Ganga Cultural Documentation
2022

BUDAUN & SAMBHAL DISTRICTS

NAMAMI GANGE

National Mission for Clean Ganga

Indian National Trust for Art and Cultural Heritage
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Azaadi Ke Rang Bharatiya Sanskriti Ke Sang

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Front Cover : Kachhla Ghat in Budaun Distt.

Background : Riparian grasses along Ganga River In Budaun Distt.

Back Cover : Bridges over Ganga River near Kachhla Ghat

Formatting and Design by : Sumesh Dudani

GANGA CULTURAL DOCUMENTATION

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1.0 Introduction

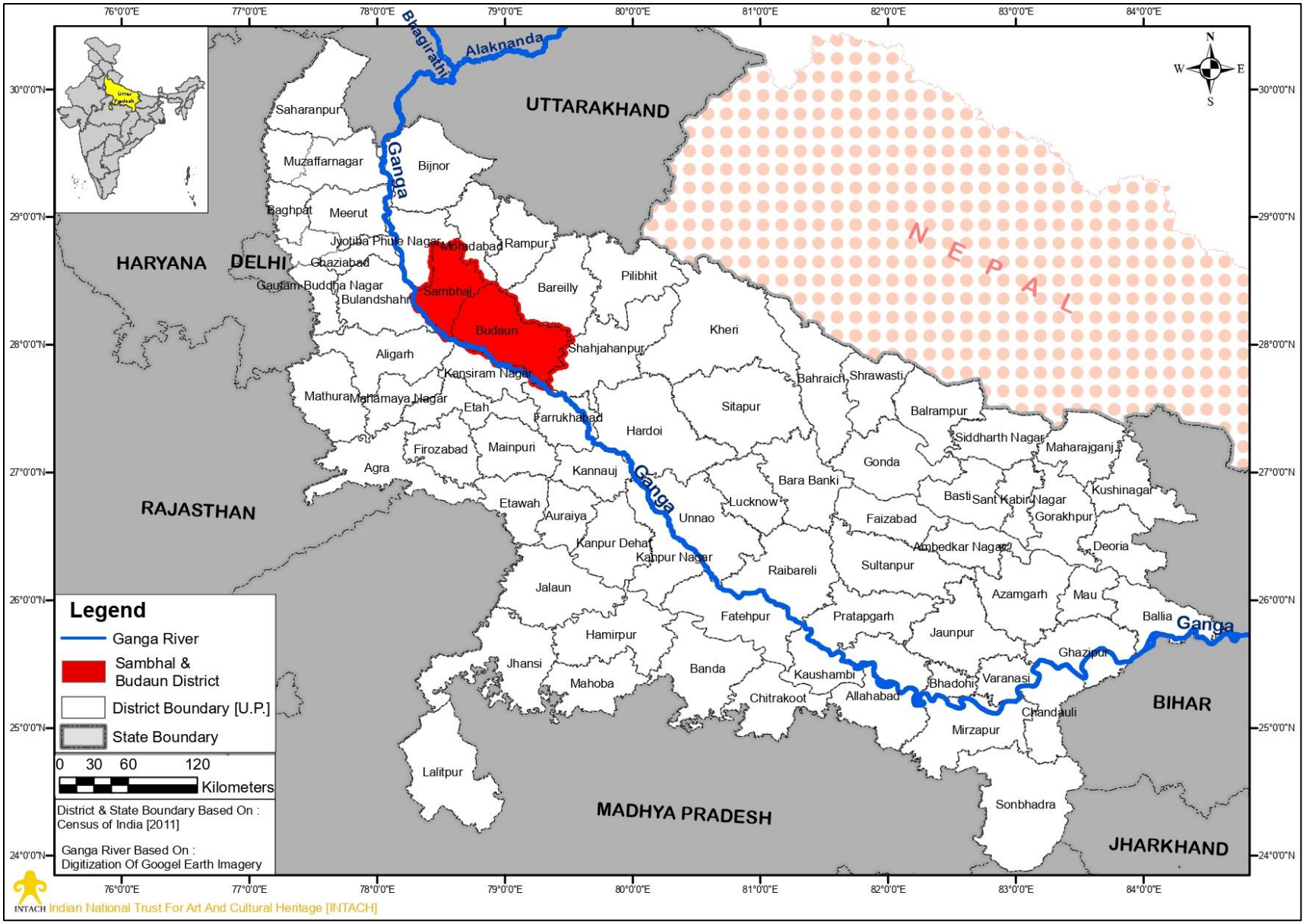
1.1 Budaun is one of the central Distt.s of western Uttar Pradesh falling in the Bareily Division with Budaun city as its Distt. headquarters. The Distt. is about 144 km long and 60 km wide covering an area of approximately 4234 sq.km. and an average elevation of 169 masl. It is divided into six different tehsils – Budaun Sadar, Bisauli, Bilsi, Dataganj and Sahaswan which are further sub-divided into 15 administrative blocks. Ganga river roughly forms the south western boundary of this Distt. separating it from the Distt.s of Aligarh, Kasganj and Farrukhabad. In the north, this Distt. is bounded by Bareily and Rampur Distt.s.; in the west it is bounded by Sambhal Distt. and in the east it is bounded by Shahjahanpur Distt. [Refer Map 1].

1.2 Sambhal which was earlier part of Budaun Distt. was announced as a separate Distt. on 28 September, 2011. At the time of its creation, this Distt. was named as 'Bhimnagar' but was later renamed as Sambhal Distt. This Distt. forms a part of Moradabad Division with Bahjoi town as its Distt. headquarters. It is divided into three tehsils – Sambhal, Chandausi and Gunnaur which are further sub-divided into 8 administrative blocks. The Distt. is bounded on the south-west part by Ganga River which separates it from Bulandshahar & Aligarh Distt.s; on the north by Moradabad Distt; on the east by Jyotiba Phule Nagar and on the west by Budaun Distt. [Refer Map 1].

1.3 The area of undivided Budaun Distt. including Sambhal Distt. currently, is drained by Ganga River and its tributaries. Ramganga is a principal tributary towards left bank of Ganga River that forms a roughly dividing boundary between Budaun with Bareily and Shahjahanpur Distt. for a short distance on its western side. According to Bhartariya (2013), the undivided region of Budaun Distt. forms a part of Central Ganga Plain and lies within the doab region of river Ganga and Ramganga. Physiographically this region can be divided into three main parts – Khaddar (low lying area occupying a narrow belt adjacent to river Ganga); Bhur (towards north-east of Khaddar with comparatively higher elevation); and Katchar (towards north-east of Bhur, a levelled and perfectly homogenous expanse of good fertile loam). The climate of this region is sub-humid and characterized by hot dry summer and winter. The average rainfall in this region is 639.8 mm with maximum received during June to September.

- Budaun is holy land of Great Sufi Saint's – Auliya, Wali and Peer's as well as a place of izarat's. It is very holy place in the India. According to Prof. Goti John this city was named "BEDAMOOTH" in an ancient inscription (stone write-up) which is now in Lucknow Museum. (https://budaun.nic.in/history/)
- According to the Distt. Gazetteer (Singh, 1986), Budaun Distt. is named after its headquarter town Budaun which is an ancient place stated to be the Vedamau of the Mahabharata and Buddhamau of the Buddha period. According to an inscription found near the suburb of the town, it was known as Vodamayuta in the 12th and 13th centuries and in course of time got corrupted to Budaun.
- The city of Budaun is also well known for a famous poet and lyricist – Shakeel Budayuni who contributed greatly in the field of Urdu poetry and composed some very popular Bollywood songs.

- During the 12th century, Prithviraj Chauhan, Delhi's last Hindu ruler is said to have engaged in two fierce battles here which were both fought against Ghazi Sayyad Salar Masud, who was the nephew of the ruler of the Ghazni empire- Mahmud Ghazni. Chauhan gained victory over the latter in the first war and vice versa is said to have occurred in the second war. There nevertheless is no circumstantial evidence to prove the same and is widely regarded as a legend.
- Qutub-ud-din Aibak, the first Muslim sultan of Delhi, seized Sambhal and included it under his empire. That was in the early 14th Century and subsequently, Firoz Shah Tughlaq, another sultan of Delhi, raided the town of Sambhal as one of the Hindu rulers from there was responsible for the killing of several of his men. He, therefore, administered a Muslim rule in Sambhal to try and vanquish all of the Hindu ruler's forces and enslave him for the rest of his life. (https://sambhal.nic.in/about-district/)

