

**1.0 EXECUTIVE SUMMARY**

The proposed Irrigation Project of Kosi-Mechi Intrastate Link Project (CCA 214812 Ha) is for providing irrigation facilities in four districts (Araria, Purnea, Kishanganj and Katihar) of Bihar. The objective of the project is to increase the irrigation facilities in four districts of Bihar. The applicant is seeking prior environmental clearance from EAC from the MOEFCC, New Delhi. The Form-I and PFR is prepared by Centre for Envotech & Management Consultancy Pvt. Ltd. (NABET Accredited Consultant QCI No. 20.

**a. SALIENT FEATURES OF THE PROJECT**

<p><b>Location of Project</b></p>	<p>The proposed link command (Culturable Command Area) comprising 214812 ha (2.15 lakh ha) is falling in Araria, Purnea, Kishanganj and Katihar districts of Bihar. The link canal traverses towards Lat. 26° 14' 27" N &amp; Long. 87° 22' 00" to Lat. 26° 21' 47"N &amp; Long. 87° 57' 23" E. The link canal forms its northern boundary while river Parman and river Mahananda form the western and eastern boundaries. In south it is spread upto river Ganga.</p> <p>Existing Hanuman Nagar Barrage Geographical Location is Lat. 26°11'00"N &amp; Long. 86° 54' 00"E.</p> <p><b>Location Map is enclosed as Annexure-I</b></p>
<p><b>General Feature of Project along with Latitude and Longitude</b></p>	<p>The existing alignment of EKMC from Reduced Distance (RD) 0.00 km to RD 41.30 km is proposed to be utilised unchanged with remodelling.</p> <p>The New proposed canal from EKMC RD 41.30 km to outfall Point in Mechi (RD 117.500 km)</p> <p>Beyond the EKMC tail end RD 41.30 km, the link canal traverses towards south–east direction upto RD 53.156 km. near village Sunmani. From RD 53.156 it turns towards north-east direction and traverse upto RD 62.160 km. near village Khesroil. In this reach it crosses some important rivers i.e. Tehri (Lat. 26° 20' 47" and Long. 87° 22' 00"), Lohandra and Bhalua. From RD 62.160 km. canal again turns towards south-east direction and cross a major road (Araria to Kuari) at RD 63.110 km near Kursakata village (Lat. 26° 21' 30" and Long. 87° 26' 39"). From RD 63.729 km alignment follows the path in north-east direction upto RD 68.761 km.</p> <p>In this reach canal crosses a major river, Bakra at RD 65.925 km (Lat. 26° 21' 32" and Long. 87° 28' 18") and a small river Ghaghi at RD 68.630 km. From RD 68.761 km to 82.843 km canal runs in south-east direction. In this reach alignment crosses Pahara and Nona river at RD 71.900 km and 77.850 km respectively and an important road (Jokihat to Tehragach) at RD 80.600 km</p>

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

	<p>(Lat. 26° 18' 54" and Long. 87° 36' 16") near village Charbana. From RD 82.843 km to 91.200 km alignment traverses almost in east direction and crosses a major river Ratua/Gerua at RD 89.300 km. near village Suiha.</p> <p>After RD 91.200 km it turns towards south east direction upto RD 98.400 km. In this reach it crosses the largest river of sub-basin i.e. Kankai/Kawal at RD 95.900 km near village Laucha (Lat. 26° 16' 58" and Long. 87° 44' 52"). The Kankai river originates from Nepal and carries a large quantum of silt.</p> <p>The Kosi-Mechi link after RD 98.400 km to RD 112.250 km traverse towards east direction and crosses some important roads viz. Bahadurganj to Samesar road at RD 103.957 and Araria to Siliguri road (SH-63) at RD 104.905 km (Lat. 26° 16' 29" and Long. 87° 50' 15") it also cross old Kankai river at RD 103.050 km, Kankai/Sarrah river at RD 107.725 km (near village Bharadhar) and Kankai river at RD 111.735 km near village Dala. In final reach from RD 112.250 km to RD 113.887 km it is aligned towards south-east direction and thereafter it turns towards east, it finally outfalls into Mechi river at RD 117.500 km near Makhanpur village (Lat. 26° 14' 27" N and Long. 87° 57' 23" E) about 1.50 km upstream of confluence of Mechi river with Mahananda river. Thus the total length of link canal form its offtake (Kosi barrage) to outfall (Mechi river) is 117.500 km including 41.30 km of EKMC and 2.9 km escape channel. The alignment passes through Supaul, Araria and Kishanganj districts of Bihar state.</p>
Name of River	Kosi-Mechi River
Source Supply	Existing Hanuman Nagar Barrage on Kosi River
Maximum Flood Discharge	949964.52 Cusecs (26,900 cumec Cumecs)
<b>Canal Length</b>	
Length of Main canal	117.50 Km
Existing canal	RD 0.00 to 41.30 km)
New canal	RD 41.30 to 117.50km
Length of Distribution System	117.50 Km.
<b>Head Discharge</b>	
Head Discharge	573 cumecs
<b>Bed Width</b>	
Bed width at head	131.50 m
Bed width at tail	15.00 m
<b>Bed Slope/Side Slope</b>	
RD 0.00 - 41.30 km	1:11000
RD 41.- 117.50 km	1:12000
Side Slope	1: 1.5

