Ganga Cultural Documentation
2022

KASGANJ DISTRICT

NAMAMI GANGE

National Mission for Clean Ganga

INTACH Indian National Trust for Art and Cultural Heritage

INDIA@75

Azaadi Ke Rang Bharatiya Sanskriti Ke Sang

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1.0 Introduction

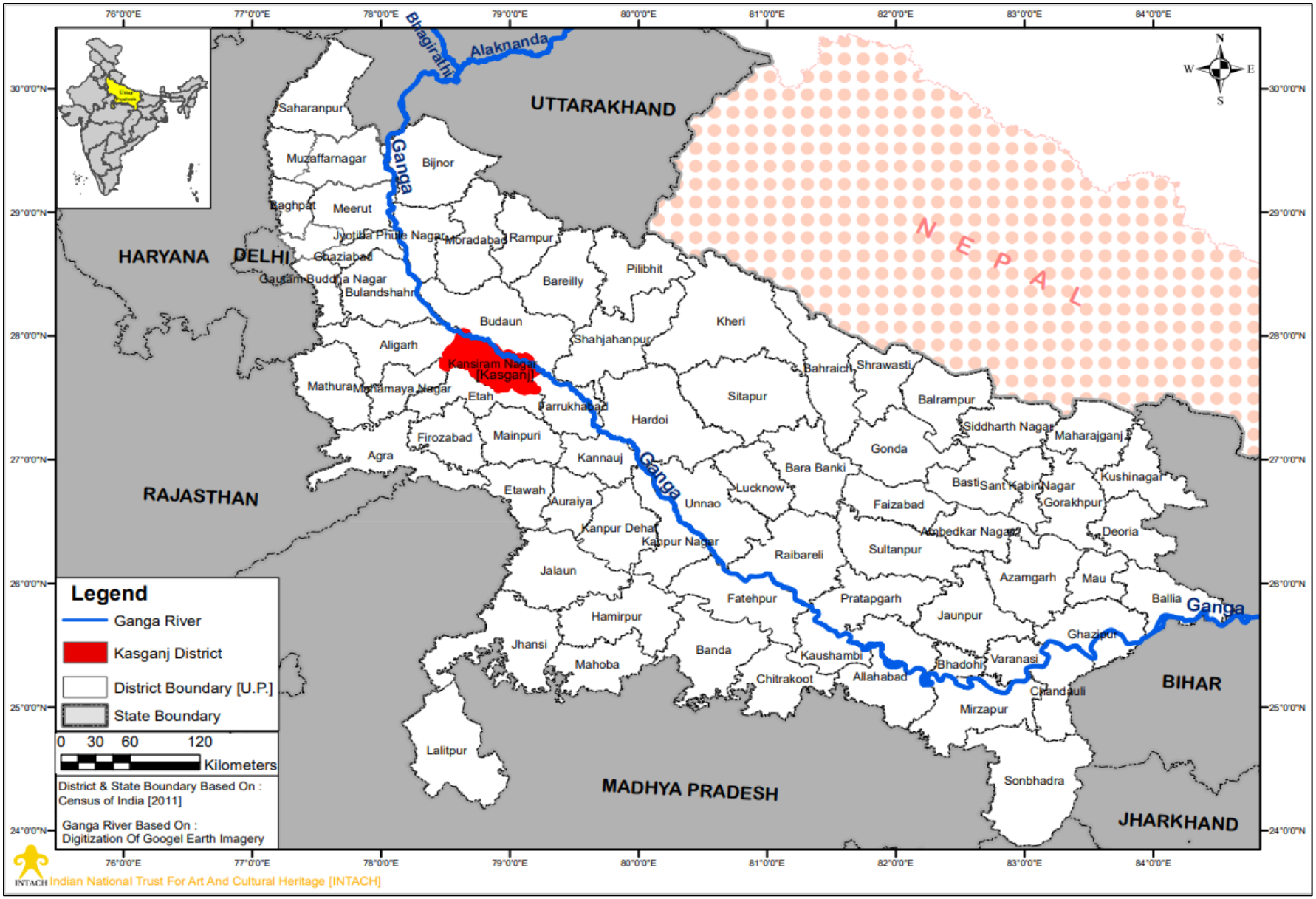
1.1 Kasganj Distt. (27.7952° N, 78.7930° E) is situated in the western part of Uttar Pradesh state. The Distt. was created on April 17, 2008 by grouping three tehsils of Etah Distt. and named as Kanshiram Nagar which was again renamed as Kasganj in the year 2012. Covering an area of about 1,993 sq.km with a population of 14,36,719, this Distt. falls under Aligarh Division. Administratively, it is divided into three tehsils namely Kasganj, Sahawar and Patiyali which are further sub-divided into 7 development blocks namely Sahawar, Kasganj, Amanpur, Soron, Sidhpura, Ganj Dundwara, Patiyali. The Distt. is bounded by Farrukhabad in the east, Aligarh in the west, Badaun in the north, Etah in the south and Hathras in the southwest.

1.2 The Distt. lies in the middle doab region of Ganga and Yamuna which makes the area one of the most fertile regions of the country and is bounded on the north side by the River Ganga which flows in a north to east direction. River Ganga and its tributaries viz, Kali and Burhi Ganga control the drainage system of this Distt. The Distt. has a flat topography with a few gentle undulations. It may be divided into three geomorphic units. (i) Flood Plain, (ii) Younger Alluvial Plain and (iii) Older Alluvial Plain. The soil in this Distt. can be grouped into three main conventional classes depending upon their textural and compositional character: *Dumat* or Loam, *Matiyar* or Clay and *Bhur* or Sand. The Distt. experiences a humid subtropical climate with daily mean temperature being 8°C during winters and reaching upto 46° C during summers. The average annual precipitation is 722.4 mm (Kudesia, 2013). Kasganj is the major town and district headquarters for Kasganj Distt.

1.3 Kasganj has got its name from the thick "Kans" forest, which was prevalent in the area during earlier years. Kasganj was also known as "Tanay" or "Khasganj" during Mughal period and as "Khasgunge" during the British period. The city finds mention in the journals of the Chinese traveler pilgrim Hsien Tsang who passed this way in 647 A.D. and recorded the city as a part of King Harshvardhan's empire. Soron, another important town in this Distt. is famous for Lord Varaha's temple which is of utmost religious significance in the Hindu traditions. Soron and the surrounding areas are known as Shukar Kshetra. Devotees from all over the country visit Soron to pay respect to Lord Varaha. A sacred kund (lake) [Image 1] known popularly as 'Har ki Pauri' is situated near the temple and is widely known for its importance in last rites and ashes immersion after the death of a person (https://kasganj.nic.in).

- Shukar Kshetra: Soron and the surrounding areas are known as Shukar Kshetra is believed to be the place where Lord Vishnu incarnated himself as Lord Varaha which is the 3rd incarnation of Lord Vishnu to save the earth from the demon *Hiranyaksha*, who had stolen the earth and kept it in the kund of Soron. Soron is also the birth place of great Indian poet Tulsi Das who had composed *Ramcharitmanas* in the praise of lord Rama.

Image 1 : Har Ki Pauri In Soron, Kasganj Distt.

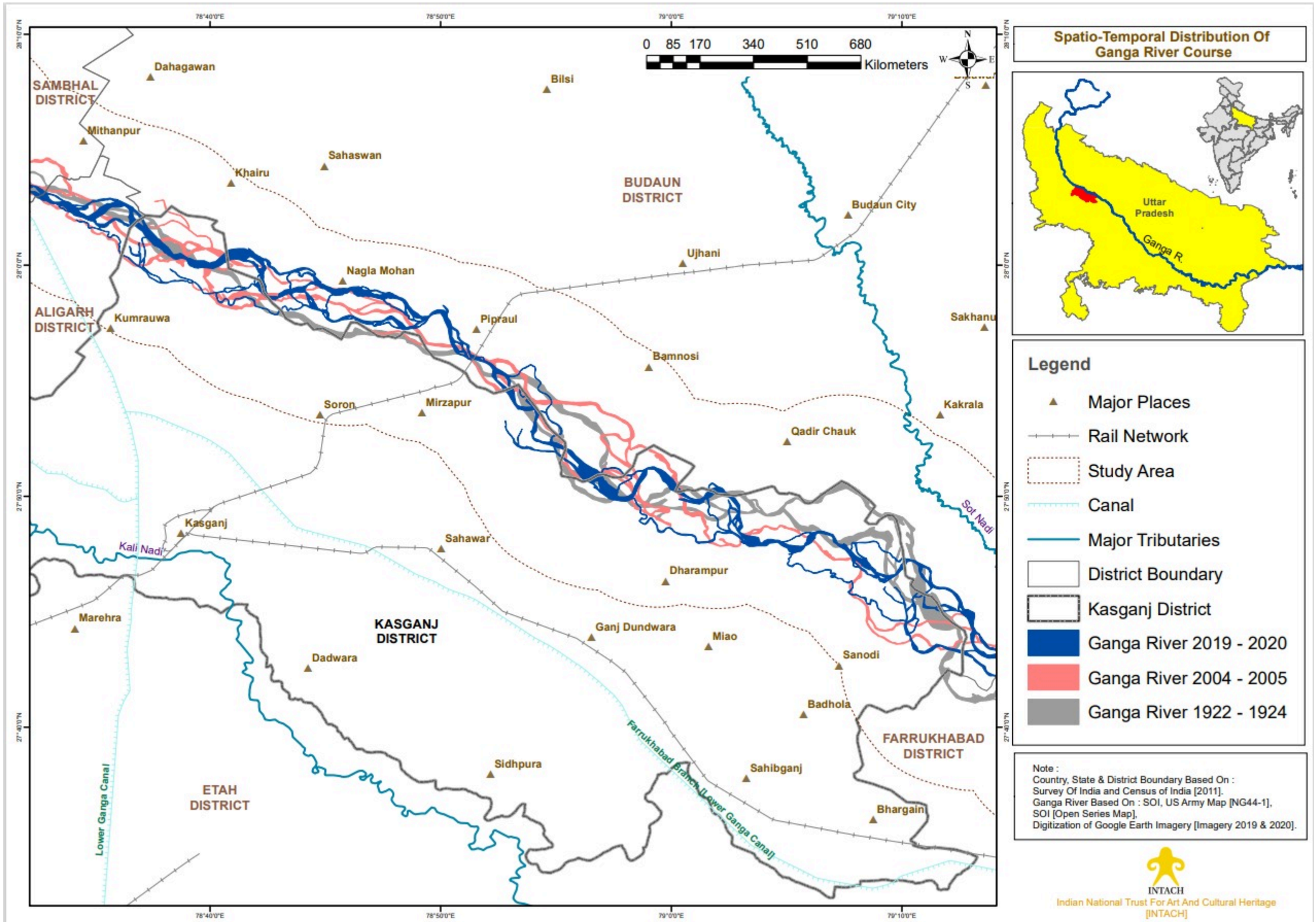


Map 1 : Location Of Kasganj Distt.