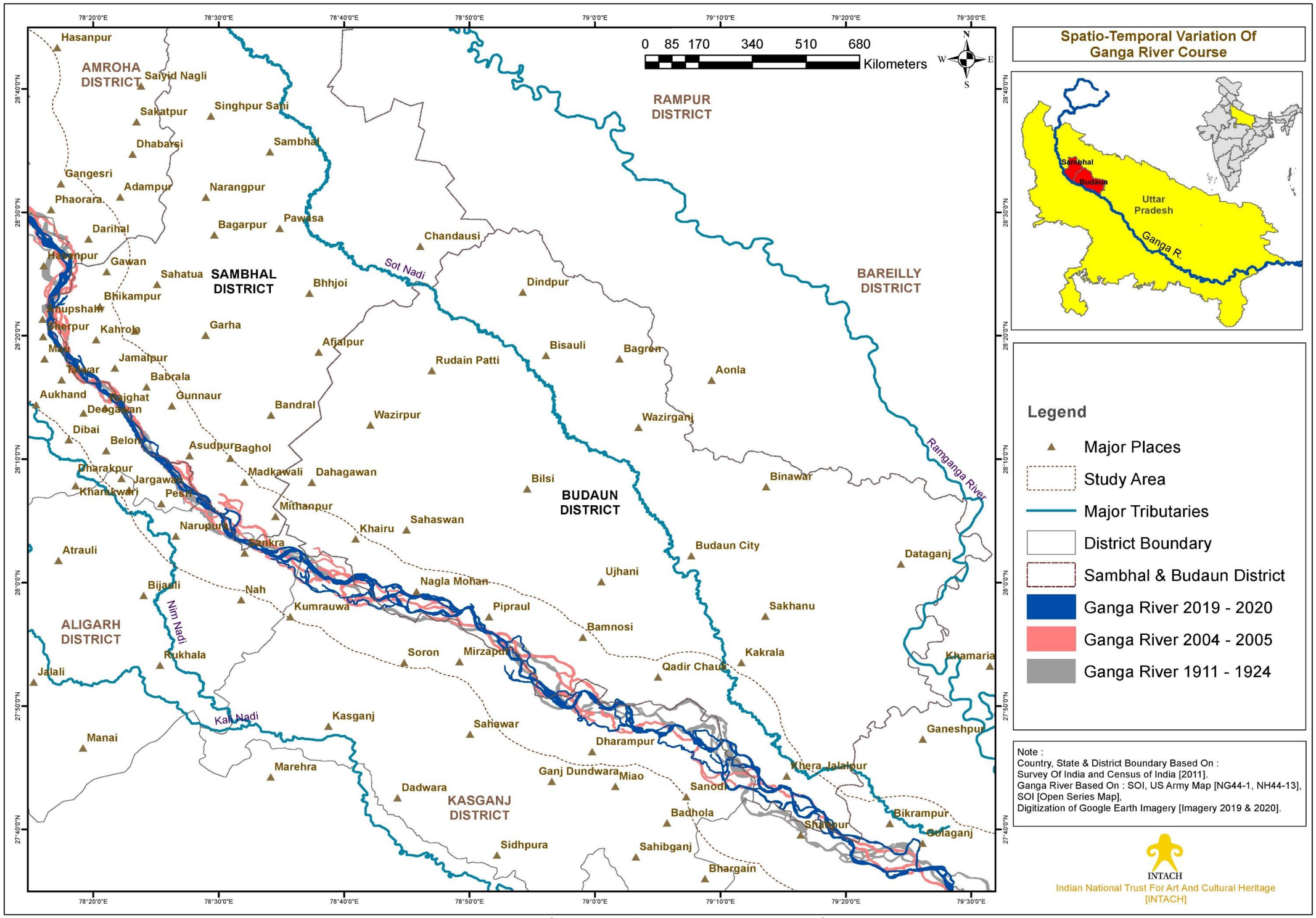


Map 1 : Location Of Budaun & Sambhal Distt.s

2.0 Ganga River In Budaun & Sambhal Distt.s

2.1 Ganga River exits Jyotiba Phule Nagar near Ibrahimpur Chak village to enter Sambhal District where it traverses in a south eastern direction. The river course in this stretch is generally narrow ranging from about 0.2 – 1.2 km in width at different places. It is interrupted by the presence of several sandbars and riverine islands intermittently in its course through this Distt. It exits the Distt. near Maihusainpur Kham village to enter Budaun Distt. where it traverses in a roughly south eastern direction before its exit near Ataina Ganga Bridge. The river covers total distance of about 87.5 km in these two Distt.s. Similar to its earlier stretch, the river is extremely braided at different points due to presence of several diaras and sandbars, many of which are larger in sizes as compared to those of Sambhal Distt. 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. Along the Distt. Gazetteer (Singh, 1986), Ganga River is highly liable to change its course in this region causing variations in the total area of this Distt. Based on the available data, Map 2 was prepared that depicts the spatial variation in Ganga River course of this region while Image 2 depicts part of the river as observed during the field survey.

Image 1 : Ganga River As Seen Near Ataina Ghat On 12th March, 2022

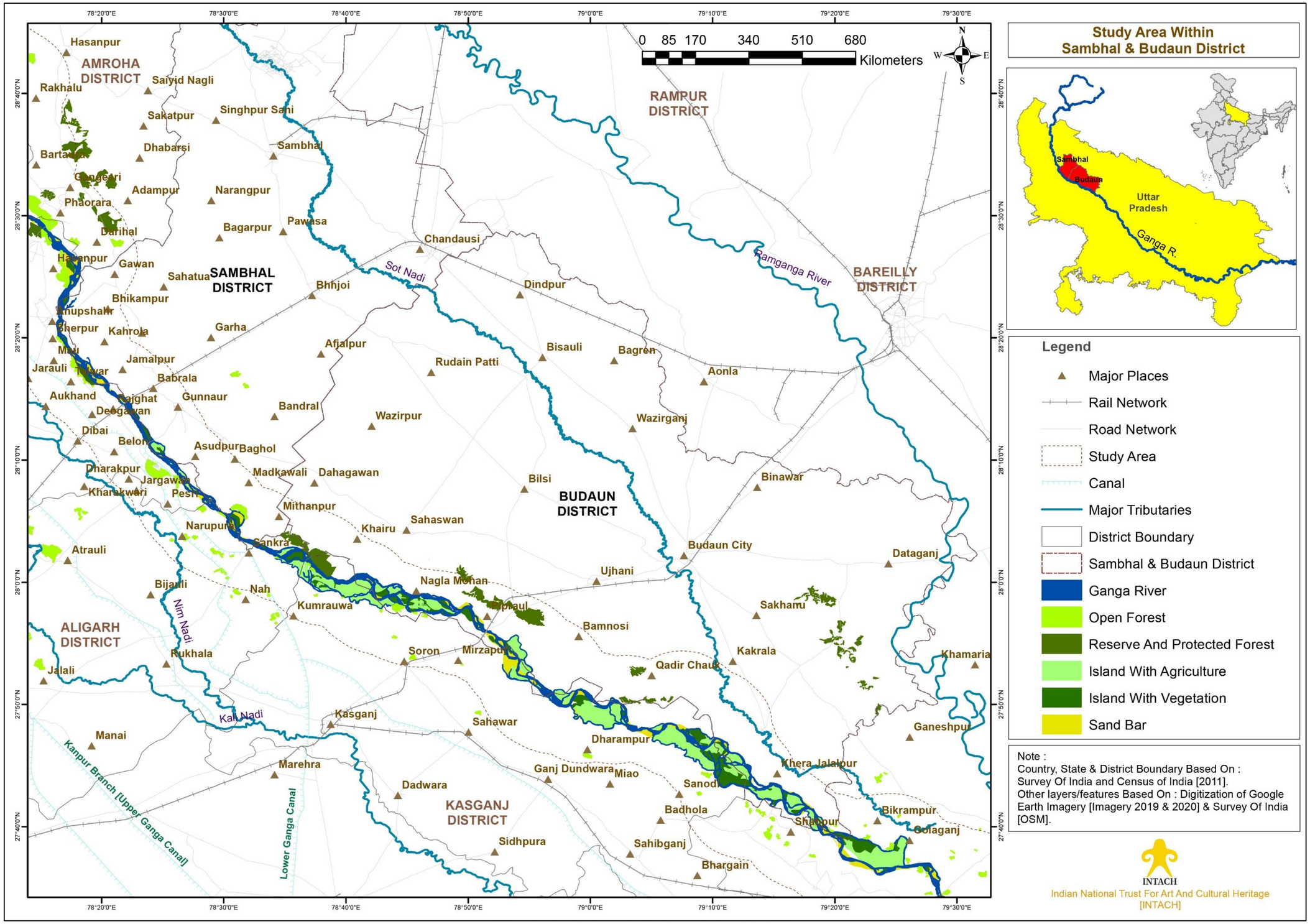


Map 2 : Temporal Variation Of Ganga River Course In Study Region

3.0 Methodology

3.1 Ganga River flows in Budaun and Sambhal Distt.s for about 87.5 km adjoining them mainly on the left bank and very small parts on the right bank. 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 Budaun and Sambhal Distt.s was carried out from 11-13 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 Budaun & Sambhal Distt.s

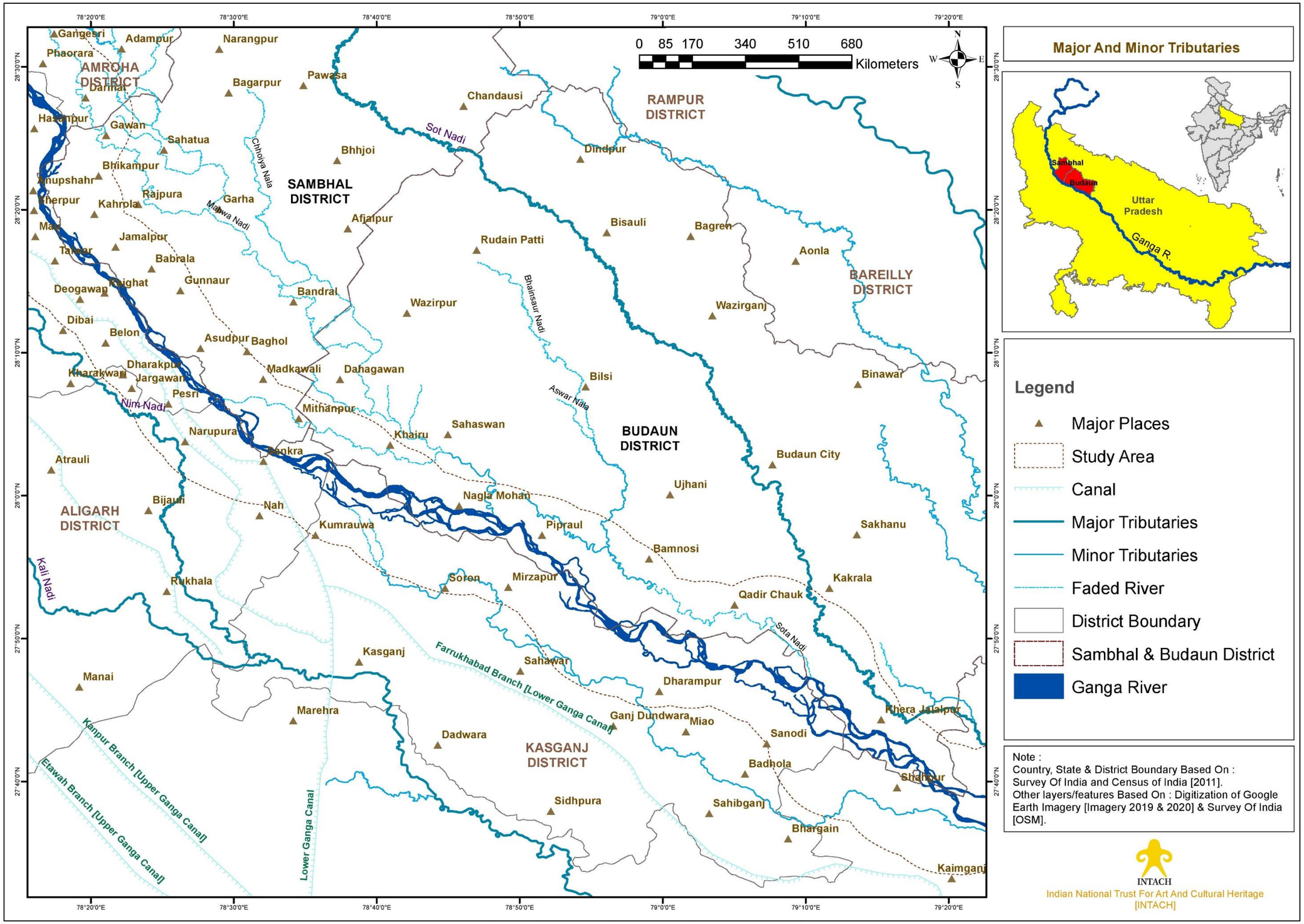
4.0 Tributaries Of Ganga River

4.1 **Sot River** : According to the Distt. Gazetteer (Singh, 1986), Sot is an important tributary of Ganga River especially for this region. Rising in the Moradabad Distt., this river flows in a south easterly direction and separates the tehsils of Sahaswan and Budaun in Budaun Distt. It also flows past Budaun city [Refer Map 4] and subsequently enters Farrukhabad Distt. where it confluences with Ganga River. Historically, this river has also been known as 'Yar-i-wafadar' poetically (meaning faithful friend) which was bestowed on it by the Mughal Emperor Muhammad Shah when his army got respite from heat and thirst while traveling from Sambhal to Budaun. The Gazetteer also mentions that this river flowed in a deep and clearly defined bed with seldom floods and often giving excellent harvests to the farmers in this region. However, during the current field survey Sot River was found to be in tremendously deteriorated condition with water all dried up, sewage waste inflowing into its channel near Budaun town along with solid waste being dumped [Image 2]. The interlocutors reiterated that once an important source of water in this region, parts of this river have also been encroached in this Distt. and if urgent efforts are not undertaken, it may soon dissipate completely.