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

<b>Velocity</b>	
Velocity at head	0.706 m/sec.
Velocity at tail	74.371 m
<b>Culturable Command Area</b>	
Existing CCA of EKMC	4.40 lakh ha
Proposed CCA	CCA 214812 Ha (2.15 lakh ha)
<b>Area under Irrigation in New Command Area</b>	
Kharif	2,10,516 ha
Rabi	-
<b>Water Requirement (MCM) For</b>	
Irrigation	2050.15 MCM
Total diversion including existing utilisation of EKMC of 5740.37MCM	7791 MCM
<b>Full Supply Depth of Canal</b>	
Existing canal (RD 0.00to 41.30 km)	4.25m to 3.5 m
New proposed canal (RD 41.30 to 117.50km)	3.5 m to 2.0 m
<b>Other Details</b>	
Total Cost of the Project	Rs. 4900.00 crore
Cost per Hact.	44 lac/ha.
B.C. Ratio	3.66
Man power (Peak during construction)	1000
Nearest railway station	Railway station: Forbesganj is the nearest rail head, located at a distance of about 5 km from link alignment and 42 km from Hanuman Nagar barrage.
Nearest Road/national highway	NH-57 & NH-57 A distance of about within 5 km from link alignment and 36 km from Hanuman Nagar barrage.
Nearest Airport	Airport: Bagdogra is the nearest airport located about 200 km from the Hanuman Nagar barrage.
Seismic zone	Zone-IV & V (As per 1893:2002)

**b. PROPOSED PLANNING**

The project is planned for irrigation of CCA 214812 Ha (2.15 ha) and it is expected that scheme will give an extra yield of 19802444 Quintal of food grains per year.

**2.0 INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION**

Ministry of Water Resources, Government of India in the year 2004 decided to undertake comprehensive assessment of feasibility of linking of the rivers of the country starting with southern rivers in a fully consultative manner and to explore the feasibility of intrastate river links of the country.

Accordingly, inclusion of prefeasibility / feasibility studies of intrastate links aspect in NWDA's mandate was put up for consideration in Special General Meeting of NWDA

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

Society held on June 28, 2006 and it was decided to incorporate this function in NWDA's mandate. Finally, MoWR vide resolution dated November 30, 2006 modified the functions of NWDA Society.

The functions of NWDA were further modified vide MoWR resolution dated May 19, 2011 to undertake the work of preparation of Detailed Project Report (DPR) of intrastate links also by NWDA. Further, the Gazette Notification of the enhanced mandate was issued on June, 2011.

In the meantime, on the basis of approval conveyed by MoWR in June 2005, NWDA requested all the State Governments to identify the intrastate link proposals in their States and send details to NWDA for their prefeasibility / feasibility studies.

Bihar responded to NWDA's request vide letter No. PMC-5(IS)-01/2006-427, Patna dated May 15, 2008 and submitted their proposals. Subsequently, a meeting was held between the officers of the Water Resources Department (WRD), Govt. of Bihar and NWDA on June 16, 2008 in Patna. In the said meeting, Govt. of Bihar requested NWDA to prepare the prefeasibility report of six intrastate links out of which two were irrigation schemes. **The Kosi-Mechi intrastate link is one of them.**

The **Kosi-Mechi intrastate link project** proposed by Government of Bihar is an irrigation project. The proposed gross command area of the project and culturable command area are 2.75 lakh ha and 214812 ha (CCA 2.15 Ha) respectively spread over in the districts of Araria, Kishanganj, Purnea and Katihar in the state of Bihar.