2.0 Ganga River In Kasganj Distt.

2.1 Ganga River enters Kasganj Distt. near Mandawali village and flows eastwards and south-eastwards throughout the Distt. Owing to shifts in its course, at some parts along the river both banks fall in Kaganj Distt. while at some parts such as Kachhla Ghat the river falls in Budaun Distt. However, in majority of its course, the left bank falls in Budaun Distt. while right bank falls in Kasganj Distt. The river is highly braided in this region due to the presence of numerous riverine islands and sand bars. Due to this, many smaller channels dry up during non-monsoon months and several stretches of the river have low water depths making this stretch almost non-navigable for medium to big sized boats. Map 2 depicts the shifts in Ganga river course over the last few decades as analyzed from available maps and satellite imagery while Image xx depicts a part of the river as observed during the field survey in study region of Kasganj Distt.

Image 2 : Ganga River As Seen From Kadarganj Ghat Bridge On 11th March, 2022

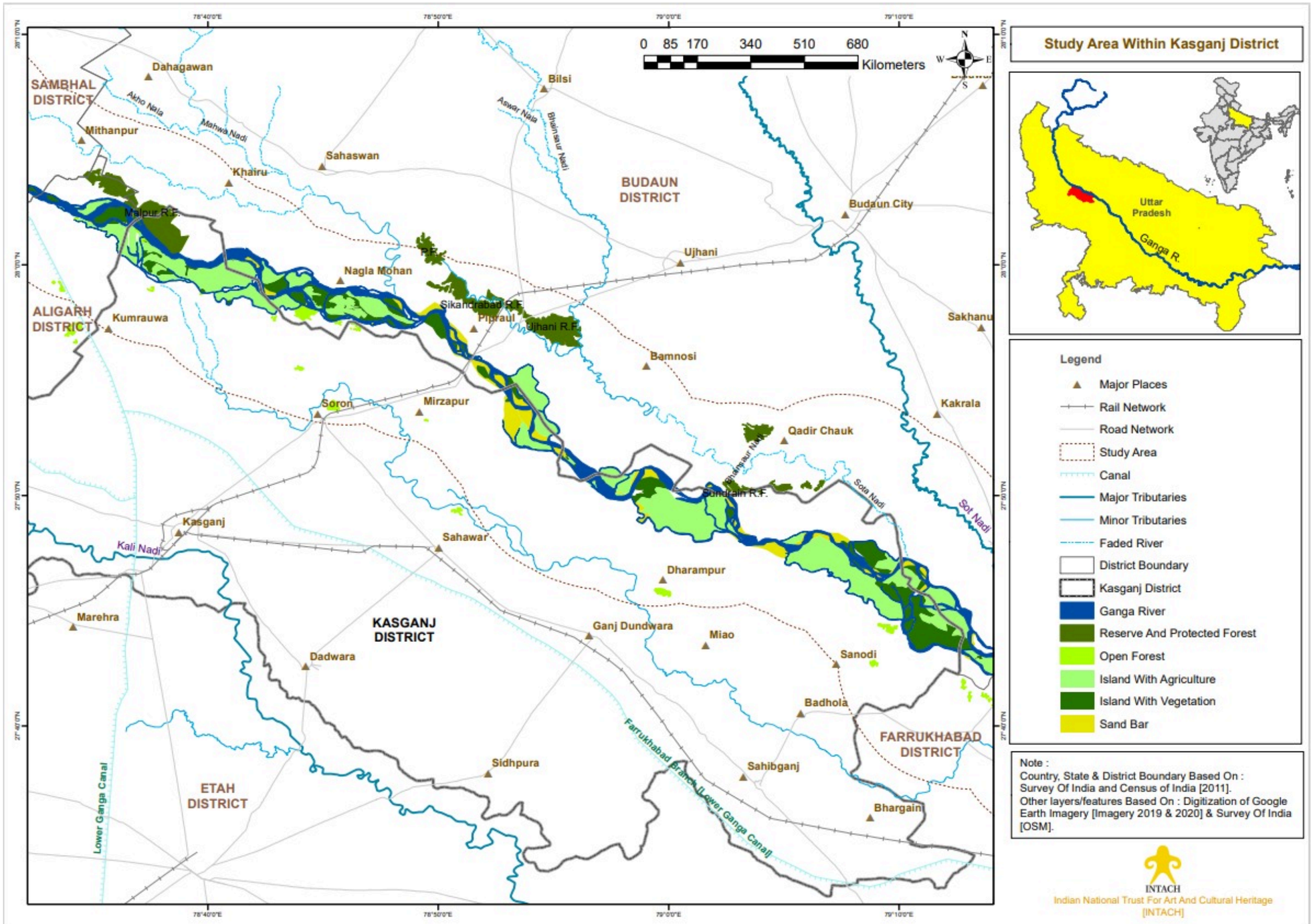


Map 2 : Temporal Variation Of Ganga River Course In Study Region

3.0 Methodology

3.1 Ganga River flows in Kasganj Distt. for approximately ….. kms adjoining it mainly on the right bank and a very small part on the left bank (towards the north-eastern side). Hence for carrying out the ground survey, a 7 km of buffer zone was selected on the both the banks of Ganga River in the Distt. [Refer Map 3]. Based on the secondary information analyzed and the features noted from Google Earth satellite 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 and *Diara* communities in the Distt. for carrying out relevant interactions.

3.2 The field survey for Natural Heritage documentation in the study region of Kasganj Distt. was carried out from 6-10 March, 2022. The high-quality pictures related to the study were recorded using Nikon D3400 DSLR camera. The GPS locations were also recorded using Garmin hand-held GPS. 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 agriculturists and dairy farmers, temple priests, village heads, fishermen, boatmen and general public.



Map 3 : Study Area In Kasganj Distt.

4.0 Tributaries Of Ganga River

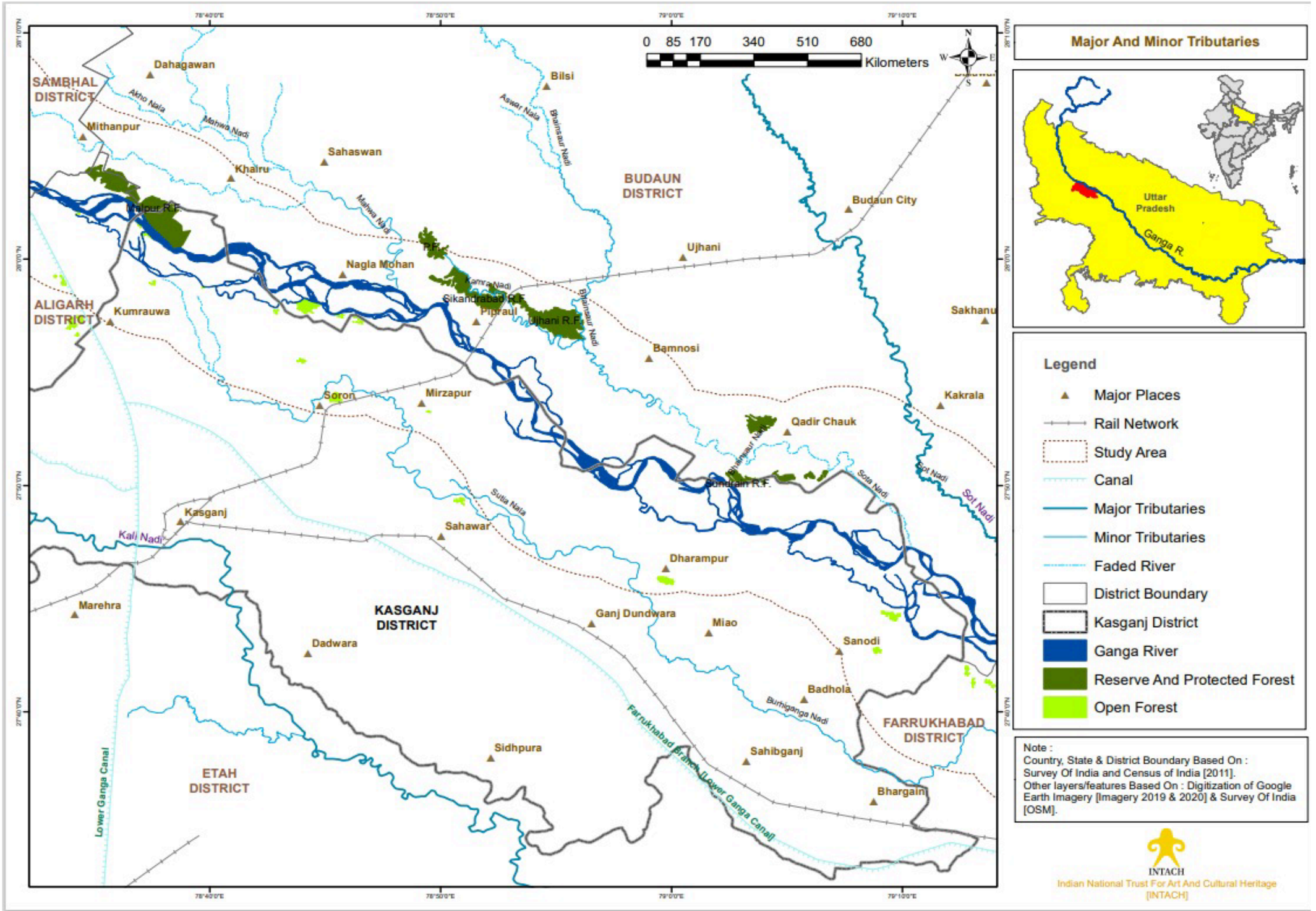
4.1 **East Kali River** : This is a major and an important tributary of Ganga River in the study region. It originates in Muzzafarnagar Distt. and traverses a distance of about 550 km passing through different Distt.s. of Uttar Pradesh state such as Meerut, Hapur, Khurja, Bulandshahar, Aligarh, Kasganj and Farrukhabad before entering Kannauj. It flows in the southern part of the Distt. forming a rough border separating it from Etah Distt. [Refer Map 4]. An important landmark in Kasganj Distt. is the 'Nadrai ka Pul' [Image xx] which is also referred as 'Jhaal Bridge'. It was constructed from 1885-1889 having Ganga Canal between the two bridges and East Kali River flowing beneath it. This is an Engineering marvel which still stands strong today and also attracts numerous students and researchers who visit this site for study. During the survey at this site, Kali river flowing below was found to be heavily polluted with blackish water seemingly infested with sewage and industrial discharges.