Image 2 : Sot River Near Budaun City As Observed On 12th March, 2022

4.2 **Bhainsaur Nadi :** According to the District Gazetteer (Singh, 1986), Bhainsaur is a small stream that originates near Islamnagar in Budaun Distt. During its course in the Distt. it passes through towns of Kot, Bilsi and Ujhani before its confluence with Ganga River. It flows in a broad and insufficiently defined bed which swells up with water during monsoons. However, during the field survey based on visual observations and accounts of interlocutors, it could be noted that this stream has undergone severe encroachment in roughly last two decades which has hampered its course. Image 3 depicts its current condition as observed near Ujhani town in Budaun Distt. Gregarious agricultural expansion in this region poses imminent danger to the existence of this stream which needs to be highlighted and paid urgent attention to.

Image 3 : A Part Of Bhainsaur Nadi Affected By Agriculture Expansion As Observed Near Ujhani Town On 13th 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 83.39% of the total geographical area. The water body component covering 3.39% of the total geographical area of this Distt. chiefly includes Ganga river, its tributaries and other wetlands. The built up area includes Sahaswan 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.

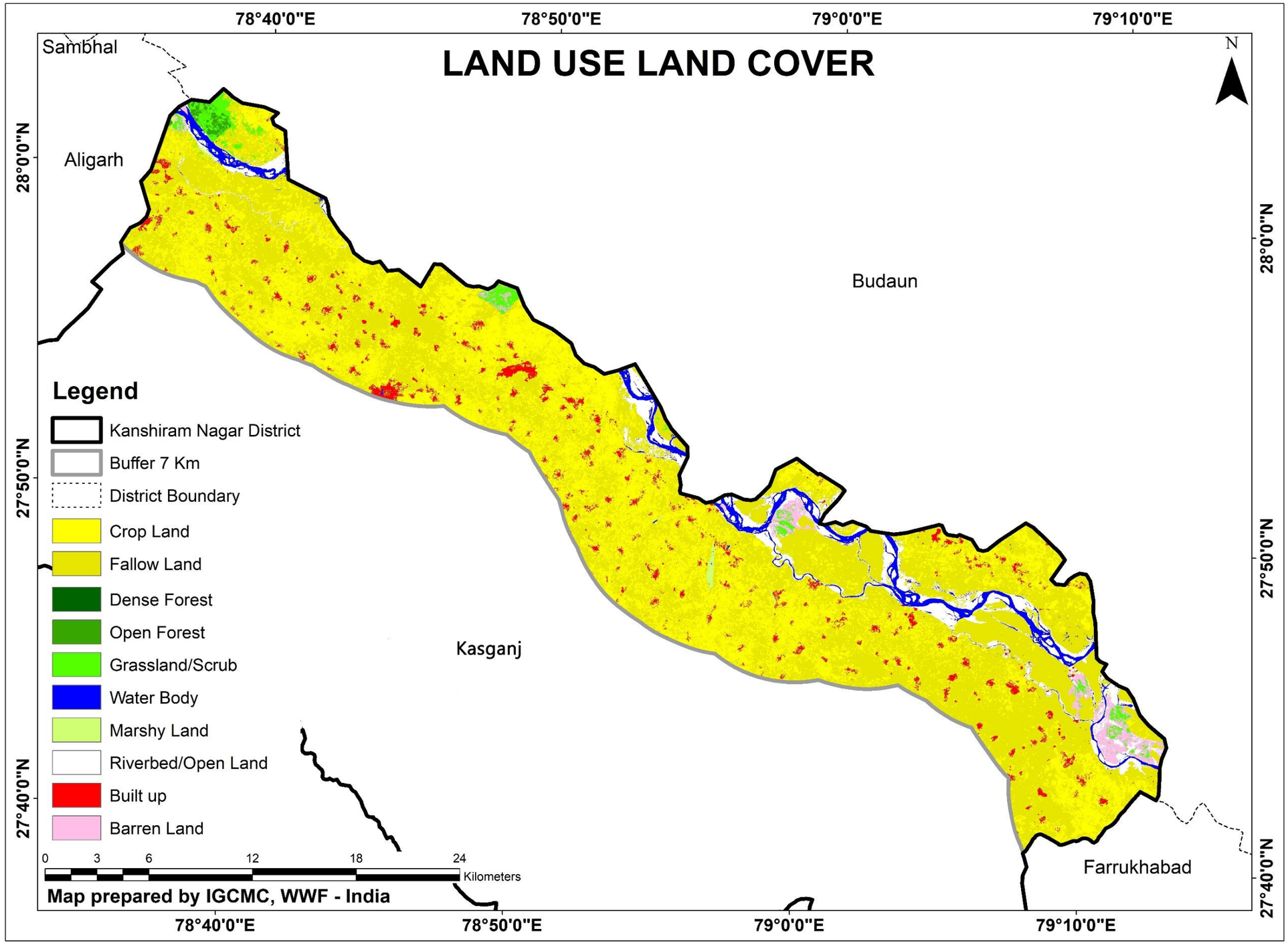
Table 1 : Land Use And Land Cover Details Of Study Region In Budaun Distt.

Budaun (LULC)		
Class	**Area (Ha)**	**Area (%)**
Crop Land	27023.5	40.44
Fallow Land	28702.45	42.95
Dense Forest	213.64	0.32
Open Forest	268.24	0.40
Grassland/Scrub	1601.55	2.40
Water Body	2264.67	3.39
Marshy Land	48.09	0.07
Riverbed/Open Land	3477.25	5.20
Built up	2115.9	3.17
Barren Land	1109.38	1.66
Total	66824.67	100

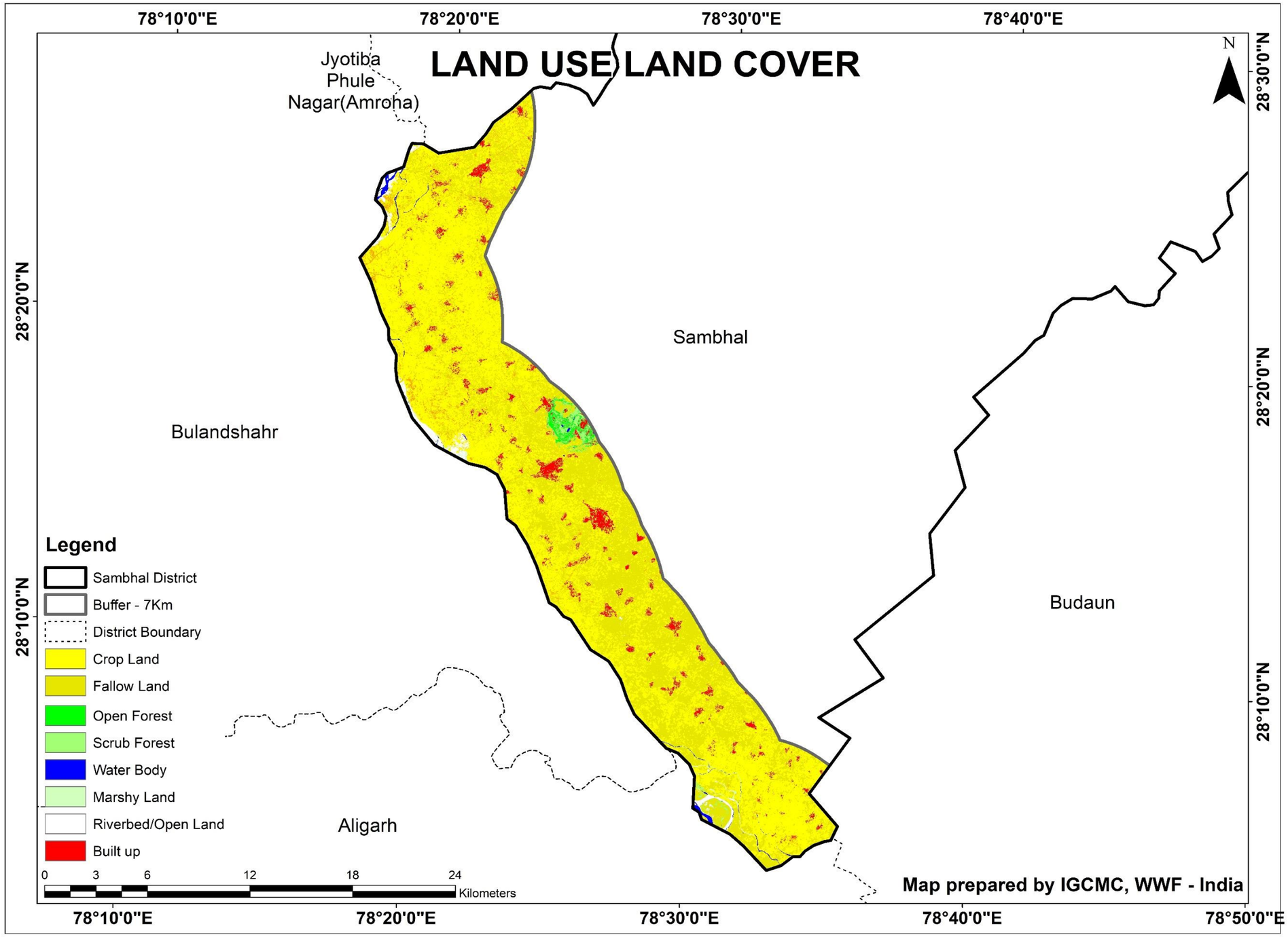
5.2 Land Use Land Cover (LULC) Map of the study corridor has been prepared from Landsat imagery. Using supervised classification system, 8 different classes were generated – crop land, fallow land, open forest, scrub forest, waterbody, marshy land, riverbed/open land and built up. Agriculture being a dominant source of income, crop land and fallow land components occupy major part of the land use system in this Distt., together covering 92.72% of the total geographical area. The water body component covering 0.45% of the total geographical area of this Distt. chiefly includes Ganga river and other wetlands. The built up area includes Gunnaur and Babrala as the major towns along with other towns and villages in the study region. Table 2 provides the statistics while Map 6 depicts the various land use/land cover classes as analysed for the study region.

Table 2 : Land Use And Land Cover Details Of Study Region In Sambhal Distt.