Under **Kosi-Mechi intrastate link project**, it is proposed to construct New canal of length 76.20 km on the existing constructed barrage on river Kosi beyond the existing eastern main Kosi main canal (41.30 km) to irrigate 2,10,516 ha command area with a total water requirement of 2050.15 MCM for irrigation in Kharif season.

**a. IDENTIFICATION OF PROJECT PROPONENT**

The proposed project will be developed by Water Resources Department Government of Bihar, Bihar and project falls under (Engineer In Chief (HQ), Water Resources Department Government of Bihar, Sinchai Bhawan, Patna, Bihar.

**b. BRIEF INFORMATION ABOUT THE PROJECT**

The project has been proposed for irrigation facilities covering culturable command area of 214812 ha (CCA 2.15 Ha) for irrigation in Kharif seasons. Project consist of Intake Structure, Canal syphon, Hume pipe culvert, Syphon aqueduct, Bridges, head regulator, Cross regulator.

The Kosi-Mechi Link Project envisages diversion of part of surplus water of Kosi river through existing Hanuman Nagar barrage to Mahananda basin. Main components of the project involve remodelling of existing EKMC upto 41.30 km and construction of a new canal from RD 41.30 km to 117.50 km long. The FSL of link canal at head is 74.371 m and at tail end is 54.238 m.

The water available at Hanuman Nagar barrage will be diverted through a 117.50 km long link canal to Mahananda basin and for enroute utilization. In this entire length of the canal, 14 syphon aqueduct, 9 canal syphon, 9 cross regulator, 28 head regulator, 9 pipe culverts and 42 road bridges and 3 escape are required to be constructed.

**c. NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY OR REGION**

The river Kosi is an international river originating from Tibet and flowing through Nepal in Himalayan Mountains and the lower portion through plains of North Bihar. To overcome the acute problem of shifting of course of Kosi river, heavy sediment load, flooding etc. and to alleviate the severe suffering of the people of Bihar, the then His Majesty's Government of Nepal and The Government of India signed an agreement on 25th April 1954 for implementation of Kosi project. The Kosi project includes a barrage namely Hanuman Nagar barrage across river Kosi located near Hanuman Nagar town close to Indo-Nepal border, canal headworks, Western Kosi Main Canal (WKMC) system in Nepal, Eastern Kosi Main Canal (EKMC) system in India. The present proposal is an extension of EKMC upto river Mechi, a tributary of river Mahananda.

The project is proposed to meet the irrigation water demands for Kharif season in four districts of Bihar: Araria, Purnea, Kishanganj and Katihar District. Since this region of Bihar lies in North East which is more fertile has considerable significance for irrigation. For meeting the irrigation demand, the present irrigation project is proposed to irrigate 214812 ha (CCA 2.15 Ha) culturable command area for irrigation in Kharif seasons. The project enhance the economic activities in the command area.

**d. DEMAND-SUPPLY GAP**

The aim of extension of EKMC upto Mechi river is mainly to provide irrigation benefits to the water scarce Mahananda basin command in the districts of Araria, Kishanganj, Purnea and Katihar during kharif season depending upon the pondage available in Hanuman Nagar barrage. Though this intrastate link canal will not have any back-up storage scheme at present, later it can be supported by and linked with proposed Kosi High Dam which is likely to take concrete shape after joint surveys and investigations of Kosi High Dam project by Govt. of Nepal and India. Out of the total command area 4,45,000 ha of Mahananda river basin, the proposed Kosi-Mechi link canal will irrigate 2.15 lakh ha areas excluding CCA covered by other schemes falling under this river basin. This intrastate link scheme will thus transfer part of surplus water of Kosi basin to Mahananda basin. In view of irrigation benefit from the link canal, the project is fully justified.

**e. IMPORTS VS. INDIGENOUS PRODUCTION**

Import does not apply in the present case.

**f. EXPORT POSSIBILITY**

Export possibility does not apply.