Image 3 : Nadrai Ka Pul As Seen On 10th March, 2022

Image 4 : Polluted Water Of East Kali River As Seen On 10th March, 2022

4.2 **Burhi Ganga :** According to the District Gazetteer (Neave, 1911), Burhi Ganga is an intermittent stream which flows in old beds of Ganga River. However, it has always been burdened by frequent disruptions often leading to its sluggish course which results in flooding along its villages during monsoons. It flows almost through the centre of Kasganj Distt. crossing towns such as Soron, Ganj Dundwara and Dharampur [Refer Map 4]. However, during summers its course has been reported to dry up which was also the case as observed during field survey in Kasganj Distt. [Image xx].

Image 5 : Dried Up Stretch Of Burhi Ganga River As Seen On 11th March, 2022



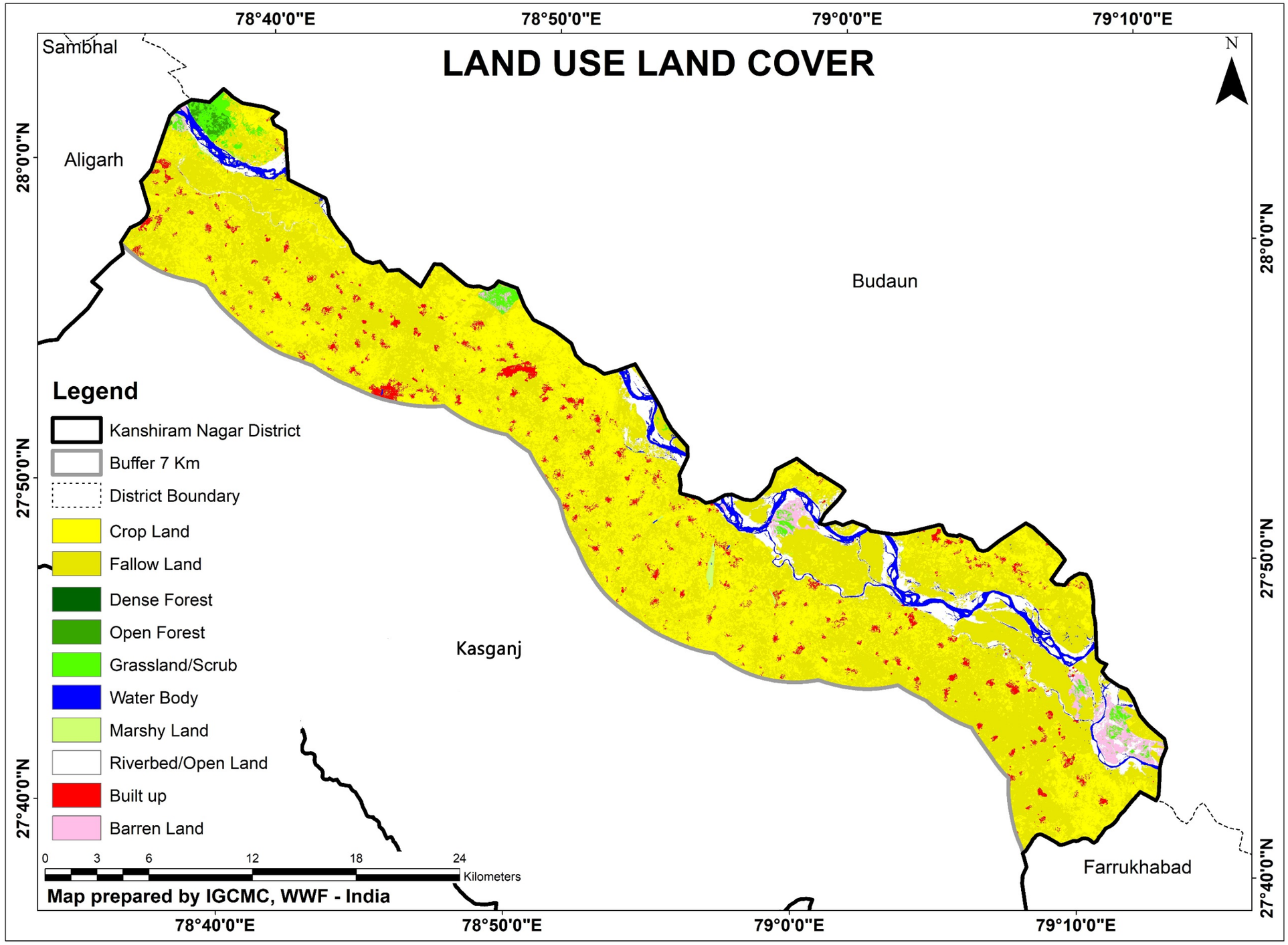
Map 4 : Major And Minor Tributaries Of Ganga River In The Study Area

5.0 Land Use/Land Cover

5.1 Land Use Land Cover (LULC) Map of the study corridor has been prepared from Landsat imagery. Using supervised classification system, 10 different classes were generated – crop land, fallow land, dense forest, open forest, grassland/scrub, waterbody, marshy land, riverbed/open land, built up and barren land. Agriculture being a dominant source of income, crop land and fallow land components occupy major part of the land use system in this Distt., together covering 85.07% of the total geographical area. The water body component covering 2.91% of the total geographical area of this Distt. chiefly includes Ganga river, its tributaries and other wetlands. The built up area includes Soron as the major town along with other towns and villages in the study region. Table 1 provides the statistics while Map 5 depicts the various land use/land cover classes as analysed for the study region.

Table 1 : Land Use And Land Cover Details Of Study Region

Kasganj (LULC)		
Class	**Area (Ha)**	**Area (%)**
Crop Land	22796.19	36.84
Fallow Land	29843.4	48.23
Dense Forest	0.32	0.00
Open Forest	156.51	0.25
Grassland/Scrub	880.15	1.42
Water Body	1802.55	2.91
Marshy Land	159.81	0.26
Riverbed/Open Land	3274.5	5.29
Built up	1998.35	3.23
Barren Land	965.1	1.56
Total	**61876.88**	**100**



Map 5 : Land Use/Land Cover Map Of Study Region In Kasganj Distt.

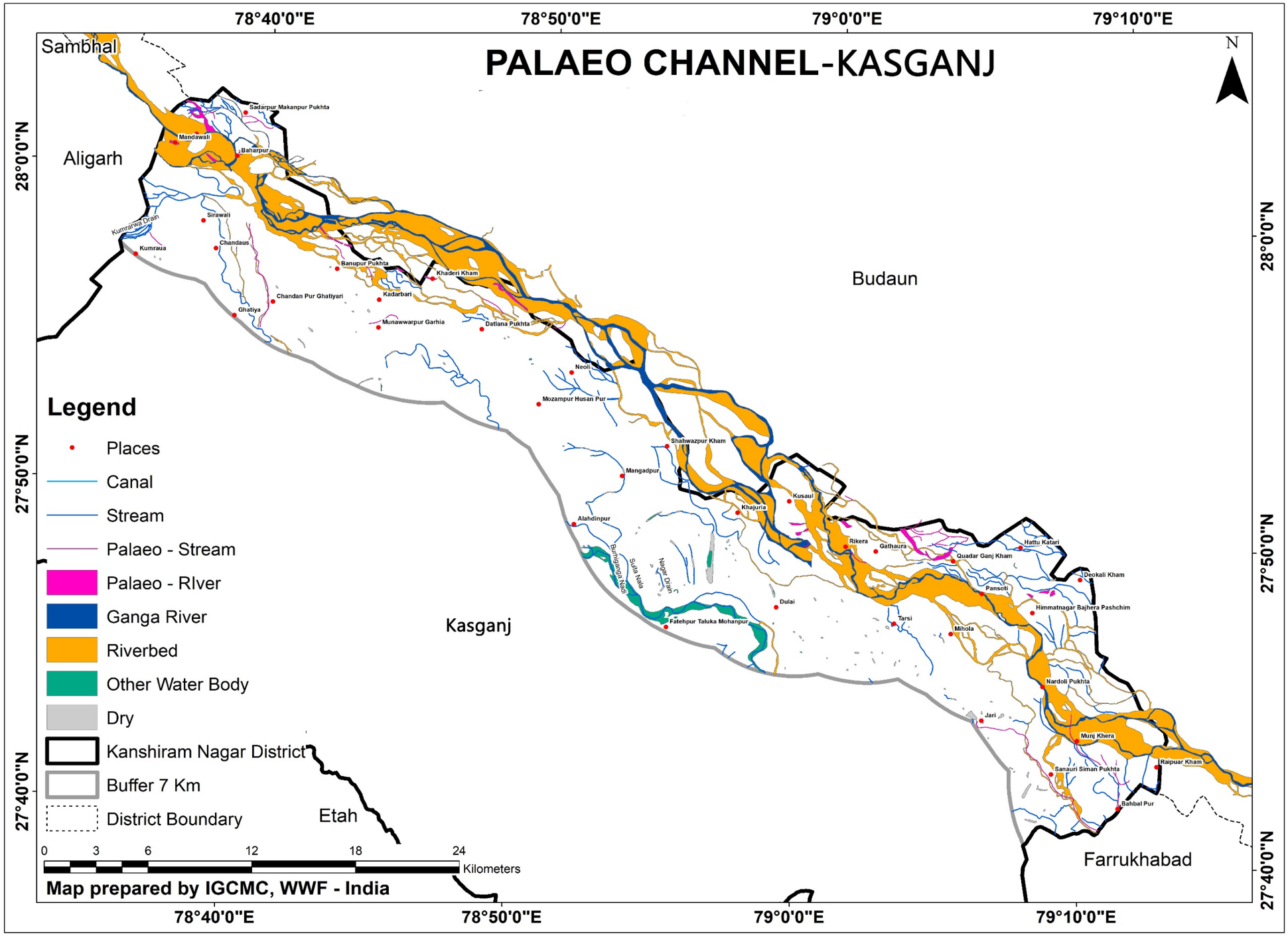
6.0 Palaeochannels Of Ganga River

6.1 Decline in natural flow of a River or stream decreases the sediment flushing ability of the Rivers. It may be a reason behind the disappearing of River channels in the Ganga River basin. Apart from that various other factors such as change in land use pattern, sand mining, agricultural practices and brick kilns may also lead to disappearance of streams and river channels in the region. These palaeochannels do not carry water during most of the year but may flow during flood events. Such abandoned and silted palaeochannels of the past can be mapped using the remote sensing techniques. Hence, based on the available satellite data and subsequent remote sensing analysis, Map 6 was prepared which depicts the various paleochannels in the study region of Kasganj Distt.