Sambhal (LULC)		
Class	**Area (Ha)**	**Area (%)**
Crop Land	17869.24	55.9973
Fallow Land	11723.4	36.7379
Open Forest	181.28	0.5681
Scrub Forest	305.77	0.9582
Water Body	145.16	0.4549
Marshy Land	88.41	0.2771
Riverbed/Open Land	466.64	1.4623
Built up	1131	3.5442
Total	31910.9	100



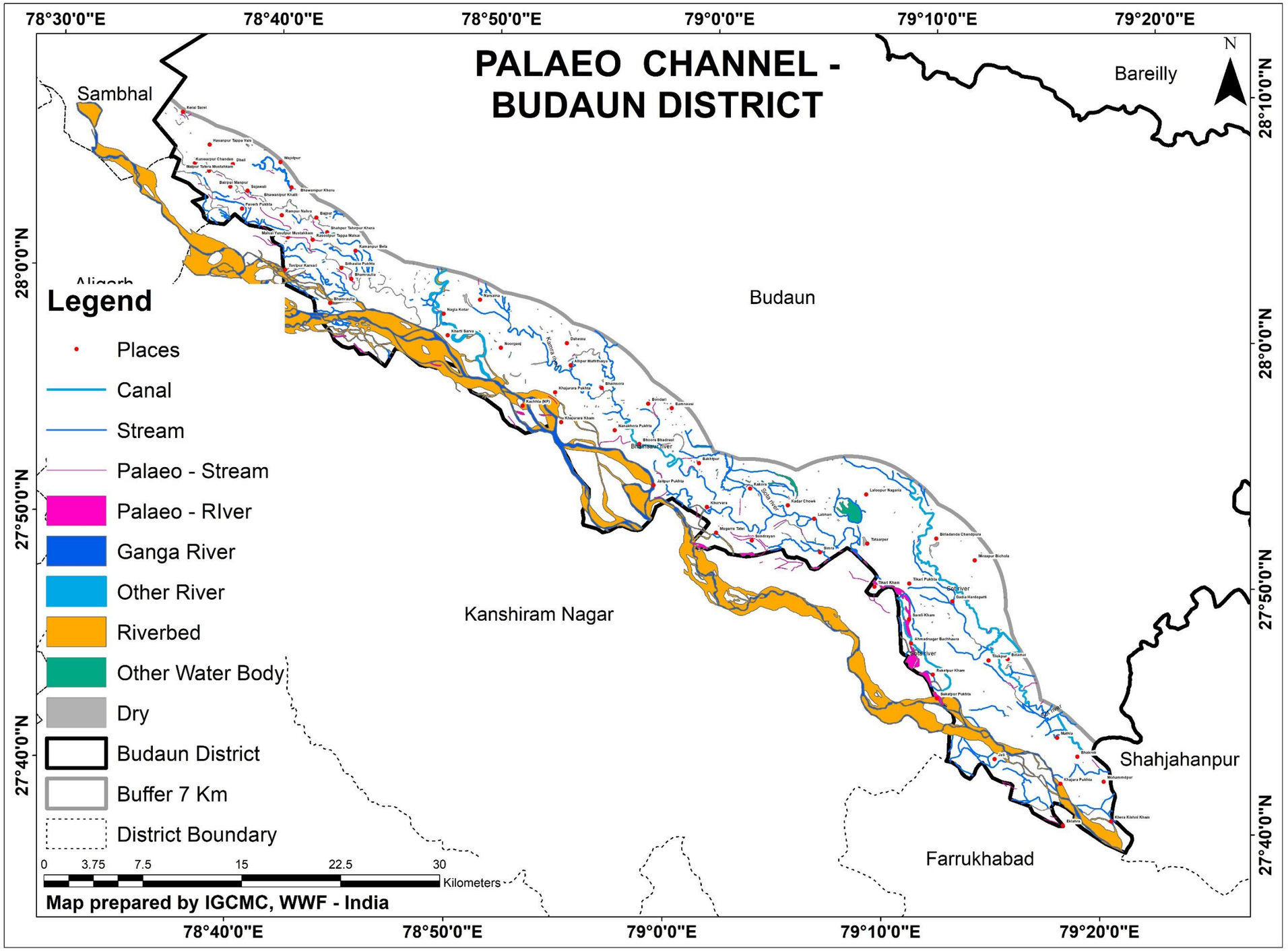
Map 5 : Land Use/Land Cover Map Of Study Region In Budaun Distt.



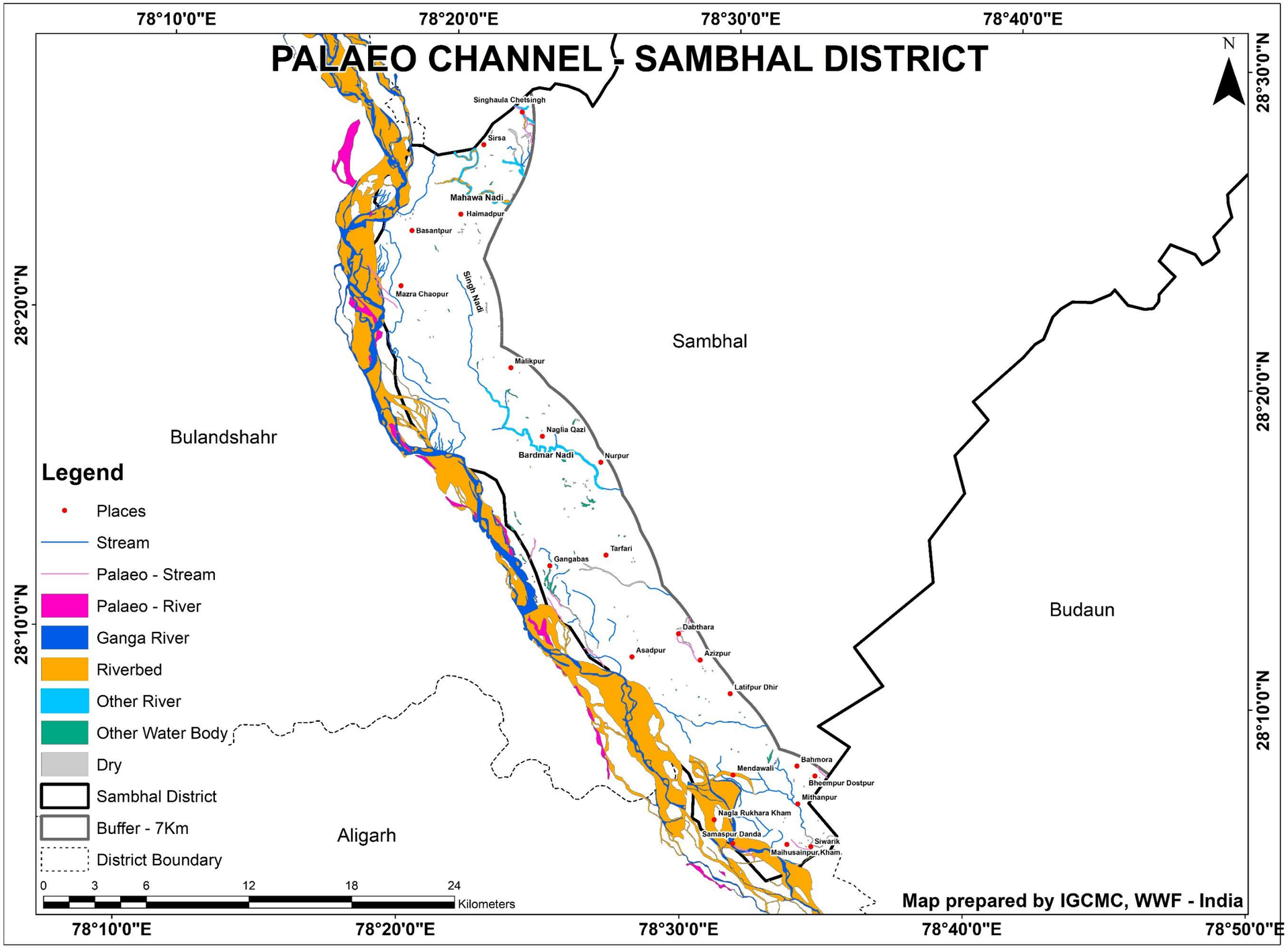
Map 6 : Land Use/Land Cover Map Of Study Region In Sambhal Distt.

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, Maps 7 and 8 were prepared which depict the various paleochannels in the study region of Budaun and Sambhal Distt.s.



Map 7 : Paleochannels In The Study Region Of Budaun Distt.



Map 8 : Paleochannels In The Study Region Of Sambhal Distt.

7.0 Floodplain Of River Ganga In Budaun Distt.

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

7.2 The region of undivided Budaun Distt. falls in the Mid-Western Plain Zone/Upper Gangetic Plain Zone with the major soils being sandy loam, loam, clay loam and silt loam. The net sown area in the district is 417.063 hectares in which 301.144 hectares of area is sown more than once (NICRA-ICAR, 2012). 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, Sot Nadi and other tributaries were observed to be under extensive crop cultivation during the field survey in study region. Some major crops grown in this region include rice, wheat, maize, bajra, urad, arhar, sugarcane along with various pulses and vegetables such as potato, tomato and green peas. The details of some villages surveyed along with their floodplain agriculture produce is provided in Table 3 while Images 4-5 depict floodplain agriculture fields as recorded during the survey.

Table 3 : Some Floodplain Villages And Their Agriculture Produce In Budaun Distt.

Sr. No.	Village Name	Agricultural Produce
1.	Hussainpur Kham	Wheat, Mustard, Maize, Sugarcane
2.	Kadar Chowk	Wheat, Mustard, Sugarcane, Tomato
3.	Atena Kham	Wheat, Potato, Maize, Sugarcane
4.	Kachhla Kham	Wheat, Arhar, Bajra, Tomato

Image 4 : Floodplain Tomato Cultivation Near Kadar Chowk Village

Image 5 : Floodplain Wheat Fields Near Atena Kham Village In Study Region

7.3 Floodplain grasses : During the field survey, *S. spontaneum* (commonly known as *Kans*) and *S. bengalense* (commonly known as *Munj/ Sarkanda*) were found to dominate the riparian vegetation both on the river banks and on the riverine islands throughout study region [Image 6] along with other grasses such as *Cynodon dactylon* (L.) Pers. (commonly known as Doob 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 6 : Ganga River Bank With *Saccharum* Grasses Near Hussainpur Kham Village