**g. DOMESTIC/ EXPORT MARKETS**

Not applicable for this project.

**h. EMPLOYMENT GENERATION**

About **1000 local labors** shall be engaged through project proponent along with skilled staff and engineers.

### 3.0 PROJECT DESCRIPTION

#### a. TYPE OF PROJECT INCLUDING INTERLINKED AND INTERDEPENDENT PROJECTS, IF ANY

The project is irrigation project and not interlinked with any other project.

#### b. LOCATION

Existing Hanuman Nagar Barrage Location Lat. 26°11'00"N & Long. 86° 54'00"E. The link canal traverses towards Lat. 26°14' 27" N & Long. 87° 22' 00" to Lat. 26° 21' 47"N & Long. 87° 57'23"E.

The proposed link command comprising 214812 ha (2.15 lakh ha) is falling in Araria, Purnea, Kishanganj and Katihar districts of Bihar.

The link canal forms its northern boundary while river Parman and river Mahananda form the western and eastern boundaries. In south it is spread upto river Ganga.

**Location Map is enclosed as Annexure-I**

#### c. DETAILS OF ALTERNATE SITES

The project location is scientifically selected based on availability of water at particular head, command area of irrigation as per guidelines of central water commission.

#### d. SIZE OR MAGNITUDE OF OPERATION

The proposed project has gross Command area for irrigation is 275135 ha. (2.75 ha) & culturable command area is 214812 ha (2.15 Lakhs ha), water for irrigation 2050.15 MCM. Total diversion including existing utilisation of EKMC of 5740.37 MCM = 7791MCM.

#### e. GEOLOGY

The geological formations of the Mahananda river system in the northern area consist of unaltered sedimentary rocks confined to the hills on the north consisting of different grades of metamorphic rocks over the rest of the area. The outcrops of the various rocks form a series of bands more or less to the general line of the Himalayas, dipping one below the other into the hills. The characteristic feature of the southern area is that the older formations rest on the younger formations, showing complete reversal of the original order of superposition.

The Geological Survey of India, Kolkata was entrusted the work of geological mapping along link canal alignment and important CD/CM structures in order to ascertain the feasibility of the project. The proposed Kosi -Mehi link is the extension of Existing Kosi Mechi Canal (EKMC) of 41.30 km length off-taking from the left head regulator of Hanuman Nagar barrage. Therefore, the foundation investigation of headworks and EKMC were not necessary in this reach. But beyond RD 41.30 km upto the tail end links into Mechi river, the geotechnical investigations along link canal and various Cross Drainage (CD/CM) structures have been carried out by GSI. The main objectives of the investigations assigned to GSI are (i) to identify the spots where deep open excavation for the canal may lead to slope failure and suggest

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

protection measures for cut slope and (ii) geotechnical investigation to evaluate foundation strata of CD/CM structures. Field investigations by GSI, Kolkata have been completed.

**Geotechnical investigation borrow area survey and construction material survey**

The work of geotechnical investigations, borrow area survey, construction material surveys, testing of soil samples etc. have been carried out by Central Soil and Material Research Station, New Delhi . Since in north Bihar no quarries are available, the quarries identified for coarse and fine aggregates for Burhi Gandak-Noon-Baya – Ganga link are proposed to be utilized in this project also. The quality of material available in various quarries have been tested by CSMRS, New Delhi and found suitable for utilizing as construction materials.

**f. LIFE OF PROJECT**

Estimated life of the project is 100 years.

**g. BLASTING**

No blasting is proposed.

**h. RAW MATERIAL REQUIRED ALONG WITH ESTIMATED QUANTITY, LIKELY SOURCE, MARKETING AREA OF FINAL PRODUCT/S, MODE OF TRANSPORT OF RAW MATERIAL AND FINISHED PRODUCT**

Based on construction methodology, major construction plant and equipment required for construction of Kosi-Mechi link including remodelling of existing canal are given in **Table: 1**

