Bhitaura

Image 51 : Old Peepal Tree in Sai Village

Image 52 : Bargad Tree At Bhitaura Samsan Ghat

19.0 Key Observation & Recommendation

19.1 Fading of Stream/Nara : Small stream/ Nara which directly drain to River Ganga are under threat due to removal of riparian vegetation, agriculture activities on stream bank and encroachment. Minor streams in the region holds the vulnerable riparian zone, which protect from erosion, provides habitat to riparian fauna and serve as migratory routes to fish species in monsoon season. Disappearing of streams may damage local biota.

19.2 Conversion of riparian vegetation into agricultural fields : Products and finished products manufactured from *Saccharum* and *bamboo* are sources of income to the local communities [Refer Image No.53]. During the field visits, it has been reported that local administration provides riparian land to local communities for agricultural activities. The newly developed agricultural fields accelerate the runoff and trigger lateral erosion.

Image 53 : A Villager Selling Products Made From Saccharum And Bamboo Plant

19.3 Paleo-Streams and Paleo-Wetlands : Paleo-streams and wetlands are currently used for agricultural activities. The study area is under semi-critical, critical and over-exploited category. In order to recharge the groundwater, the depression areas may be

restored. Proper demarcation of such areas is required. Plantation of native species on such area may increase the overall forest cover in the district. It will provide the addition habitat to fauna of the region and will further lower the man-animal conflict.

19.4 Threats to Wetlands : Wetland like Chop Jhil, Paliya Jhil, Sinai Jhil and Akhnai is facing serious threat due to loss of riparian vegetation, high silt load, encroachment, conversion of wetland area into agricultural field and dumping of solid waste. The wetland area is shrinking gradually while Chop Jhil has completely lost its identity. The shrinking of wetland area is still in progress due to above mentioned threats. Below-mentioned points may be a path for the conservation of the wetlands in the study area :

- ❖ Inventory of wetlands should be maintained with the details highlighting the current land use, ownership and values of the wetland.
- ❖ Currently, most of the wetlands are under revenue department and are on lease for agricultural activities. There is a need to transfer those wetlands to Uttar Pradesh State Wetland Authority constituted under the provisions of the Wetlands (Conservation and Management) Rules, 2017.
- ❖ A Comprehensive Management and Action Plan (CMAP) should be prepared for each wetland or group of wetlands. CMAP should focus on the ecological, hydrological, social, and economic and tourism aspects of the wetland.
- ❖ Local communities should be encouraged and their participation in wetland conservation should be fixed.
- ❖ Lease of wetland to fishermen community maybe an alternative to maintain water level.
- ❖ Forest department and concerned agencies should plant native riparian flora along the wetland.
- ❖ Developmental activities may be restricted at least 500 m from the wetland area.

19.5 Groundwater Conditions : The study area is under semi-critical, critical and over-exploited category. It exhibits declining trend in groundwater level. To arrest the decline of water level, artificial recharge technique should be adopted. To minimize the decline of water level, in urban areas, roof top rain water harvesting, with structures such as recharges pits/shafts/trenches of suitable design, should be made mandatory for all government buildings, schools etc. having large roof top area.

Some area of the distt. has higher level of TDS, Chloride and Sodium. There is urgent need of Quality assessment of shallow and deeper groundwater and its relationship with the lithological behaviour.

The study area is going through fluoride contamination. It is required to install community-based fluoride removal plant to tackle the menace. Nalgounda technique may also a simple and effective technique to tackle fluoride contamination.

19.6 Protection for River Islands : Riverine Island is present throughout the stretch of River Ganga Within Fatehpur Distt.. Jurisdiction of the riverine islands lies in Fatehpur, Raebareli & Unnao Distt.. Emerging islands under cultivation are mainly susceptible to erosion. Agricultural activities at the edge of stable islands erode the banks. There is requirement of comprehensive management plan [CAMP] for conservation, management and sustainable utilization of riverine islands.

19.7 Cremation and Burial : Cremation of dead bodies and immersion of their remains is reported throughout the stretch. Lack of cremation infrastructure, their maintenance and lack of awareness are reason behind such ongoing practices. Proper cremation infrastructure including the modern crematoria is required atleast at Naubasta Ghat and Bhitaura Ghat. Burial at sand bar is common. Proper site should be provided and area should be demarcated.

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