8.0 Wetlands In Budaun & Sambhal Distt.s

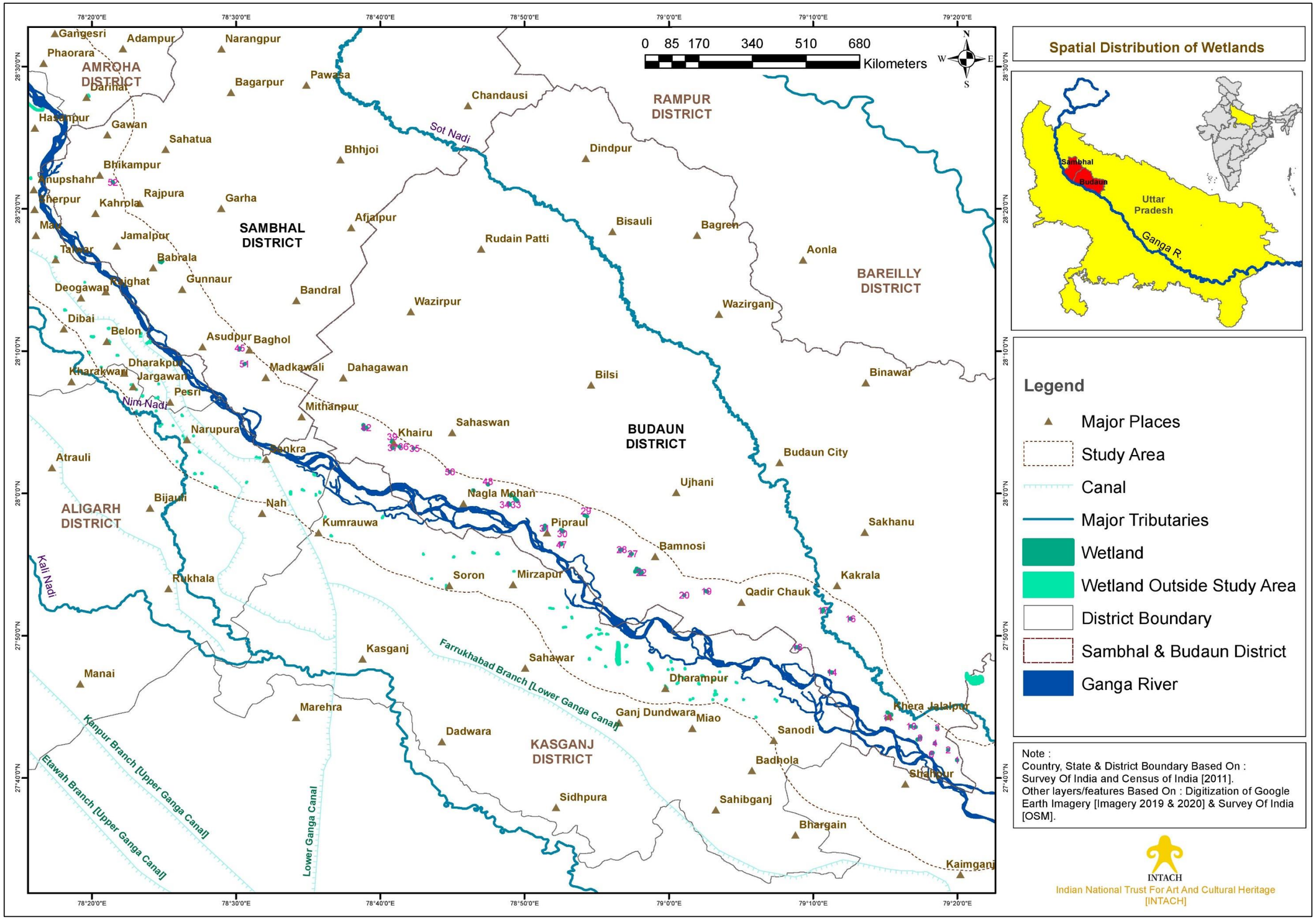
8.1 Wetlands are one of the most productive and unique ecosystems. They help in maintaining the food web and provide habitat for the aquatic biodiversity. They also help in controlling floods, recharging groundwater, nutrient recycling, climate stabilization and carbon sequestration. During the current study about 52 different wetlands are recorded from the study region of Budaun and Sambhal Distt.s whose details are provided in Table 4. Map 9 shows the spatial distribution of these wetlands in the study region. Most of these wetlands are under tremendous pressure and increasing threats from urbanization and gregarious agricultural expansion in this region. Furthermore, even upon interactions, insignificant information could be obtained about the location and other information pertaining to wetlands in study region highlighting the gross neglect by local residents.

Table 4 : List Of Wetlands In The Study Region

Sr. NO.	Wetland Name/ Wetland NO.	Coordinates		Area [Hectare]
		Latitude	Longitude	
1	1	27°41'15.96"N	79°19'59.10"E	0.34
2	2	27°41'58.72"N	79°19'21.60"E	0.20
3	3	27°43'31.46"N	79°18'36.34"E	0.18
4	4	27°42'26.80"N	79°18'26.63"E	0.39
5	5	27°41'46.64"N	79°18'16.91"E	0.22
6	6	27°41'44.76"N	79°18'12.44"E	0.22
7	7	27°43'35.59"N	79°17'6.17"E	0.12
8	8	27°42'49.59"N	79°17'25.25"E	0.32
9	9	27°42'42.09"N	79°17'13.98"E	0.10
10	10	27°43'38.61"N	79°16'47.82"E	0.44
11	11	27°44'12.66"N	79°15'6.04"E	1.34
12	12	27°44'27.36"N	79°15'24.36"E	0.49
13	13	27°44'35.11"N	79°15'11.58"E	0.31
14	14	27°47'24.98"N	79°11'18.42"E	0.51
15	15	27°47'28.61"N	79°11'9.03"E	0.26

16	16	27°51'12.08"N	79°12'36.21"E	0.51
17	17	27°51'46.65"N	79°10'41.52"E	1.31
18	18	27°49'11.15"N	79° 8'53.53"E	2.61
19	19	27°53'7.59"N	79° 2'36.44"E	0.92
20	20	27°52'51.51"N	79° 1'3.44"E	0.24
21	21	27°54'21.70"N	78°58'2.45"E	0.55
22	22	27°54'27.45"N	78°58'4.84"E	0.79
23	23	27°54'31.68"N	78°58'4.42"E	0.31
24	24	27°54'31.27"N	78°57'40.54"E	0.56
25	25	27°54'39.01"N	78°57'44.88"E	0.77
26	26	27°54'35.48"N	78°57'52.55"E	0.62
27	27	27°55'45.24"N	78°57'23.97"E	0.80
28	28	27°56'2.98"N	78°56'43.21"E	1.22
29	29	27°58'25.20"N	78°54'17.45"E	1.32
30	30	27°57'20.45"N	78°52'38.46"E	1.94
31	31	27°57'32.17"N	78°51'22.05"E	2.29
32	32	27°59'53.47"N	78°49'2.75"E	1.39
33	33	27°59'30.67"N	78°49'25.57"E	2.87
34	34	27°59'12.67"N	78°48'56.89"E	1.70
35	35	28° 3'9.94"N	78°42'17.18"E	0.14
36	36	28° 3'17.06"N	78°41'20.37"E	0.47
37	37	28° 3'12.20"N	78°40'50.32"E	0.84
38	38	28° 3'32.53"N	78°40'53.23"E	0.44
39	39	28° 3'39.68"N	78°40'48.67"E	0.54
40	40	28° 3'42.69"N	78°40'50.15"E	0.17
41	41	28° 4'48.29"N	78°38'49.11"E	0.28
42	42	28° 4'37.89"N	78°39'0.93"E	0.44
43	43	28° 4'31.15"N	78°38'52.19"E	0.39
44	44	28°10'6.39"N	78°30'12.49"E	0.16
45	45	28°10'11.91"N	78°30'14.64"E	0.19
46	Babrala Lake	28°16'17.91"N	78°24'48.81"E	3.26
47	47	27°56'27.28"N	78°52'32.80"E	1.33

48	48	28° 0'38.96"N	78°47'27.41"E	0.42
49	49	28° 0'12.75"N	78°46'27.12"E	0.46
50	50	28° 1'31.15"N	78°44'48.59"E	0.14
51	51	28° 9'5.78"N	78°30'34.29"E	0.44
52	52	28°21'52.20"N	78°21'26.68"E	0.51
Total Area [Hectare]				**38.78**



Map 9 : Spatial Distribution Of Water Bodies Within Study Area Of Budaun & Sambhal Distt.s

9.0 Riparian Flora Along Ganga River In Budaun & Sambhal Distt.s

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 and dense in few places [Image 9]. 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, Siris, Peepal and Bargad among which Peepal and Banyan were also found associated with various religious sites. The common shrubs and herbs in the study region included – *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 5.

Table 5 : 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.	*Albizia lebbeck* (L.) Benth.	Fabaceae	Tree	Saras/Siris
4.	*Azadirachta indica* A. Juss.	Meliaceae	Tree	Neem
5.	*Borassus flabellifer* L.	Arecaceae	Tree	Taad
6.	*Dalbergia sissoo* Roxb. ex DC.	Fabaceae	Tree	Shisham
7.	*Eucalyptus* sp.	Myrtaceae	Tree	Nilgiri
8.	*Ficus benghalensis* L.	Moraceae	Tree	Banyan/Bargad
9.	*Ficus religiosa* L.	Moraceae	Tree	Peepal
10.	*Leucaena leucocephala* (Lam.) de Wit	Fabaceae	Tree	Safed Babool
11.	*Mangifera indica* L.	Anacardiaceae	Tree	Mango
12.	*Calotropis gigantea* (L.) Dryand.	Apocynaceae	Shrub	Safed Aak
13.	*Calotropis procera* (Aiton) Dryand.	Apocynaceae	Shrub	Aak
14.	*Lippia alba* (Mill.) N.E. Br. ex Britton & P. Wilson	Verbenaceae	Shrub	Bushy Lippia
15.	*Polygonum sp.*	Polygonaceae	Shrub	
16.	*Ricinus communis* L.	Euphorbiaceae	Shrub	Wild Castor
17.	*Zizyphus* sp.	Rhamnaceae	Shrub	Wild Ber
18.	*Achyranthes aspera* L.	Amaranthaceae	Herb	Chirchira
19.	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Herb	Kakronda
20.	*Croton bonplandianus* Baill.	Euphorbiaceae	Herb	Ban Tulsi
21.	*Rumex dentatus* L.	Polygonaceae	Herb	
22.	*Parthenium hysterophorus* L.	Asteraceae	Herb	Congress Grass
23.	*Xanthium strumarium* L.	Asteraceae	Herb	Chhotav dhatura
24.	*Saccharum munja* Roxb.	Poaceae	Grass	Munj
25.	*Cyperus* sp.	Cyperaceae	Grass	
26.	*Cynodon dactylon* (L.) Pers.	Poaceae	Grass	Doob
27.	*Saccharum spontaneum* L.	Poaceae	Grass	Kans/Katha
28.	*Saccharum bengalense* Retz.	Poaceae	Grass	Munj

Image 7 : Riparian Vegetation As Observed Near Hussainpur Kham Village

Image 8 : *Leucaena leucocephala* (Safed Babool)

9.4 **Forest Vegetation in Study Region :** According to the land use land cover analysis of study region in Budaun Distt., the dense forest, open forest and scrublands together constitute about 3.12% of the total study region area. Two major forest patches were encountered during the field survey which are located near Kakora and Allipur Maththaiya villages respectively [Images 11-12]. Upon interaction with the forest department officials and local residents, it was recorded that these used to be dense forests once dominated by trees such as *Butea monosperma* (Dhak) which whose leaves were used for making bowls and whose flowers were used for making dyes, along with other native vegetation. However, these patches suffered massive disturbance during the last two-three decades resulting in declining number of species and their density in this region [Images 13-14]. Taking cognizance of this matter, the Budaun Forest Department undertook plantations of Babool, Khajur and Eucalyptus along with other different species which has improved the vegetation in these areas. Map 10 presented in this section depicts the spatial distribution of forest area in the study regions of Budaun and Sambhal Distt.s.