6.2 A stretch of one such palaeochannel of Ganga River was observed near Datalana Kham village in Kasganj Distt. [Image xx]. Parts of this channel have disappeared over a period of time principally due to intensive agriculture in the region. The interlocutors reiterated that this channel receives water from Ganga during monsoon which is later used up for irrigation purposes. Ultimately when summers arrive, this channel remains dried up completely. Part of this channel which had a depression was observed during field survey and it had some water left [Image xx].

Image 6 : Palaeochannel (Marked Red) Near Datalana Kham Village In Kasganj Distt.

Image 7 : Part Of This Palaeochannel As Observed On 14th March, 2022



Map 6 : Paleochannels In The Study Region

7.0 Floodplain Of River Ganga In Kasganj

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.

7.2 Kasganj Distt. falls in the Western Plain Zone/Upper Gangetic Plain Zone with the major soils being loam, silt, silty loam and fine soil. The net sown area in the district is 141.2 hectares in which 104.2 hectares of area is sown more than once (NICRA-ICAR, 2013). Agriculture is one of the major sources of income for the residents of the Distt. and it is benefitted by the fertile alluvium brought by Ganga river and its tributaries. Vast floodplain lands along Ganga, Burhi Ganga and East kali Rivers were observed to be under extensive crop cultivation during the field survey in study region. Rice is the chief Kharif crop while Wheat and Mustard are the chief Rabi crops grown in the Distt. Other major crops grown here include maize, chana, bajra, sugarcane along with various pulses and vegetables such as potato, onion, chillies, green peas and tomato. Tobacco plantation was also observed in some parts of the Distt. The details of some villages surveyed along with their floodplain agriculture produce is provided in Table 2 while Images 11-13 depicts a floodplain agriculture field as recorded during the survey.

Table 2 : Some Floodplain Villages And Their Agriculture Produce In Kasganj Distt.

Sr. No.	Village Name	Agricultural Produce
1.	Dharampur	Rice, wheat, mustard, chana, potato, brinjal
2.	Neoli	Rice, wheat, mustard, sugarcane, onion, tomato
3.	Pathak Pur	Rice, wheat, chana, maize, onion, chillies, tobacco
4.	Miholi	Rice, wheat, mustard, sugar cane, mustard, brinjal
5.	Kadarganj	Rice, wheat, mustard, mustard, sugar cane, maize
6.	Sultanpur	Rice, wheat, bajra, maize, potato, sugarcane, tobacco
7.	Ghabra	Rice, mustard, wheat, maize, chana, potato, tomato

Image 8 : Floodplain Wheat Fields Near Neoli Village In Study Region

Image 9 : Floodplain Sugarcane Fields Near Kadarganj Village In Study Region

7.3 Floodplain grasses : The name 'Kasganj' itself is derived from the fact that this region once constituted thick forests mainly dominated by the 'Kans grass'. Even today, *S. spontaneum* (commonly known as *Kans*) and *S. bengalense* (commonly known as *Munj/ Sarkanda*) dominate the riparian vegetation both on the river banks and on the riverine islands throughout study region [Images xx-xx] along with other grasses such as *Cynodon dactylon* (L.) Pers. (commonly known as Doob or Durva grass). *Saccharum* species are tall, perennial wild grasses growing upto 2-3 m height. They form extensive root networks that bind the soil/pebbles and form tall thick clumps with high biomass tufts. The dried *Saccharum* grasses are widely used throughout the Distt. for roof thatching in villages. Along with this some local residents also use these grasses in construction of temporary huts to monitor their agricultural fields. These grasses are also used in making mats/*chatai*. The abundance of this grass and availability throughout the year makes it an excellent bio resource for the residents in this region.

Image 10 : Lush Growth Of *Saccharum* Grasses Along Ganga River Near xxx In Kasganj Distt.

Image 11 : *Saccharum* Grasses Used For Demarcating Fields On A Riverine Island

8.0 Wetlands In Kasganj 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. During the current study about 57 different wetlands are recorded whose details are provided in Table 3. Map 7 shows the spatial distribution of these wetlands in the study region. During the field survey, one major wetland in the study region of Kasganj was identified and surveyed which is discussed in this section. Most other wetlands are small in size and face continuous threats from encroachment and gregarious agricultural expansion in this region.

Table 3 : List Of Wetlands In The Study Region

Sr. No.	Wetland	Coordinates		Area [Hectares]
		Latitude	Longitude	
01	01	27°45'24.24"N	79° 7'27.97"E	0.13
02	02	27°45'27.80"N	79° 7'29.11"E	0.18
03	03	27°45'32.53"N	79° 7'21.32"E	0.26
04	04	27°44'17.08"N	79° 6'2.43"E	0.74
05	05	27°45'30.97"N	79° 5'10.52"E	0.30
06	06	27°45'29.36"N	79° 3'57.52"E	0.50
07	07	27°46'42.73"N	79° 4'41.47"E	0.48
08	08	27°45'30.89"N	79° 3'2.61"E	0.55
09	09	27°45'52.07"N	79° 3'10.14"E	1.33
10	10	27°45'52.46"N	79° 3'18.57"E	0.63
11	11	27°45'57.78"N	79° 3'12.61"E	0.27
12	12	27°46'6.60"N	79° 3'13.23"E	0.73
13	13	27°46'58.82"N	79° 3'55.20"E	0.43
14	14	27°47'27.73"N	79° 3'31.29"E	0.25
15	15	27°46'53.21"N	79° 3'6.24"E	0.49
16	16	27°45'30.58"N	79° 1'28.40"E	0.75
17	17	27°45'35.48"N	79° 1'40.27"E	0.24

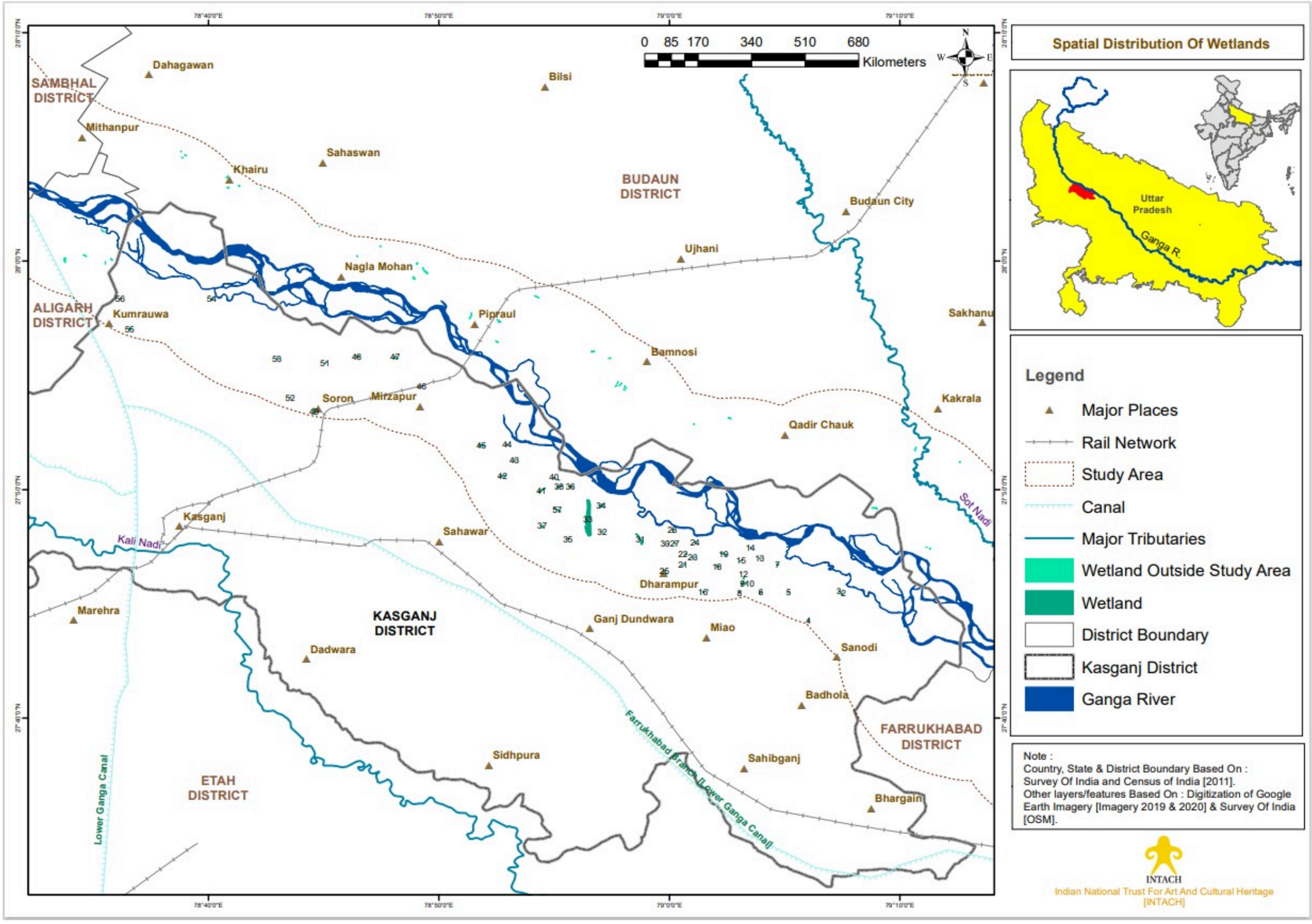
18	18	27°46'38.54"N	79° 2'4.74"E	1.45
19	19	27°47'11.32"N	79° 2'21.73"E	1.75
20	20	27°46'38.34"N	79° 0'33.91"E	0.39
21	21	27°46'42.49"N	79° 0'38.17"E	0.46
22	22	27°47'9.90"N	79° 0'43.19"E	0.78
23	23	27°47'0.82"N	79° 1'1.27"E	0.98
24	24	27°47'41.14"N	79° 1'7.38"E	0.98
25	25	27°46'25.54"N	78°59'47.68"E	0.89
26	26	27°46'18.54"N	78°59'52.46"E	0.44
27	27	27°47'38.62"N	79° 0'15.00"E	0.99
28	28	27°48'13.71"N	79° 0'7.93"E	0.35
29	29	27°48'7.98"N	79° 0'10.17"E	0.28
30	30	27°47'37.14"N	78°59'56.65"E	0.31
31	31	27°47'45.39"N	78°58'45.26"E	8.76
32	32	27°48'8.52"N	78°57'6.46"E	0.31
33	Unnamed wetland in Kasganj	27°48'18.87"N	78°56'28.03"E	84.2
34	34	27°49'16.59"N	78°57'2.85"E	3.0
35	35	27°47'49.89"N	78°55'36.12"E	0.54
36	36	27°50'7.06"N	78°55'42.99"E	1.12
37	37	27°48'23.01"N	78°54'28.93"E	1.0
38	38	27°50'7.77"N	78°55'12.15"E	2.1
39	39	27°50'25.19"N	78°55'12.81"E	0.28
40	40	27°50'30.57"N	78°54'59.86"E	0.53
41	41	27°49'58.12"N	78°54'28.72"E	4.22
42	42	27°50'35.49"N	78°52'44.54"E	1.1
43	43	27°51'16.49"N	78°53'16.13"E	0.70
44	44	27°51'58.70"N	78°52'57.81"E	0.34
45	45	27°51'55.52"N	78°51'51.11"E	1.19
46	46	27°54'31.78"N	78°49'15.09"E	0.41
47	47	27°55'46.28"N	78°48'5.78"E	1.24