**Table: 1 Major construction plant and equipment required for construction of Kosi-Mechi link**

Sl. no.	Equipments	Size/capacity	Quantity (Nos.)
1.	Hydraulic excavator	2.5 cum	5
2.	Crawler/wagon drill	600 cum	3
3.	Road roller	8/10 t	3
4.	Front end loader	1.5 cum	5
5.	Rear end dumper	18/20 t	15
6.	Crawler dozer	180 hp	2
7.	Vibratory compactor (pad foot)	10 t	6
8.	Vibratory compactor (smooth drum)	10 t	3
9.	Water sprinkler	8000 lt.	8
10.	Tippers	4.5 cum	15
11.	Aggregate processing plant	100 tph	3
12.	Batching and mixing plant	45 cum/hour	3

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

13.	Mobile batching and mixing plant	18 cum/hour	3
14.	Electric winch	20t	5
15.	Concrete pump with 25m boom	38 cum/hour	3
16.	Concrete vibrator (electrical/pneumatic)		21
17.	Compressed air	4200cfm	5
18.	Grout pump	20 kg/m <sup>2</sup>	6
19.	Front end wheel loader	2.5 cum	2
20.	Mobile crane	20t	3
21.	Transit mixers truck mounted	4.5 cum	15

**i. RESOURCE OPTIMIZATION/ RECYCLING AND REUSE**

Cutting material will be reused in filling after meeting the standards.

**j. AVAILABILITY OF WATER ITS SOURCE, ENERGY / POWER REQUIREMENT AND SOURCE**

**• Water Requirement**

Water requirement for project is water for irrigation is 2050.15MCM. Total diversion including existing utilisation of EKMC of 5740.37 MCM = 7791 MCM.

**• Power**

The power will be arranged from Bihar State Power holding Co. LTD (Distribution).

**k. QUANTITY OF WASTES TO BE GENERATED (LIQUID AND SOLID) AND SCHEME FOR THEIR MANAGEMENT/ DISPOSAL**

**• Solid Waste Generation & its Disposal**

No solid waste will be generated from the project.

**• Liquid Effluent**

There will be no waste water generation from irrigation activities. However, for construction workers sewage will be disposed through soak pits.

**4.0 SITE ANALYSIS**

**a. CONNECTIVITY**

The project area is well connected with road and railway networks. Forbesganj is the nearest rail head, located at a distance of about 5 km from link alignment and 42 km from Hanuman Nagar barrage. Bagdogra is the nearest airport located about 200 km from the Hanuman Nagar barrage.



**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

**b. LANDFORM, LANDUSE AND LAND OWNERSHIP**

• **Landform**

The CCA has been worked using latest 5 years land use statistics for the period 2006-07 to 2009-10. It was seen that culturable area is highest in the year 2006-07. Taking that land use data of 2006-07, the gross command area under the new canal is worked out as 2,75,135 ha and CCA works out to 2,14,812 ha (2.15 ha).

• **Land Use**

The classification of land use in the enroute command area is furnished in **Table: 2** below.

**Table: 2 Abstract of land use of command area lying under the link**

Sl. No.	Particulars	Name of districts				Total area
		Araria	Purnea	Katihar	Kishanganj	
1	Gross command area	88000	85750	49235	52150	275135
2	Forest	271	31	302	98	702
3	Barren & un-cultivable land	1646	3394	3764	3139	11943
4	Land put to non-agricultural use	16394	12235	9472	9301	47403
5	Cultivable waste land	183	317	133	341	974
6	Permanent pastures & grazing land	46	120	45	64	275
7	Land under Misc. tree, crop & groves	6127	2389	1856	1374	11746
8	Fallow land other than Current fallow	969	1306	1029	854	4159
9	Current fallow	3152	8907	4033	2335	18427
10	Net area shown	59211	57052	28601	34644	179507
11	Area shown more than once	30962	19995	15356	12396	78708
12	Total Culturable land (5+7+8+9+10)	69642	69970	35653	39548	<b>214812</b>

• **Land Ownership**

The land ownership lies is private hands, government and forest land.

**c. TOPOGRAPHY & PHYSIOGRAPHY**

The topography of the Mechi basin (Mahananda river system) varies from rugged hills of Himalayas (in Nepal) to plains at its outfall into the Mahananda. The upper portion of the catchment extends to an altitude of about 200 m and lies mostly in Himalayas in Nepal (a small portion is also in West Bengal) while the portion in plains lies mostly in India. The northern part of the river system is hilly and the southern part has mostly plain lands traced by a number of channels falling into the main river, Mahananda. The reach from origin upto Siliguri is mountainous covered with thick forest upto Sonapurhat 37 km, below Siliguri, the river bed consists of boulder and sand brought by the river during the floods and the banks are remarkably stable.