Image 9 : Location Of Forest Patch Near Kakora Village

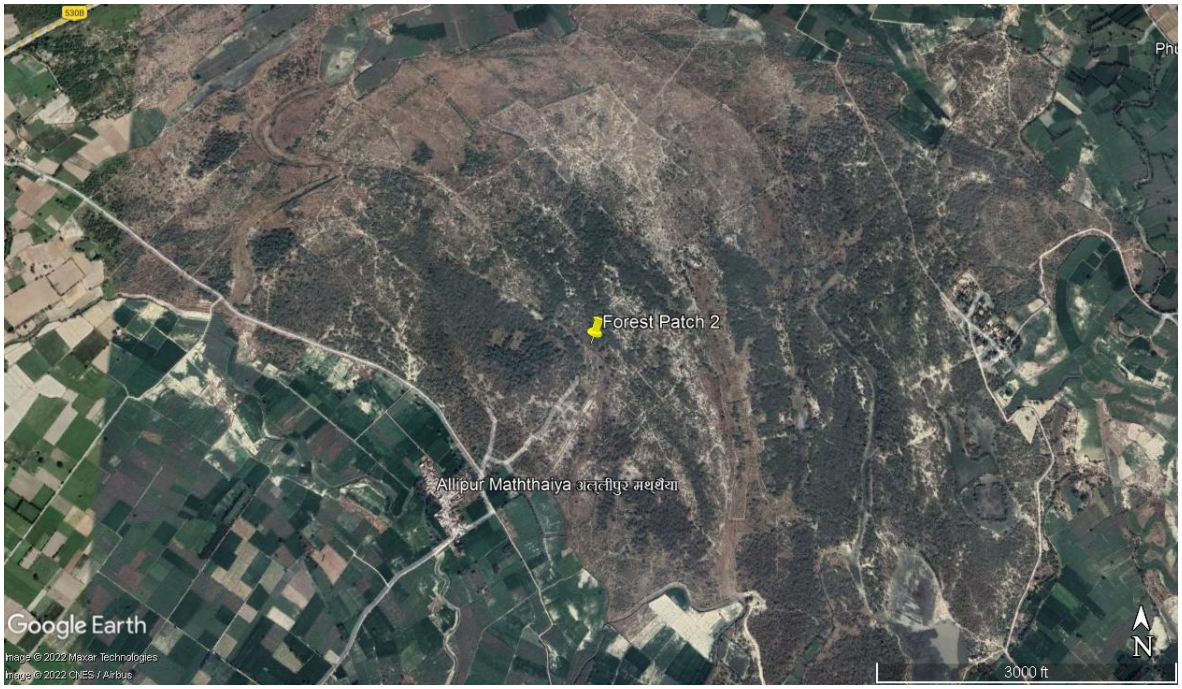
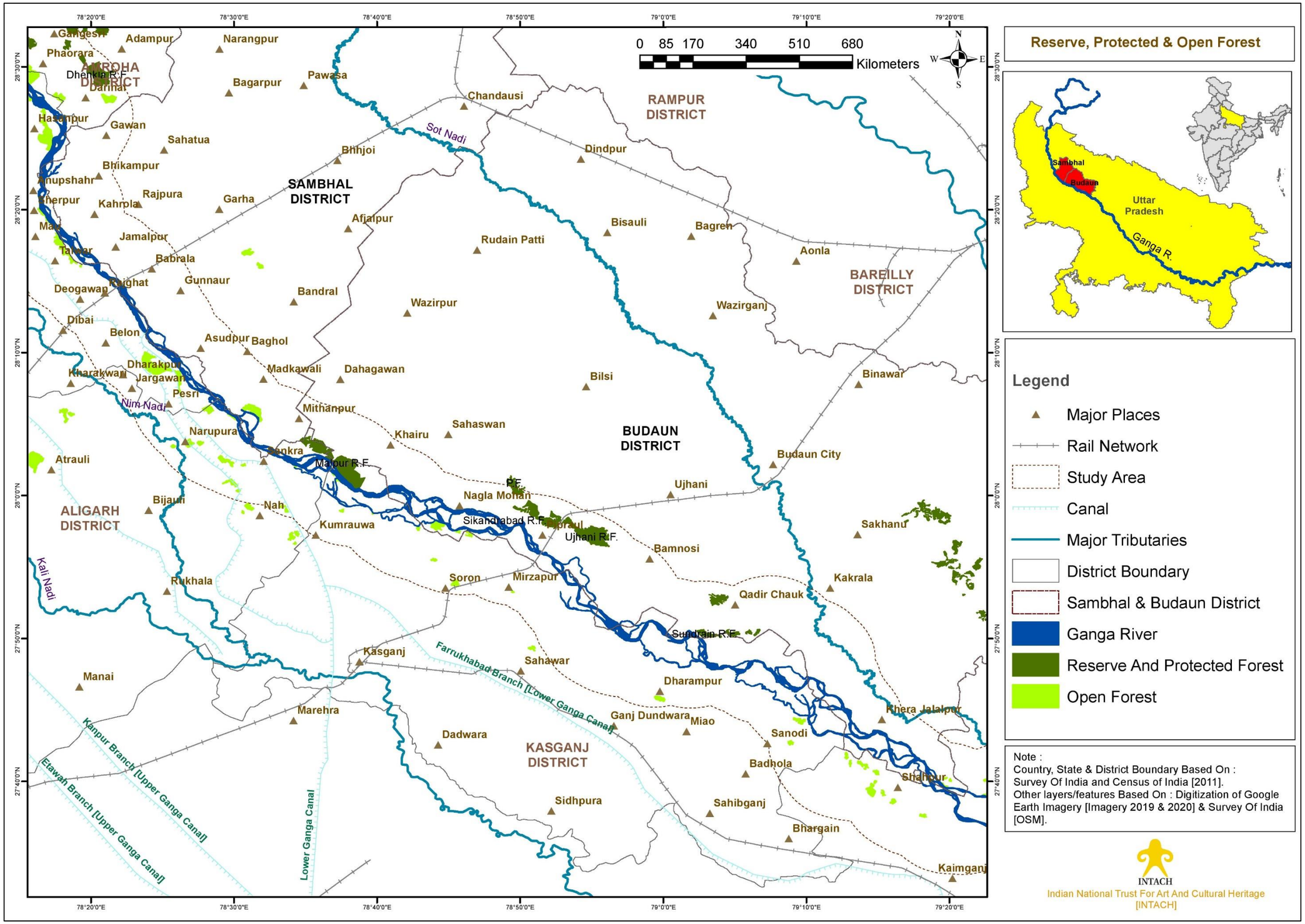


Image 10 : Location Of Forest Patch Near Allipur Maththaiya Village

Image 11 : Open Forest Dominated By Butea, Babool And Khajur Trees Near Kakora Village in Budaun Distt.

Image 12 : Open Forest Dominated By Babool, Vilayti Babool And *Saccharum* Grasses Near Allipur Maththaiya Village In Budaun Distt.



Map 10 : Spatial Distribution Of Forest Areas In Budaun And Sambhal Distt.S

10.0 Faunal Diversity In Budaun & Sambhal Distt.s

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 Budaun & Kasganj Distt.s. According to the interlocutors, occasional dolphin sightings occur in the study region during monsoons when the water level rises.

10.2 **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 Kakora, Khajura Pukhta, Bachaura Khurd Kham, Qadar Ganj Kham and Chandanpur Kham.

10.3 **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 [Image 15]. 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.

Image 13 : Turtles Basking On A Sandbar In Ganga River Stretch Of Budaun 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 several areas of both Budaun and Sambhal Distt.s. In the study region, wild boars inhabit the tall riparian grasses along the river and within the riverine islands usually foraging on the 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 Budaun & Sambhal Distt.s is presented in Table 6.

Table 6 : Other Important Fauna Recorded In The Study Region

Sr. No.	Common Name	Scientific Name	Conservation Status
1.	Blackbuck	*Antilope cervicapara*	Least Concern
2.	Barking Deer (Northern Red Muntjac)	*Muntiacus vaginalis*	Least Concern

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.	**Indian Rock Python**	***Python molurus***	**Near Threatened**
9.	Indian Cobra	*Naja Naja*	Least Concern
10.	**Red Sand Boa**	***Eryx johnii***	**Near Threatened**
11.	Danaid Eggfly (Butterfly)	*Hypolimnas misippus*	Least Concern
12.	Grey Pansy (Butterfly)	*Junonia atlites*	Least Concern
13.	Peacock Pansy (Butterfly)	*Junonia almana*	Least Concern
14.	Blue Jay (Butterfly)	*Graphium doson*	Least Concern
15.	Common Mime (Butterfly)	*Papilio clytia*	Least Concern
16.	Common Grass Yellow (Butterfly)	*Eurema brigitta*	Least Concern

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. The combined study region of both Budaun and Sambhal Distt.s. has rich and highly diverse avian fauna which is still relatively understudied. During the field survey in 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. A total of 90 different birds were identified whose details are presented in Table 7 while Images 16-18 depict some significant species as observed during survey. Following different observations were made based on results obtained:

- 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, Asian Woollyneck, Painted Stork** and **River Lapwing** fall under **"Near Threatened"** category of IUCN's Red List of Threatened Species. **River Tern** has **"Vulnerable"** status, whereas **Black-bellied Tern** falls under **"Endangered"** Category (IUCN red Data List).