48	48	27°55'48.26"N	78°46'26.99"E	0.96
49	49	27°53'26.01"N	78°44'35.40"E	4.28
50	50	27°55'33.60"N	78°45'6.08"E	0.23
51	51	27°55'31.40"N	78°45'3.56"E	0.31
52	52	27°54'1.35"N	78°43'32.94"E	0.17
53	53	27°55'44.59"N	78°42'58.31"E	0.35
54	54	27°58'21.52"N	78°40'9.30"E	1.0
55	55	27°57'1.09"N	78°36'34.92"E	1.28
56	56	27°58'20.15"N	78°36'10.21"E	0.25
57	57	27°49'7.03"N	78°55'7.59"E	2.19
	Total Area [Hectares			**140.37**

8.2 **Unnamed wetland in Kasganj :** An elongated and possibly a part of an erstwhile oxbow lake was observed near Ganeshpur Bhatan village in Kasganj Distt. covering an area of about 84.2 ha [Image xx]. This is the biggest wetland in study region and an important source of water for neighboring villages. During the survey, several birds such as Asian openbill storks, Sarus cranes and different duck species were found to inhabit this wetland [Image xx] making it an important bird habitat in this region. The interlocutors reiterated that this wetland got flooded with water from Ganga River during monsoons and remains for most part of the year except during summers when it dries up considerably. The water from this wetland serves as important source for irrigating the surrounding fields to grow crops such as wheat, rice and potato. Parts of this wetland were found to be covered with vegetation including water hyacinth, *Typha* grass and *Sagittaria* sp. If conserved and maintained appropriately, this water body has all the potential to become an important wetland in Kasganj Distt. Ever increasing agricultural expansion and scarcity of interest among local residents towards this wetland poses immediate danger towards its survival and the survival of biodiversity associated with it.

Image 12 : Location Of The Wetland In Kasganj Distt. [27° 48' 18.87" N; 78° 56' 28.03" E]

Image 13 : Sarus Crane Along With Other Birds In And Around The Wetland As Observed On 11th March, 2022



Map 7 : Spatial Distribution Of Water Bodies Within Study Area

9.0 Riparian Flora Along Ganga River In Kasganj Distt.

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. Siddiqui (1991) gave an account of 40 riparian macrophytes from Narora-Kannauj region of which species of *Ammania*, *Eclipta*, *Polygonum*, *Ipomoea*, *Rumex*, *Saccharum*, *Scirpus* and *Tamarix* are amphibious in nature.

9.3 During the field survey the riparian vegetation was found to have patchy distribution with it being sparse in most sites observed [Image xx]. This could be attributed to the fact that agriculture is dominant in the landscape of study region especially along Ganga River and its tributaries. Shrubs and herbs were dominant in terms of growth and extent of distribution as compared to the trees. The common tree species in study region included – Babool, Neem, peepal and Banyan among which Peepal and Banyan were also found associated with various religious sites. The common shrubs and herbs in the study region included – *Ageratum conyzoides* [Image xx], *Croton bonplandianus, Parthenium hysterophorus, Polygonum sp.* and *Zizyphus* sp. The floodplain grasses – *Saccharum* sps. were a major component of riparian vegetation throughout with its luxuriance dominating the other flora at some sites. Some notable riparian flora is presented in Table 3.

Table 4 : Riparian Plant Species Recorded In The Study Area

Sr. No.	Botanical Name	Family	Habit	Common Name
1.	*Acacia nilotic*a (L.) Delile	Fabaceae	Tree	Babool
2.	*Aegle marmelos* (L.) Correa	Rutaceae	Tree	Bel Patra
3.	*Azadirachta indica* A. Juss.	Meliaceae	Tree	Neem
4.	*Borassus flabellifer* L.	Arecaceae	Tree	Taad
5.	*Dalbergia sissoo* Roxb. ex DC.	Fabaceae	Tree	Shisham
6.	*Ficus benghalensis* L.	Moraceae	Tree	Banyan
7.	*Ficus religiosa* L.	Moraceae	Tree	Peepal
8.	*Mangifera indica* L.	Anacardiaceae	Tree	Mango
9.	*Calotropis gigantea* (L.) Dryand.	Apocynaceae	Shrub	Safed Aak
10.	*Calotropis procera* (Aiton) Dryand.	Apocynaceae	Shrub	Aak
11.	*Lippia alba* (Mill.) N.E. Br. ex Britton & P. Wilson	Verbenaceae	Shrub	Bushy Lippia
12.	*Polygonum sp.*	Polygonaceae	Shrub	
13.	*Ricinus communis* L.	Euphorbiaceae	Shrub	Wild Castor
14.	*Zizyphus* sp.	Rhamnaceae	Shrub	Wild Ber
15.	*Achyranthes aspera* L.	Amaranthaceae	Herb	Chirchira
16.	*Ageratum conyzoides* L.	Amaranthaceae	Herb	Prickly Amaranth
17.	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Herb	Kakronda
18.	*Croton bonplandianus* Baill.	Euphorbiaceae	Herb	Ban Tulsi
19.	*Rumex dentatus* L.	Polygonaceae	Herb	
20.	*Parthenium hysterophorus* L.	Asteraceae	Herb	Congress Grass
21.	*Xanthium strumarium* L.	Asteraceae	Herb	Chhotav dhatura
22.	*Saccharum munja* Roxb.	Poaceae	Grass	Munj
23.	*Cyperus* sp.	Cyperaceae	Grass	
24.	*Cynodon dactylon* (L.) Pers.	Poaceae	Grass	Doob
25.	*Saccharum spontaneum* L.	Poaceae	Grass	Kans/Katha
26.	*Saccharum bengalense* Retz.	Poaceae	Grass	Munj

Image 14 : Ganga River Bank With Sparse Riparian Vegetation Near Kadarganj

Image 15 : *Ageratum conyzoides*

9.4 **Forestry Along Ganga :** The Kasganj forest department has carried out intensive plantation activities in two selected areas along Ganga River. One of these areas has been named as Ganga Van [Image xx] and the other is named as Bhagirathi Van [Image xx]. While Ganga Van is spread in an area of 98.5 ha and was established in the year 2019, Bhagirathi Van is much bigger covering an area of 298 ha and was established in the year 2020. Thousands of tree saplings including Shisham, Palash, Peepal, Gular, Ashok and Kadam were planted in these lands, many of which have survived despite frequent floods helping convert these sites into man-made forests [Image xx]. The forest officials and other resident interlocutors also revealed presence of various deer species along with Nilgai, wild boars and several birds in these forested lands.

Image 16 : Location Of Ganga Van In Kasganj Distt.

Image 17 : Location Of Bhagirathi Van In Kasganj Distt.

Image 18 : Young Shisham Trees In Bhagirathi Van

10.0 Faunal Diversity In Kasganj Distt.

10.1 **Gangetic Dolphins :** 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 Ganges–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 during last 3-4 decades. During the field survey, only one dolphin was sighted few hundred meters away from Kachhla Ghat in the Ganga River stretch between Kasganj & Budaun Distt.s. According to the interlocutors, occasional dolphin sightings occur in the study region during monsoons when the water level rises. Furthermore, dolphins have also been sighted in the Lower Ganga canal and can be spotted from *Nadrai ka Pul* in Kasganj Distt.

10.2 **Turtles :** Turtles form an important component of Ganga riverine biodiversity and play a critical ecological role by controlling aquatic vegetation, serve as scavengers and help maintain rivers (WII-GACMC, 2017). During the survey **3 Indian Softshell Turtles** (*Chitra indica*) which have been listed as **'Endangered'** in IUCN's Red Data List, **10-15 Brown Roofed Turtles** (Pangshura smithii) which is listed as **'Near Threatened'** and **2 Indian Roofed Turtles** (*Pangshura tecta)* which have **'Vulnerable'** status were observed basking in the sun along the sandy banks and on sand bars in Ganga River. According to the interlocutors, a good population of these recorded turtles inhabit the Ganga river stretch in study region. However, illegal poaching & trafficking of these species is a major threat to their survival. Turtles often captured in the fishing net get sold illegally to the people who keep them as pets.

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. According to the interlocutors the population of Nilgai in the district is low as compared to other Distt.s along Ganga River. Their presence has been recorded in villages such as Akbar Pur, Pathak Pur, Miholi, Madan Pur, Nardoli Kham and Alipur Bhakri. Image xx depicts a Nilgai as sighted during the field survey in study region of Kasganj Distt.

Image 19 : Nilgai As Sighted Near Pathakpur Village In Kasganj Distt.

10.4 **Wild boar :** The Indian wild boar (*Sus scrofa* L.) also known as the wild pig is one of the most 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). During the survey, the interlocutors reiterated that boars are responsible for destroying the crops such as potato and other vegetables. This problem persists specially in Neoli, Ghabra, Dharampur, Pathak Pur, Miholi, Madan Pur and other flood plain agricultural areas. In the study region, wild boars inhabit the tall riparian grasses along the river along with the riverine islands and usually attack fields during nighttime.

10.5 Based on visual observations during field survey and interactions with the interlocutors some other major faunal species recorded from study region in Kasganj Distt. is presented in Table 5.