**d. EXISTING LAND USE PATTERN**

The existing land use of area belongs to land use category is given in **Table 2**.

**e. EXISTING INFRASTRUCTURE & SENSITIVE ECOLOGICAL LOCATIONS**

S. No.	Sensitive Ecological Features	Name	Aerial Distance (in km.) from Dam site
1.	National Park/Wildlife Sanctuary	None	-
2.	Tiger Reserve/Elephant Reserve/Turtle Nesting Ground	None	-
3.	Core Zone of Biosphere Reserve	None	-
4.	Habitat for migratory birds	None	-
5.	Lakes/Reservoir/Dams	None	-
6.	Stream/Rivers	Parman River	5.0 Km from the link alignment and 42 km from Hanuman Nagar barrage.
		Kosi River	42.0 Km from the link alignment and 0.00 Km from Hanuman Nagar barrage.
7.	Estuary/Sea	None	-
8.	Mangroves	None	-
9.	Mountains/Hills	None	-
10.	Notified Archaeological sites	None	-
11.	Industries/Thermal Power Plants	None	-
12.	Defense Installation	None	-
13.	Airports	Bagdogra	200 km

**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

S. No.	Sensitive Ecological Features	Name	Aerial Distance (in km.) from Dam site
14.	Railway Lines	Forbesganj at a distance of about 5 km from link alignment and 42 km from Hanuman Nagar barrage	8.50 km
15.	National / State Highways	NH-57 & NH-57 A distance of about 5 km from link alignment and 36 km from Hanuman Nagar barrage	Within 5.0 km
16.	Important worship place	None	-

**f. SOIL CLASSIFICATION**

The Kosi and Mahananda rivers originate and have catchments in Himalayan region, which are not calcareous but rich in acidic minerals. As a result, the soils of this zone are non calcareous. Accumulation of sodium salts and sodium absorption has taken place in areas where the drainage is poor. As Kosi and Mahananda both rivers carry tremendous load of sediments, the soils are mostly light textured except in back waters of river Ganga and Kosi.

Introduction of irrigation in an area must be preceded by detailed field and laboratory investigations aimed at the classification of the soils of the area to assess their suitability for irrigation and determining appropriate cropping pattern, intensity of irrigation and water delivery requirements. In order to make interpretation for soil-plant-water relationship, the following soil qualities must be determined from the above mentioned surveys and laboratory test.

- + Fertility
- + Productivity
- + Erodibility
- + Drainability
- + Leachability
- + Infiltration rate
- + Available moisture holding capacity

The district wise general soil classifications are given in **Table:3**

**Table: 3 District wise general soil types of Kosi basin**

Sl. No.	State/District	Type of soil
	<b>Bihar</b>	
1.	Darbhanga	Alluvial, calcareous alluvial
2.	Munger	Alluvial, calcareous alluvial, peaty and saline peaty.
3.	Saharsa	Alluvial, calcareous alluvial, peaty and saline peaty.
4.	Purnea	Alluvial and Terai
5.	Bhagalpur	Alluvial
6.	Madhubani	Alluvial
7.	Katihar	Alluvial

**g. CLIMATIC DATA FROM SECONDARY SOURCES**

The Mahananda river system in Darjeeling district experiences varying climatic conditions. Occasionally snowfall occurs in January and February at high altitudes for a few hours. During April and May short lived summer is experienced accompanied by summer rains for three months from June to August and the catchment is drenched with rain. The catchment in Jalpaiguri district experiences heavy rainfall. Its temperature is rarely excessive due to the proximity of the hills and the catchment is always green. The climate of the river system in Purnea, Kishanganj, Araria, Katihar and West Dinajpur districts is cold from November to February and hot from March to middle of June due to strong westerly winds. With the receding of the monsoon in the middle of October, the nights become appreciably cooler, though the days remain hot, sometimes longer. The relative humidity varies from 20% to 85%. It is lowest during April and May and highest in the months of June to September.