Table 7 : 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.	Green Sandpiper	*Tringa ochropus*	Least Concern
11.	Wood Sandpiper	*Tringa glareola*	Least Concern
12.	Asian Openbill	*Anastomus oscitans*	Least Concern
13.	**Painted Stork**	***Mycteria leucocephala***	**Near Threatened (LM)**
14.	**Asian Woollyneck**	***Ciconia episcopus***	**Near Threatened**
15.	Eurasian Spoonbill	*Platalea leucorodia*	Least Concern
16.	Little Cormorant	*Microcarbo niger*	Least Concern
17.	Great Cormorant	*Phalacrocorax carbo*	Least Concern
18.	Red-naped Ibis	*Pseudibis papillosa*	Least Concern
19.	**Black-headed Ibis**	***Threskiornis melancephalus***	**Near Threatened**
20.	White breasted - Waterhen	*Amaurornis phoenicurus*	Least Concern
21.	Common Moorhen	*Gallinula chloropus*	Least Concern
22.	Little Grebe	*Tachybaptus ruficollis*	Least Concern
23.	Common Teal	*Anas crecca*	Least Concern
24.	Ruddy Shelduck	*Tadorna ferruginea*	Least Concern
25.	Tufted Duck	*Aythya fuligula*	Least Concern
26.	Indian Spot-billed Duck	*Anas poecilorhyncha*	Least Concern
27.	Bar-headed Goose	*Anser indicus*	Least Concern
28.	Purple Swamphen	*Porphyrio porphyrio*	Least Concern
29.	Eurasian Coot	*Fulica atra*	Least Concern
30.	Common Greenshank	*Tringa nebularia*	Least Concern

31.	Common Redshank	*Tringa totanus*	Least Concern
32.	Black-winged Stilt	*Himantopus himantopus*	Least Concern
33.	Bronze-winged Jacana	*Metopidius indicus*	Least Concern
34.	Caspian Gull	*Larus cachinnas*	Least Concern
35.	Pallas's Gull	*Larus ichthyaetus*	Least Concern
36.	**Black-bellied Tern**	***Sterna acuticauda***	**Endangered**
37.	**River Tern**	***Sterna aurantia***	**Vulnerable**
38.	**River Lapwing**	***Vanellus duvaucelii***	**Near Threatened**
39.	Red-wattled Lapwing	*Vanellus indicus*	Least Concern
40.	Black Drongo	*Dicrurus macrocercus*	Least Concern
41.	Common Myna	*Acridotheres tristis*	Least Concern
42.	Bank Myna	*Acridotheres ginginianus*	Least Concern
43.	Asian Pied Starling	*Gracupica contra*	Least Concern
44.	Common Stonechat	*Saxicola torquatus*	Least Concern
45.	Pied Bushchat	*Saxicola caprata*	Least Concern
46.	Common Babbler	*Argya caudata*	Least Concern
47.	Jungle Babbler	*Argya striata*	Least Concern
48.	Large Grey Babbler	*Argya malcolmi*	Least Concern
49.	White Wagtail	*Motacilla alba*	Least Concern
50.	White-browed Wagtail	*Motacilla maderaspatensis*	Least Concern
51.	Indian Silverbill	*Euodice malabarica*	Least Concern
52.	Common Hoopoe	*Upupa epops*	Least Concern
53.	Common Tailorbird	*Orthotomus sutorius*	Least Concern
54.	Rose-ringed Parakeet	*Psittacula krameri*	Least Concern
55.	House Sparrow	*Passer domesticus*	Least Concern
56.	Indian Jungle Crow	*Corvus culminatus*	Least Concern
57.	House Crow	*Corvus splendens*	Least Concern
58.	Oriental Magpie Robin	*Copsychus saularis*	Least Concern
59.	Indian Robin	*Saxicoloides fulicatus*	Least Concern
60.	Streak throated Swallow	*Petrochelidon fluvicola*	Least Concern
61.	Barn Swallow	*Hurindo rustica*	Least Concern
62.	Brown-headed Barbet	*Psilopogon zeylanicus*	Least Concern
63.	Coppersmith Barbet	*Psilopogon haemacephalus*	Least Concern
64.	Ashy Prina	*Prinia socialis*	Least Concern
65.	Plain Prinia	*Prinia innornata*	Least Concern
66.	Greater Coucal	*Centropus sinensis*	Least Concern
67.	Red-whiskered Bulbul	*Pycnonotus jocosus*	Least Concern
68.	Red-vented Bulul	*Pycnonotus cafer*	Least Concern
69.	Black-winged kite	*Elanus caeruleus*	Least Concern
70.	Black Eagle	*Ictinaetus malaiensis*	Least Concern
71.	Green Bee-eater	*Merops orientalis*	Least Concern
72.	Blue-tailed Bee eater	*Merops philippinus*	Least Concern
73.	Scaly-breasted Munia	*Lonchura punctulata*	Least Concern
74.	Indian Peafowl	*Pavo cristatus*	Least Concern

75.	Jungle Owlet	*Glaucidium radiatum*	Least Concern
76.	Crested Lark	*Galerida cristata*	Least Concern
77.	Paddyfield Pipit	*Anthus rufulus*	Least Concern
78.	Common Pigeon	*Columba livia*	Least Concern
79.	Spotted Dove	*Spilopelia* chinesis	Least Concern
80.	Red Turtle Dove	*Streptopelia tranquebarica*	Least Concern
81.	Eurasian Collared Dove	*Streptopelia decaocto*	Least Concern
82.	Laughing Dove	*Spilopelia senegalensis*	Least concern
83.	Yellow-footed Green-pigeon	*Treron phoenicopterus*	Least concern
84.	Rufous Treepie	*Dendrocitta vagabunda*	Least concern
85.	Purple Sunbird	*Cinnyris asiaticus*	Least concern
86.	Indian Roller	*Coracias benghalensis*	Least concern
87.	Indian Grey Hornbill	*Ocyceros birostris*	Least Concern
88.	Brown Rockchat	*Oenanthe fusca*	Least Concern
89.	Painted Sandgrouse	*Pterocles indicus*	Least Concern
90.	Grey Francolin	*Francolinus pondicerianus*	Least Concern

Image 14 : Ruddy Shelduck

Image 15 : A Herd Of Painted Stork

Image 16 : Eurasian Spoonbill (White) And Asian Woollyneck (Black)

10.7 **Migratory Birds:** A total of 12 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 8:

Table 8 : 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	*Actitishypoleucos*	Least Concern	M
2.	Wood Sandpiper	*Tringa glareola*	Least Concern	M
3.	Green Sandpiper	*Tringa ochropus*	Least Concern	M
4.	Ruddy Shelduck	*Tadorna ferruginea*	Least Concern	M
5.	Tufted Duck	*Aythya fuligula*	Least Concern	M
6.	Bar-headed Goose	*Anser indicus*	Least Concern	M
7.	White Wagtail	*Motacilla alba*	Least Concern	M
8.	Common Greenshank	*Tringa nebularia*	Least Concern	M
9.	Spotted Redshank	*Tringa erythropus*	Least Concern	M
10.	Common Redshank	*Tringa totanus*	Least Concern	M
11.	Caspian Gull	*Larus cachinnas*	Least Concern	M
12.	Pallas's Gull	*Larus ichthyaetus*	Least Concern	M
13.	Great Cormorant	*Phalacrocorax carbo*	Least Concern	LM
14.	Black-winged Stilt	*Himantopus himantopus*	Least Concern	LM
15.	Barn Swallow	*Hurindo rustica*	Least Concern	LM
16.	**Painted Stork**	***Mycteria leucocephala***	**Near Threatened**	**LM**

11.0 Ganga Riverine Islands/*Diaras* In Budaun & Sambhal Distt.s

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 Jamani village in Budaun [Image 19]. Ganga River is braided into two major streams, one of which lies adjoining Kasganj Distt. where Lahara Ghat is located and the other adjoins Budaun Distt. where villages such as Nagla Baran and Jamani are located. During the field survey this island was observed from Lahara Ghat and was predominantly covered by agricultural fields [Image 20]. 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 17 : One Of The Biggest Riverine Island In Study Region Of Budaun Distt.

Image 18 : 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. Some such sandbars were observed around Kachhla Ghat [Image 21] which fall in the jurisdiction of Budaun Distt. While some of these sandbars had patches of natural vegetation dominated by Saccharum grasses, many sandbars were also cultivated upon with crops such as melons and cucumber. Some newly formed sandbars were also observed which are inundated completely during monsoons and remain emergent during remaining part of the year [Image 22]. Such sandbars also serve as important habitats for numerous migratory and resident bird species in the region. However, these sandbars are exposed to threats of intensive cultivation in coming time which would be detrimental to the emergent vegetation that could otherwise play an important role in riverine ecology and serve as important habitats for various faunal groups.

Image 19 : Sand Bars And Riverine Islands Around Kachhla Ghat In Budaun Distt.

Image 20 : Sand Bars As Observed During Field Survey From Kachhla Ganga Bridge On 12th March, 2022

12.0 Fishing In Budaun & Sambhal Distt.s

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 [Image 23]. Mostly residents of villages along Ganga River such as Hussainpur Kham, Atena Kham and Qadarganj Kham 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 9 while Image 24 depict fish caught by some local residents near Hussainpur Kham village in Budaun Distt.

Image 21 : Cast Net Fishing

Table 9 : 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 22 : A Child Near Hussainpur Kham Village Showing Baam Fish Caught From Ganga River

13.0 Groundwater In Budaun & Sambhal Distt.s

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. The undivided area of Budaun Distt. including current Distt.s of Budaun and Sambhal covers an area of about 5168 sq.km in the central Ganga Plain and is underlain by Quaternary alluvial sediments. These deposits are fluvial in nature and have been deposited by the drainage system of the Ganga river and its tributaries. Geomorphologically, this region can be divided into two broad units – Younger Aluminium and Older Aluminium (Bhartariya, 2013).

13.2 Ground water in this region occurs in the pore spaces of the unconsolidated alluvial sediments in the zone of saturation. The near surface sediments are dominantly sandy clays and clays which grade into sediments having varied proportions of sand and clays. These sediments occur as inter layered sequence and pockets. Kankar is generally present in clay in the form of lenses and layers as well as interspersed. These mixed sediments occur down to 20 m and support large number of dug wells. The depth of dug wells range between 6 to 20 m. Below the top 4 to 10 m silty clays and clays, there occurs the sand formations which form a part of aquifer system. This aquifer is largely unconfined to semi-confined and supports a large number of cavity/shallow tube wells (Bhartariya, 2013).

13.3 The 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 5ft. (Kachla Ghat) to 70 ft. (Badaun City) below ground level in Badaun Distt. whereas it varied from 10 ft. (Babrala Ganga Ghat) to 65 ft. (Sambhal Town) below ground level in Sambhal Distt. This depth kept on increasing as the distance from Ganga River increased. The interlocutors reiterated a decline in the use of dug wells in this region which has given way to handpumps and motorized methods of drawing ground water.