Table 5 : Other Important Fauna Recorded In The Study Region

Sr. No.	Common Name	Scientific Name	Conservation Status
1.	Blackbuck	*Antilope cervicapara*	Least Concern
2.	**Red Sand Boa**	***Eryx johnii***	**Near Threatened**
3.	Northern Plains Grey Langur	*Semnopithecus entellus*	Least Concern
4.	Golden Jackal	*Canis aureus*	Least Concern
5.	Rhesus Monkey	*Macaca mulatta*	Least Concern
6.	Indian Grey Mongoose	*Herpestes edwardsii*	Least Concern
7.	**Bengal Monitor**	***Varanus bengalensis***	**Near Threatened**
8.	Danaid Eggfly (Butterfly)	*Hypolimnas misippus*	Least Concern
9.	Grey Pansy (Butterfly)	*Junonia atlites*	Least Concern
10.	Peacock Pansy (Butterfly)	*Junonia almana*	Least Concern
11.	Blue Jay (Butterfly)	*Graphium doson*	Least Concern
12.	Common Mime (Butterfly)	*Papilio clytia*	Least Concern
13.	Common Grass Yellow (Butterfly)	*Eurema brigitta*	Least Concern

Image 20 : Red Sand Boa

10.6 **Avifauna Diversity:** Ganga River, with its mosaic of habitats, supports a rich diversity of avifauna which include both resident and migratory species. Some iconic and globally threatened birds such as the black-bellied tern (*Sterna acuticauda*), Indian skimmer (*Rynchops albicollis*), sarus crane (*Antigone antigone*) and river lapwing (*Vanellus duvaucelii*) also breed on the islands, sandbars and banks of the Ganga River. Kasganj Distt. has rich and highly diverse avian fauna which is still relatively understudied. During the field survey in study region during March, 2022, 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 referring IUCN Red Data List. The details of recorded species is presented in Table 6 while Images xx-xx depict some significant species as observed during survey. Following different observations were made based on results obtained:

- A total of 94 different bird species were sighted, out of which 39 were wetland birds' species while remaining 55 species were of forest and grassland including 4 species of raptors.
- White throated kingfisher, Little Egret, Cattle Egret, Indian Pond Heron, House Sparrow, Jungle Crow, Common Myna, Bank Myna, Asian Pied Starling, Common Pigeon, Common Babbler, Spotted Dove, Eurasian Collared Dove and White Wagtail were the most frequently sighted species.
- Some sighted avian species like **Black-headed Ibis, Black-tailed Godwit** and **River Lapwing** comes under **"Near Threatened"** category of IUCN's Red List of Threatened Species. **River Tern** has **"Vulnerable"** status, whereas **Black-bellied Tern** and **Steppe Eagle** falls under **"Endangered"** Category (IUCN red Data List).

Table 6 : List Of Birds Recorded In The Study Region

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.	Common Sandpiper	*Actitis hypoleucos*	Least Concern
10.	Wood Sandpiper	*Tringa glareola*	Least Concern
11.	Green Sandpiper	*Tringa ochropus*	Least Concern
12.	Asian Openbill	*Anastomus oscitans*	Least Concern

13.	Eurasian Spoonbill	*Platalea leucorodia*	Least Concern
14.	Little Cormorant	*Microcarbo niger*	Least Concern
15.	Indian Cormorant	*Phalacrocorax fuscicollis*	Least Concern
16.	Great Cormorant	*Phalacrocorax carbo*	Least Concern
17.	Red-naped Ibis	*Pseudibis papillosa*	Least Concern
18.	**Black-headed Ibis**	***Threskiornis melancephalus***	**Near Threatened**
19.	White breasted -Waterhen	*Amaurornis phoenicurus*	Least Concern
20.	Common Moorhen	*Gallinula chloropus*	Least Concern
21.	Little Grebe	*Tachybaptus ruficollis*	Least Concern
22.	Common Teal	*Anas crecca*	Least Concern
23.	Red-creasted Pochard	*Netta rufina*	Least Concern
24.	Ruddy Shelduck	*Tadorna ferruginea*	Least Concern
25.	Tufted Duck	*Aythya fuligula*	Least Concern
26.	Bar-headed Goose	*Anser indicus*	Least Concern
27.	Garganey	*Spatula querquedula*	Least Concern
28.	Purple Swamphen	*Porphyrio porphyrio*	Least Concern
29.	Eurasian Coot	*Fulica atra*	Least Concern
30.	Common Greenshank	*Tringa nebularia*	Least Concern
31.	Spotted Redshank	*Tringa erythropus*	Least Concern
32.	Common Redshank	*Tringa totanus*	Least Concern
33.	**Black-tailed Godwit**	***Limosa Limosa***	**Near Threatened**
34.	Black-winged Stilt	*Himantopus himantopus*	Least Concern
35.	Bronze-winged Jacana	*Metopidius indicus*	Least Concern
36.	Caspian Gull	*Larus cachinnas*	Least Concern
37.	Pallas's Gull	*Larus ichthyaetus*	Least Concern
38.	**Black-bellied Tern**	***Sterna acuticauda***	**Endangered**
39.	**River Tern**	***Sterna aurantia***	**Vulnerable**
40.	**River Lapwing**	***Vanellus duvaucelii***	**Near Threatened**
41.	Red-wattled Lapwing	*Vanellus indicus*	Least Concern
42.	Black Drongo	*Dicrurus macrocercus*	Least Concern
43.	Common Myna	*Acridotheres tristis*	Least Concern
44.	Bank Myna	*Acridotheres ginginianus*	Least Concern
45.	Asian Pied Starling	*Gracupica contra*	Least Concern
46.	Common Stonechat	*Saxicola torquatus*	Least Concern
47.	Pied Bushchat	*Saxicola caprata*	Least Concern
48.	Common Babbler	*Argya caudata*	Least Concern
49.	Jungle Babbler	*Argya striata*	Least Concern
50.	Large Grey Babbler	*Argya malcolmi*	Least Concern
51.	White Wagtail	*Motacilla alba*	Least Concern
52.	White-browed Wagtail	*Motacilla maderaspatensis*	Least Concern
53.	Indian Silverbill	*Euodice malabarica*	Least Concern

54.	Common Hoopoe		
55.	Common Tailorbird	*Orthotomus sutorius*	Least Concern
56.	Rose-ringed Parakeet	*Psittacula krameri*	Least Concern
57.	House Sparrow	*Passer domesticus*	Least Concern
58.	Indian Jungle Crow	*Corvus culminatus*	Least Concern
59.	House Crow	*Corvus splendens*	Least Concern
60.	Oriental Magpie Robin	*Copsychus saularis*	Least Concern
61.	Streak throated Swallow	*Petrochelidon fluvicola*	Least Concern
62.	Barn Swallow	*Hurindo rustica*	Least Concern
63.	Brown-headed Barbet	*Psilopogon zeylanicus*	Least Concern
64.	Coppersmith Barbet	*Psilopogon haemacephalus*	Least Concern
65.	Ashy Prina	*Prinia socialis*	Least Concern
66.	Plain Prinia	*Prinia innornata*	Least Concern
67.	Greater Coucal	*Centropus sinensis*	Least Concern
68.	Red-whiskered Bulbul	*Pycnonotus jocosus*	Least Concern
69.	Red-vented Bulul	*Pycnonotus cafer*	Least Concern
70.	Common Kestral	*Falco tinnunculus*	Least Concern
71.	Black-winged kite	*Elanus caeruleus*	Least Concern
72.	Black Eagle	*Ictinaetus malaiensis*	Least Concern
73.	**Steppe eagle**	***Aquila nipalensis***	**Endangered**
74.	Green Bee-eater	*Merops orientalis*	Least Concern
75.	Scaly-breasted Munia	*Lonchura punctulata*	Least Concern
76.	Indian Peafowl	*Pavo cristatus*	Least Concern
77.	Jungle Owlet	*Glaucidium radiatum*	Least Concern
78.	Crested Lark	*Galerida cristata*	Least Concern
79.	Oriental Skylark	*Alauda gulgula*	Least Concern
80.	Indian Bushlark	*Mirafra erythroptera*	Least Concern
81.	Paddyfield Pipit	*Anthus rufulus*	Least Concern
82.	Jungle Owlet	*Glaucidium radiatum*	Least Concern
83.	Common Pigeon	*Columba livia*	Least Concern
84.	Spotted Dove	*Spilopelia* chinesis	Least Concern
85.	Red Turtle Dove	*Streptopelia tranquebarica*	Least Concern
86.	Eurasian Collared Dove	*Streptopelia decaocto*	Least Concern
87.	Laughing Dove	*Spilopelia senegalensis*	Least concern
88.	Yellow-footed Green-pigeon	*Treron phoenicopterus*	Least concern
89.	Long-tailed Shrike	*Lanius schach*	Least Concern
90.	Rufous Treepie	*Dendrocitta vagabunda*	Least concern
91.	Purple Sunbird	*Cinnyris asiaticus*	Least concern
92.	Indian Roller	*Coracias benghalensis*	Least concern
93.	Indian Grey Hornbill	*Ocyceros birostris*	Least Concern
94.	Brown Rockchat	*Oenanthe fusca*	Least Concern

Image 21 : Steppe Eagle

Image 22 : A Herd Of Bar Headed Geese

Image 23 : Asian Openbill

Image 24 : Shikra

10.7 **Migratory Birds:** A total of 17 Migratory and 4 Local Migratory species were identified among the recorded avian species. These migratory species (excluding LM) are winter visitors to Indian Subcontinent can be seen from October to March. The Migrants (M) and Local Migrant (LM) species are listed in Table 7:

Table 7 : List Of Migratory Birds Recorded In The Study Region

Sr. No	Common Name	Scientific Name	Conservation Status	M (Migrant)/ LM (Local Migrant)
1.	Common Sandpiper	*Actitis hypoleucos*	Least Concern	M
2.	Green Sandpiper	*Tringa ochropus*	Least Concern	M
3.	Wood Sandpiper	*Tringa glareola*	Least Concern	M
4.	**Common Pochard**	***Aythya farina***	**Vulnerable**	**M**
5.	Red-creasted Pochard	*Netta rufina*	Least Concern	M
6.	Ruddy Shelduck	*Tadorna ferruginea*	Least Concern	
7.	Tufted Duck	*Aythya fuligula*	Least Concern	M
8.	Bar-headed Goose	*Anser indicus*	Least Concern	M
9.	Garganey	*Spatula querquedula*	Least Concern	M
10.	White Wagtail	*Motacilla alba*	Least Concern	M
11.	Common Greenshank	*Tringa nebularia*	Least Concern	M
12.	Spotted Redshank	*Tringa erythropus*	Least Concern	M
13.	Common Redshank	*Tringa totanus*	Least Concern	M
14.	**Black-tailed Godwit**	***Limosa Limosa***	**Near Threatened**	M
15.	Caspian Gull	*Larus cachinnas*	Least Concern	M
16.	Pallas's Gull	*Larus ichthyaetus*	Least Concern	M
17.	**Steppe eagle**	***Aquila nipalensis***	**Endangered**	M
18.	Great Cormorant	*Phalacrocorax carbo*	Least Concern	LM
19.	Black-winged Stilt	*Himantopus himantopus*	Least Concern	LM
20.	Common Kestral	*Falco tinnunculus*	Least Concern	LM
21.	Barn Swallow	*Hurindo rustica*	Least Concern	LM

11.0 Ganga Riverine Islands/*Diaras* In Kasganj 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 irregularly shaped sand bars and few riverine islands are present in the Ganga river stretch of study region.