The average annual rainfall in Mahananda river system in India is about 2050 mm. About 80% of the rainfall occurs during the monsoon months. The usual direction of moisture laden current is generally northward. The annual rainfall in the upper catchment ranges from 100 mm to 1400 mm. As per the Bihar Statistical Hand Book-2012, annual normal rainfall in the districts of Araria, Purnea, Kishanganj and Katihar are between 1218 mm to 2041 mm and during monsoon the average rainfall is between 1067 mm to 1785 mm. The average numbers of rainy days in monsoon are 55 in these districts.

Except in the snow bound areas and the hills of Nepal, the basin experiences both hot summer and cold winters. The month of May is the hottest with the maximum temperature upto 40°C. The winter temperature goes down to nearly 4°C in January in the plains in the lower reaches while in the hills, it is still lower. There are two hydro meteorological observatories in the Mahananda catchment one at Purnea and the other at Malda.

**h. SOCIAL INFRASTRUCTURE**

The social infrastructure like educational facilities (primary and higher secondary schools, degree college), drinking water supply, post and telegraph, public transportation and hospitals are by and large available in the study area.

**5.0 PLANNING BRIEF**

**a. PLANNING CONCEPT**

The project is planned for irrigation and it is expected to provide irrigation for 2,14,812 ha (2.15 ha) culturable command area.

**b. ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)**

Adequate infrastructure facilities are available in the vicinity of area and due to the activities; no extra infrastructure over and above the existing infrastructure is required.

**c. AMENITIES/FACILITIES**

**Project Office, Workshop etc.**

Proper site services such as First Aid, Rest Shelter, and Drinking Water will be provided to the workers.

**Rest Shelter**

Rest shelter along with first-aid station complying with all the provisions of Labor Rules shall be provided by project proponent.

**Water Supply**

Water will be supplied for human consumption, dust suppression and for plantation.

**Transport of Men and Material**

Employee will report to the duty on own means. The material to the site will be transported by trucks / tippers / tractor trolleys.

**Communication**

Mobile phones shall be used for communication.

**Security Arrangements**

Appropriate security arrangement shall be made.

**6.0 PROPOSED INFRASTRUCTURE**

**a. INDUSTRIAL AREA (PROCESSING AREA)**

Temporary arrangements like site office, rest shelters & approach roads etc shall be provided.

**b. RESIDENTIAL AREA (NON PROCESSING AREA)**

The local person shall be employed during construction stages. Residential building / housing are proposed for staff.

**c. GREEN BELT**

The green belt shall be developed at the appropriate places.

**d. SOCIAL INFRASTRUCTURE**

In-line with the Social Responsibility Activities at other operational sites, relevant developmental assistance shall be rendered depending on the local needs identified through studies.

**e. CONNECTIVITY**

The project area is well connected with road and railway networks. Forbesganj is the nearest rail head, located at a distance of about 5 km from link alignment and 42 km from Hanuman Nagar barrage. Bagdogra is the nearest airport located about 200 km from the Hanuman Nagar barrage.

**f. DRINKING WATER MANAGEMENT**

Water requirement for drinking and operations will be met from underground water resource and river water.

**g. SEWERAGE SYSTEM**

In construction camp, sewage will be disposed through soak pits.

**h. INDUSTRIAL WASTE MANAGEMENT**

Not applicable, as the proposed activity will not be generating any overburden or waste water.

**i. SOLID WASTE MANAGEMENT**

No solid waste will be generated during operation of the project. However, during construction, the waste generated in construction camp will be disposed as per MSW rule 2000.

**7.0 REHABILITATION AND RESETTLEMENT (R&R) PLAN**

The compensation for the land will be given as per applicable R & R policy Government of India.

**8.0 PROJECT SCHEDULE & COST ESTIMATES**

**a. LIKELY DATE OF START OF CONSTRUCTION AND LIKELY DATE OF COMPLETION**

The work will be commenced after getting the environmental clearance of the project in the year 2016.

**b. ESTIMATED PROJECT COST ALONG WITH ANALYSIS IN TERMS OF ECONOMIC VIABILITY OF THE PROJECT**

The capital cost of proposed project is estimated as Rs. 4900.00 crore.