Table 10 : Groundwater Levels Recorded From Different Villages In Study Region

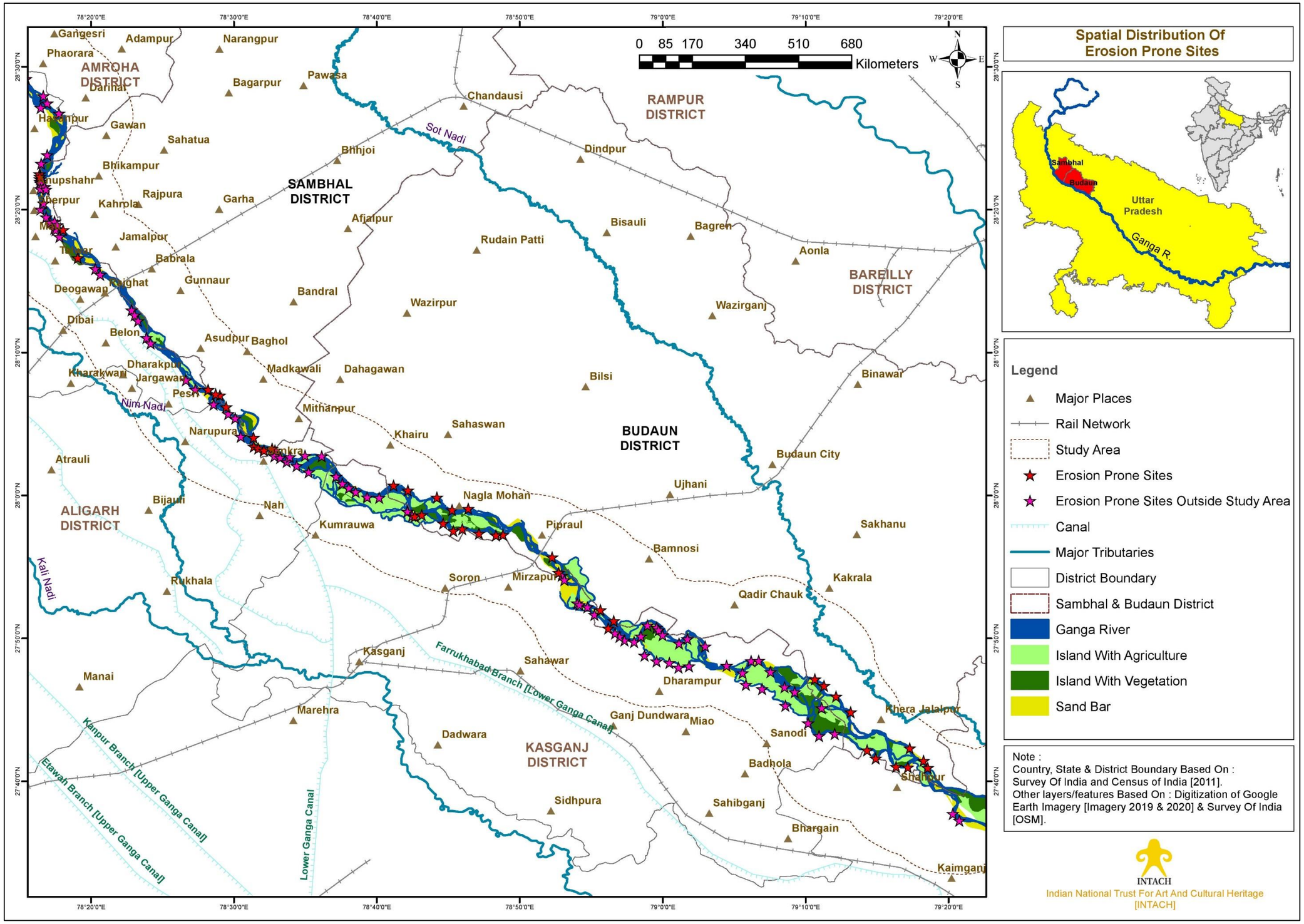
Place	Coordinates		Ground Water Table in Feet (Below Ground Level)
	Lat.	Long.	
Badaun			
Kachhla Ghat	27°55'39.71"N	78°51'28.09"E	5
Palia Kham	27°53'57.76"N	78°55'6.37"E	20
Ujhani	28° 0'2.69"N	79° 0'16.97"E	50
Kadar Chowk	27°52'5.07"N	79° 5'4.34"E	25
Kakora Devi Mandiar	27°52'59.70"N	79° 2'55.31"E	40
Badaun City	28° 2'30.00"N	79° 8'3.69"E	70
Kurban Pur	27°59'20.56"N	78°48'2.07"E	20
Dakara Pukhta	28° 0'6.32"N	78°43'42.52"E	25
Sambhal			
Firozpur	28°13'56.89"N	78°23'29.98"E	20
Mirapur	28°13'29.80"N	78°23'27.14"E	25
Babrala Ganga Ghat	28°14'48.12"N	78°22'14.43"E	10
Chandausi	28°26'40.27"N	28°26'40.27"N	55
Sambhal Town	28°35'15.84"N	78°34'6.16"E	65

14.0 Ganga River Bank Erosion In Budaun 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 11. Some erosion prone sites as observed during the field survey include near Hussainpur Kham, Kachhla Kham and Khajura Pukhta among others [Images 25-26]. 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 23 : Ganga River Bank Erosion As Observed Near Kachhla Kham In Budaun Distt.

Image 24 : Erosion Prone Bank As Observed Near Hussainpur Kham In Budaun Distt.

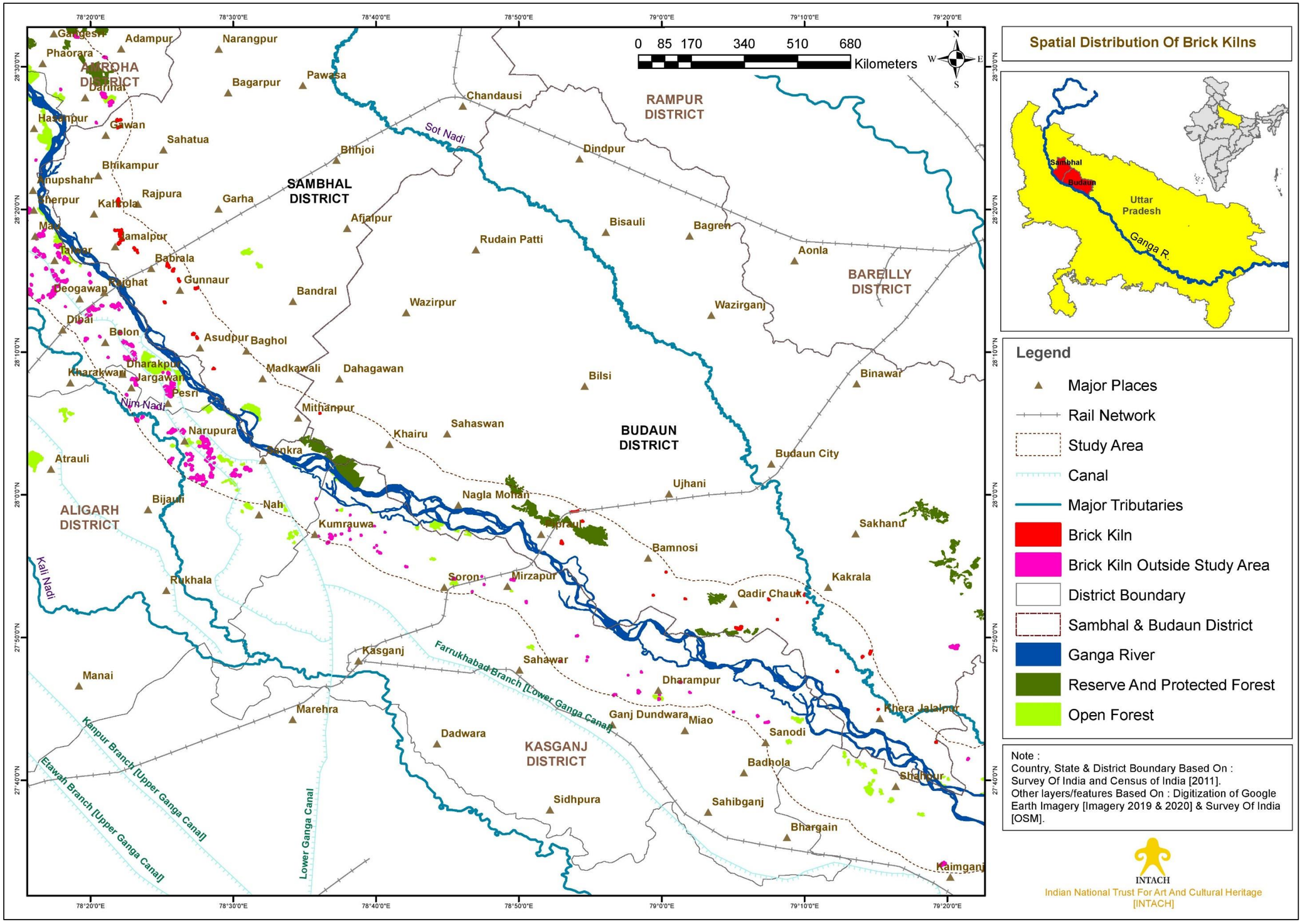


Map 11 : Spatial Distribution Of Erosion Prone Sites In Budaun & Sambhal Distt.s

15.0 Mining And Brick Kilns In Budaun 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. During the field survey in study region of Budaun and Sambhal Distt.s no direct sand mining activities could be observed but their presence was reiterated by interlocutors in the region.

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, brick kilns were observed to be scattered in the study region of Budaun Distt. with their density being lower as compared to Sambhal and other neighboring Distt.s. The spatial distribution of brick kilns in the study region of Budaun and Sambhal Distt.s is depicted in Map 12.



Map 12 : Spatial Distribution Of Brick Kilns In The Study Region Of Budaun & Sambhal Distt.s

16.0 Boatmaking And Inland Navigation In Budaun 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 [Image 27] 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 [Image 28] principally used at sites such as Kachhla 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. Iron was the chief metal used along with wood for construction of tourism-based boats as observed near Kachhla Ghat. These boats charge anywhere between Rs. 50-500 depending upon number of people, purpose and distance to be travelled from Kachhla Ghat. Bigger size boats are completely absent from this region because of lower depth in Ganga River which often hinders the boating activity. The average cost of boatmaking ranges between Rs. 50,000 – Rs. 1 lakh depending upon various factors.

Image 25 : Smaller Hand-Rowed Wooden Boats Used For Fishing In Study Region

Image 26 : Boats Made Of Wood And Metal Employed For Tourism Activity At Kachhla Ghat

17.0 Sacred Sites In Budaun Distt.

17.1 **Kakora Devi Temple :** According to various online articles and information from resident interlocutors of Budaun, Kadar Chowk was a sandy area dominated by Kakora grass about 500 years ago. This grass had tremendous medicinal benefits that prompted a Muslim King who was suffering from a skin disease, to visit this place and apply juice of Kakora grass followed by a dip in Ganga River. He immediately got relief and ultimately completely cured from his disease that led him to build this temple along with native Hindu Kings of that time dedicated to what came to be known later as 'Kakoda Devi' [Image 29]. A huge fair lasting for almost half a month takes place at Kadarganj Ghat which is known as Kakoda Mela where thousands of pilgrims visit to worship the Goddess and take bath in Ganga River.

Image 27 : Temple Of Kakoda Devi In Budaun Distt.

17.2 **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. One such sacred tree is depicted in Image 30.

Image 28 : A sacred Peepal Tree Associated With A Goddess Temple In Study Region Of Budaun Distt.

18.0 Key Observations and Recommendations

18.1 One important Hindu ritual associated with Ganga river throughout India is cremation of dead bodies as it is widely believed that by immersing your burnt remains in the holy Ganga water, the person will attain 'Moksha'. The remains of these rites along with other substances such as pots, flowers, clothes, threads and so on are often dumped directly into the river thereby impacting the riparian and in stream biodiversity. Such activity was observed during the survey along Ganga River near Kachhla Ghat & Ataina Ghat in the study region [Image 31]. Hence, it is strongly suggested through this study to take cognizance of this matter and develop suitable cremation facilities while ensuring that water pollution and ecosystem damage is prevented in this region.

Image 29 : Cremation Activity Along Ganga River Near Ataina Ghat

18.2 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.

18.3 The popularity of places such as Kachhla Ghat often lead to a high footfall of tourists and pilgrims which also leads to generation of solid and liquid waste. 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.

18.4 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.

18.5 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.

18.6 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.

18.7 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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