11.2 One of the biggest and a significant riverine island in the study region is irregularly shaped situated near Sotua village in Kasganj [Image xx]. During the field survey it was observed from Lahara Ghat and was predominantly covered by agricultural fields [Image xx]. The interlocutors in the region reiterated that crops such as mustard and wheat along with different vegetables and fruits were grown on this island. They further claimed that fields were allotted on this island by local authorities to different villagers inhabiting close by.

Image 25 : The Biggest Riverine Island In Study Region Of Ghazipur Distt.

Image 26 : Part Of This Riverine Island As Seen From Near Lahara Ghat on 9th March, 2022

11.3 Along with the riverine islands, numerous sand bars are also present in the Ganga river stretch of study region. One such sandbar was observed below the Kadarganj Ganga bridge [Image xx] during the field survey. It was profoundly cultivated upon with crops such as melons, cucumber and parwal along with other vegetables. The fields were demarcated using *Saccharum* grasses which are an important bioresource in this region. Such intensive cultivation on sandbars are detrimental to the emergent vegetation which could otherwise play an important role in riverine ecology. Furthermore, no proper records or authority is available in this region as noted based on interactions regarding the usage and encroachment of such sandbars and other riverine islands.

Image 27 : Sand Bars Below And Around Kadarganj Ganga Bridge In Kasganj Distt.

Image 28 : Sand Bars As Observed During Field Survey On 11th March, 2022

12.0 Fishing In Kasganj 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 According to the interlocutors, fishing is prohibited in Ganga owing to various religious activities, beliefs and practices especially along sites such as Kadarganj Ghat, Kachhla Ghat & Lahara Ghat. However, during the survey fishing activities were observed at various sites, especially on the sites which are secluded and inaccessible for the others. Cast nets and drag nets along with locally made fishing rods were principally used for the purpose. Mostly residents of villages along Ganga River such as Hussainpur Kham, Munj Khera and Kailai Badapur are involved in fishing activity which is majorly for local consumption. Though most people involved in fishing did not respond to interactions during the survey, few of them reiterated a decline in fish population over the last few decades. Furthermore, they claimed that due to various factors such as supposed ban on fishing activities in the region, decreasing water depths and lower fish catch lead to only minimal fishing activities in this region which are confined to local consumption only. According to some of the interlocutors, major fish caught from the study region included– rohu, katla, tengara, baam, pothiya, barari and sidhari. Some of the major fish species caught from the region as recorded during the survey are represented in Table 8 while Image xx depicts fish caught by one of the local residents near Bikron village in Kasganj Distt.

Table 8 : Major Fish Caught From Rivers In The Study Region

Sr. No.	Scientific Name	Common Name
1.	*Labeo rohita*	Rohu
2.	*Labeo catla*	Catla/Bhakur
3.	*Wallago attu*	Buari/Barari

4.	*Mystus tengara*	Tengara
5.	*Puntius sp.*	Sidhari
6.	*Cyprinus carpio*	Common/Chinese carp
7.	*Channa punctata*	Garai
8.	*Eutropiichthys vacha*	Bachwa
9.	*Anguilla bengalensis*	Baam
10.	*Cirrhinus mrigala*	Naini
11.	*Mastacembelus armatus*	Gaichi
12.	*Cabdio morar*	Chepua
13.	*Oreochromis* sp.	Tilapia

Image 29 : Sidhari Fish Caught By A Local Resident Of Bikron Village In Kasganj Distt.

13.0 Groundwater In Kasganj Distt.

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. Geomorphologically, Kasganj Distt. area is not fully matured and exhibits flat topography with few gentle undulations. The Distt. can be divided into three geomorphic units – Flood Plain, Younger Alluvial Plain and Older Alluvial Plain. River Ganga and its tributaries are the major drainages in this Distt. The soil types here are categorized into three classes – *Dumat* or Loam, *Matiyar* Clay, *Bhur* or Sand (Kudesia, 2013).

13.2 Major water bearing formations in the Distt. are sand of various grades, silt and *kankar*. The ground water occurs in the zone of sedimentation where it is present in the pore spaces of unconsolidated alluvial sediments. The ground water occurs in the deeper aquifers in semi confined to confined conditions. The aquifer system in the Distt. has been categorized in four groups. The first group of aquifer has a maximum thickness of 80 m. which contains fine to medium sand sometimes admixed with *kankar* and gravels and present just below the top clay layer. The second group of aquifer lies between the depth range of 110-160 mgbl. which contains fine to coarse sand admixed with *kankar* and gravels. The third group of aquifer is present in a depth range of 240 (±20) m to 290 (±20) m, containing fine to coarse sand admixed with *kankar* and gravels. The fourth aquifer group lies below 340 (±20 m) meters and consists of fine to coarse sand with occasional gravel (Kudesia, 2013).

13.3 During the field survey, ground water levels as recorded from different sites during the field survey based on information from the interlocutors is presented in Table 10. The water depth varied from 5 ft. below ground level (Kadarganj Ghat) to 50 ft. below ground level (Soron) in the study region and it kept on increasing as the distance from Ganga River increased. The use of wells in earlier years was quite common in this region which has declined significantly giving way to handpumps and motor based systems.

Table 9 : Grounwater Levels Recorded From Different Villages In Study Region

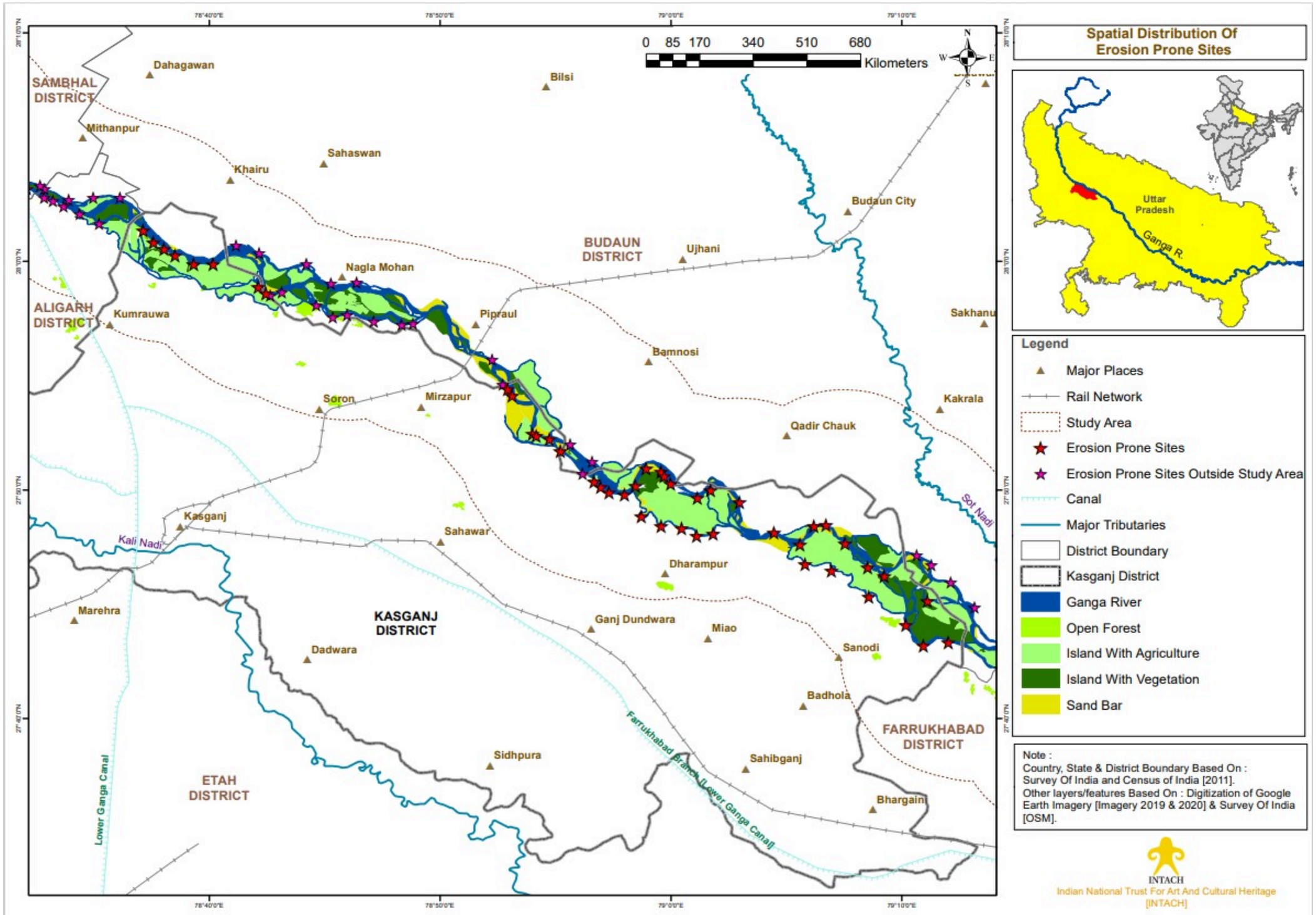
Place	Coordinates		Ground Water Table in Feet
	Lat.	Long.	
Miholi	27°46'45.05"N	79° 5'26.29"E	10
Dharampur	27°45'59.48"N	78°58'54.92"E	15
Neoli	27°54'4.59"N	78°51'8.80"E	15
Soron	27°53'11.89"N	27°53'11.89"N	50
Pathak Pur	27°56'35.50"N	78°47'35.13"E	10
Kasganj Town	27°48'29.17"N	78°38'40.21"E	25
Ghabra	27°47'14.05"N	78°59'58.62"E	20
Kadarganj Ghat	27°47'44.68"N	27°47'44.68"N	5
Sultanpur Ghat	27°48'0.46"N	79° 1'57.11"E	8

14.0 Ganga River Bank Erosion In Kasganj 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. The Ganga River bank throughout study region is prone to erosion as observed from Map xx. Some erosion prone sites as observed during the field survey include near Lahara Ghat, Kadarganj Ghat and Munj Khera among others [Images xx-xx]. The interlocutors reiterated that severe erosion led to losses in agricultural lands and even village settlements at some places which in turn affected their livelihoods. Intensive agricultural expansion in this region leading to diminished riparian vegetation can be a chief region attributed to bald banks which are prone to erosion. Steps to control erosion were not observed much during the field survey.

Image 30 : Ganga River Bank Erosion As Observed Near Lahara Ghat In Kasganj Distt.

Image 31 : Ganga River Bank Erosion As Observed Near Kadarganj Ghat In Kasganj Distt.



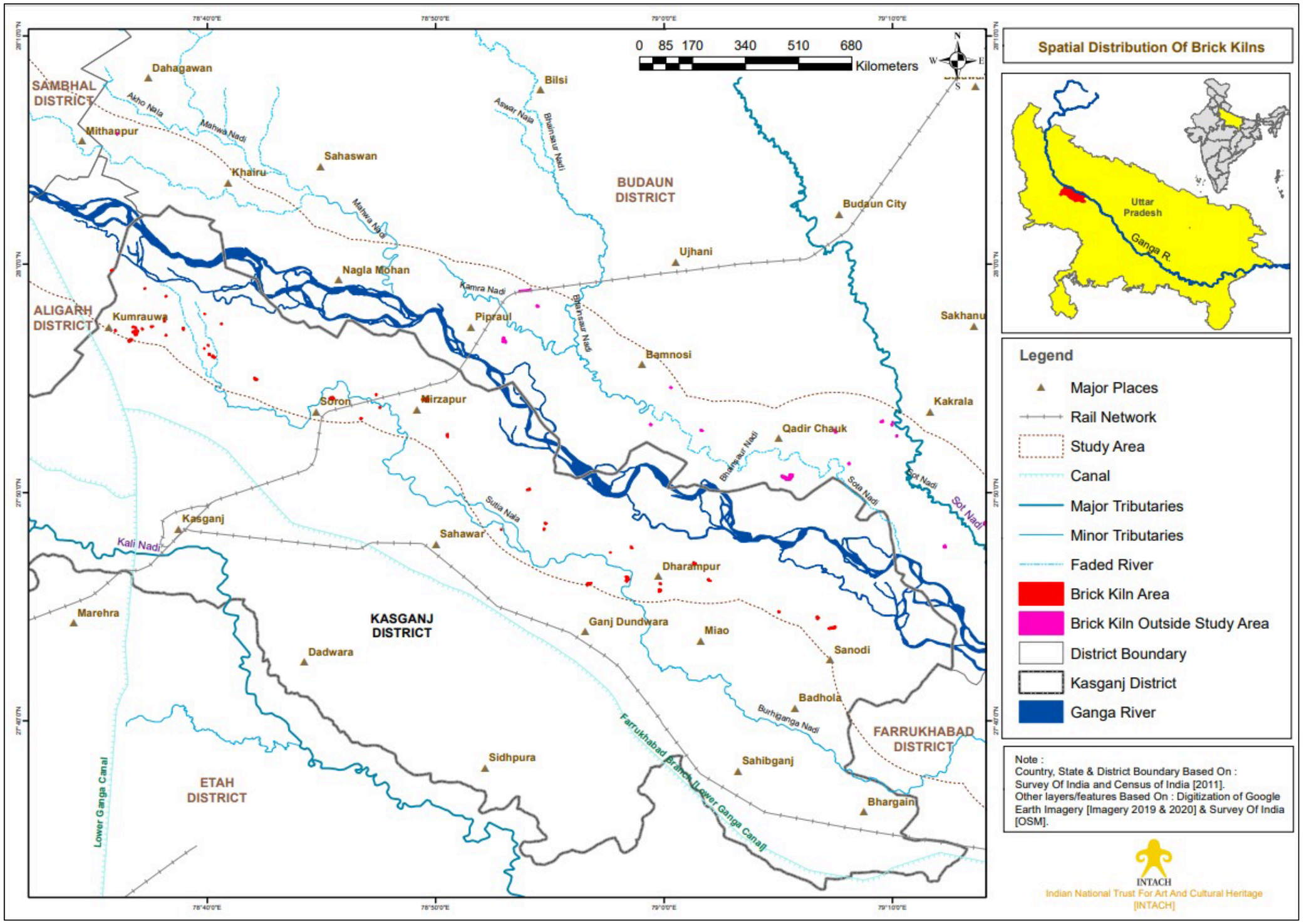
Map 8 : Spatial Distribution Of Erosion Prone Sites In Kasganj Distt.

15.0 Mining And Brick Kilns In Kasganj Distt.

15.1 Sand is one of the major minerals extracted from the Ganga River, especially in its middle and lower stretch. The demand is ever increasing due to rapid expansion of settlements and their upgradation across the country. Kasganj Distt. belongs to the North Indian Gangetic plain and particularly the Doab of Yamuna and Ganga Rivers and hence, the land surface is full of annual deposition of loam and sandy loam rendering fertile patches all around the Distt. The annual deposition of sand in the region also serves as an important mining resource for which contracts are given out in specific sites (DEIAA, 2018). During the survey sand mining was observed at sites such as Kadarganj Ghat.

15.2 **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. During the field survey, several brick kilns sere observed in Pathak Pur, Neoli, Ghabra and Sultanpur. The spatial distribution of brick kilns in the study region is depicted in Map 9 while Image xx depicts a brick kiln as seen in the field.

Image 32 : A Brick Kiln As Observed Near Xx Village



Map 9 : Spatial Distribution Of Brick Kilns In The Study Region

16.0 Boatmaking And Inland Navigation In Ghazipur Distt.

16.1 Boats play a crucial role in the livelihood and day-to-day activities of riparian communities in the study region. Different types of boats ply on the Ganga River and its tributaries depending upon its purpose. Two major types of boats were observed in the study region – smaller hand rowed wooden boats which were principally used for fishing and transporting goods/people from banks to diaras and vice-versa; & motorized boats made up of wood and metal principally used at sites such as Lahara Ghat and Kadarganj Ghat especially during auspicious occasions for tourists and pilgrims. Most interlocutors reiterated that these boats were constructed with the help of 'Mistry' (carpenters) from nearby towns and cities specializing in this aspect. While Sakhua (*Shorea robusta*) is the chief wood choice in these boats, other options such as babool and mango are also explored depending upon prices and availability. The average cost of boatmaking ranges between Rs. 50,000 – Rs. 1 lakh depending upon various factors.

Image 33 : A Hand-Rowed Wooden Boat Used For Transportation From Bank To Sand Bars/Riverine Islands In Kasganj Distt.

17.0 Sacred Sites In Kasganj Distt.

17.1 **Har ki Pauri, Soron :** Soron is a very old and one of the most important towns from mythology point of view in this Distt. It houses the temple [Image xx] dedicated to Lord Varaha (a Boar form of Lord Vishnu) which is visited by numerous pilgrims and tourists round the year. Close to the temple is located a holy pond which is referred to as 'Har ki Pauri' [Image xx] and is known for its great value especially for immersion of ashes of a deceased person. According to the local priests, tons of ashes are immersed in this pond every year and it is believed that all ashes are completely dissolved within 72 hours of its immersion. The pond water is also associated with Ganga River and hence, there are some Ghats where people take holy dip into the water. This place is also believed to be the birth place of Tulsidas and houses a memorial in his remembrance. Numerous other small temples and sacred trees dot the entire landscape around this sacred waterbody.

Image 34 : Temple Of Lord Varaha In Soron

Image 35 : Har Ki Pauri In Soron

17.2 **Surya Kund and Chandra Kund :** Two other old and sacred sites in Soron are – Surya kund dedicated to Sun God and Chandra Kund dedicated to Moon God [Images xx-xx]. Both these sites are believed to be very old and numerous sages/holy persons have practiced penance and worshipped at these sites. There were some ancient temple structures too especially at Surya Kund which were destroyed by invaders but still some remains are available reminiscent of the olden glory of these sites.

Image 36 : Surya Kund In Soron

Image 37 : Chandra Kund In Soron

17.3 **Sacred Trees:** Various sacred trees were observed during the field survey in study region. Peepal (*Ficus religiosa*) is the major tree species often found associated with temples and other religious sites throughout. The worship of this tree is usually done by the female residents in that region by tying threads around it and offering water along with sindoor, coconuts or incense sticks. Another tree species that is also found commonly associated with sacred sites is *Ficus benghalensis* (Banyan tree). Owing to their protection these sacred trees often develop trunks with huge girths and a luxuriant canopy. Some such examples of sacred trees as observed during field survey are depicted in Images xx-xx.

Image 38 : An Old And Sacred Banyan Tree Associated With Chandra Kund In Soron

Image 39 : A Sacred Peepal Tree In Soron

18.0 Key Observations and Recommendations

18.1 One important concern often raised during the survey was crop destruction caused by nilgai and wild boar especially in the floodplain agricultural fields. Though the farmers never retaliated violently towards the nilgai, they did admit to killing wild boars as they are 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.

18.2 The popularity of places such as Lahara Ghat often lead to a high footfall of tourists and pilgrims which also leads to generation of solid and liquid waste [Image xx]. If appropriate measures are not ensured such waste may enter directly into the water of Ganga River and turn out be extremely hazardous by degrading the water quality and negatively impacting the aquatic biodiversity. Hence, it is suggested in this study to develop appropriate waste management strategies for the local communities directly linked to Ganga River.

Image 40 : Solid And Liquid Waste Entering Ganga River As Observed Near Bara Village

18.3 Evidences of severe bank erosion can be observed on the map throughout the study region which usually results in losses of human settlements and agricultural fields. Hence, it is recommended to carry out detailed studies in the Distt. to identify erosion prone and impacted sites 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.

18.4 The wetlands observed in the study serve as crucial resources for livelihoods and day to day needs of local residents associated with them. However, no effort has been made to ensure conservation and maintenance of these resources which has resulted in issues like sewage influx and dominance of invasive species. These wetlands if conserved properly have the potential to not only provide good fish resources, but also harbor other flora and fauna diversity, provide aesthetic benefits and clean water for various uses. Hence, it is strongly recommended to pay immediate attention for maintenance of these water bodies especially in conjunction with local stakeholders.

18.5 The fishermen in study region strongly reiterated their concerns regarding fish ban and decreasing fish catch. It is imperative to get clarity on these matters and take appropriate measures for ensuring their livelihoods are not impacted and at the same time river ecology is not harmed. Numerous turtles were also observed during the survey and these people should also be sensitized about their importance so as to avoid illegal catching and selling.

18.6 The riparian ecosystems are of high conservation priority owing to the rich biodiversity they support and the large-scale ecosystem services they provide. However, intensive agricultural practices including expansion of fields up to the current flow of Ganga River in many parts of this Distt. has already negatively 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.

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