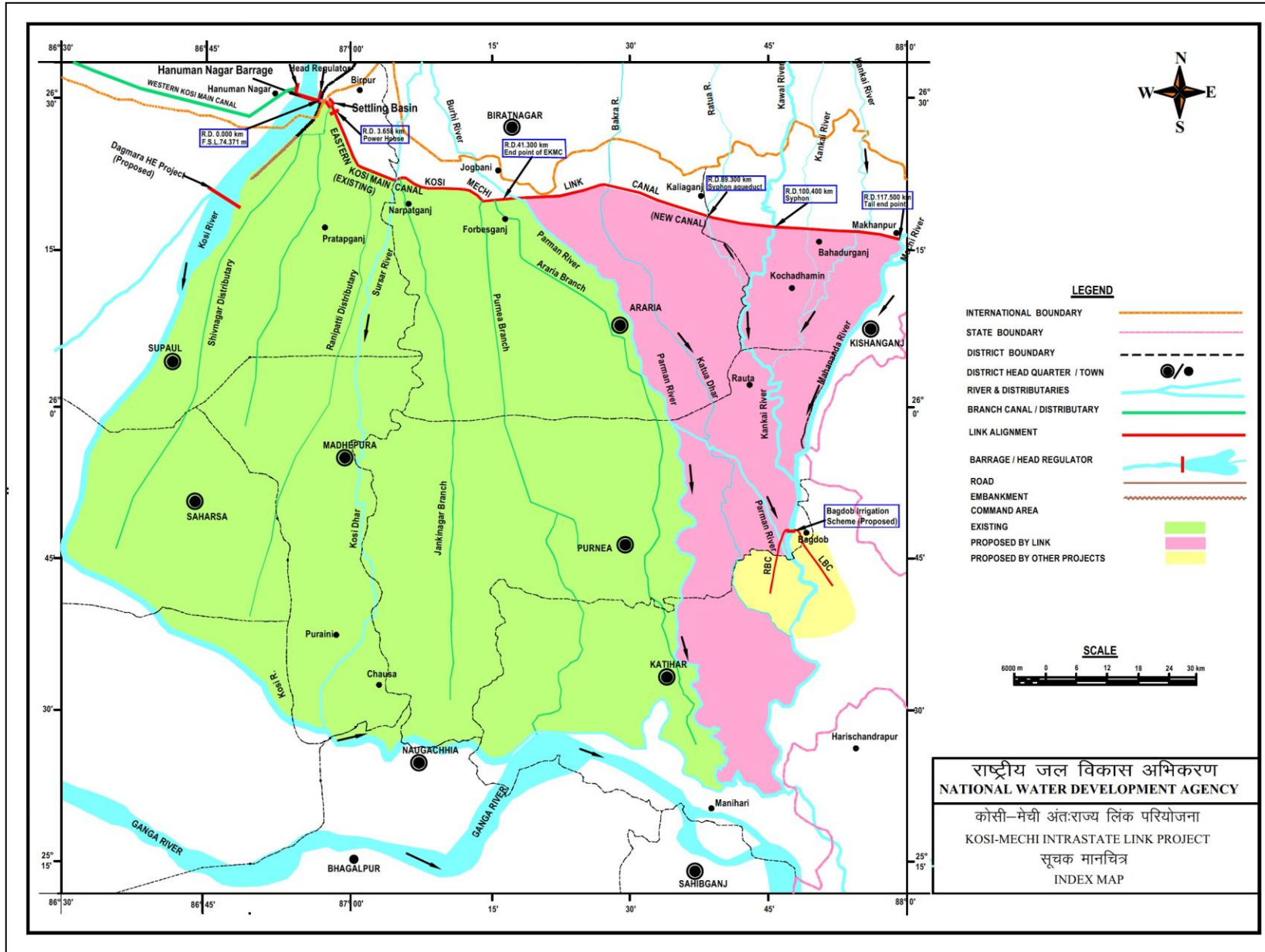
**9.0 ANALYSIS OF PROPOSAL**

**a. FINANCIAL AND SOCIAL BENEFITS WITH SPECIAL EMPHASIS ON THE BENEFIT TO THE LOCAL PEOPLE INCLUDING TRIBAL POPULATION, IF ANY, IN THE AREA**

The proposed project is expected to provide employment to local people in different activities during construction and enhance the cropped productivity as well as drinking water needs in the region. The project activity will not have any major impact on the environment.

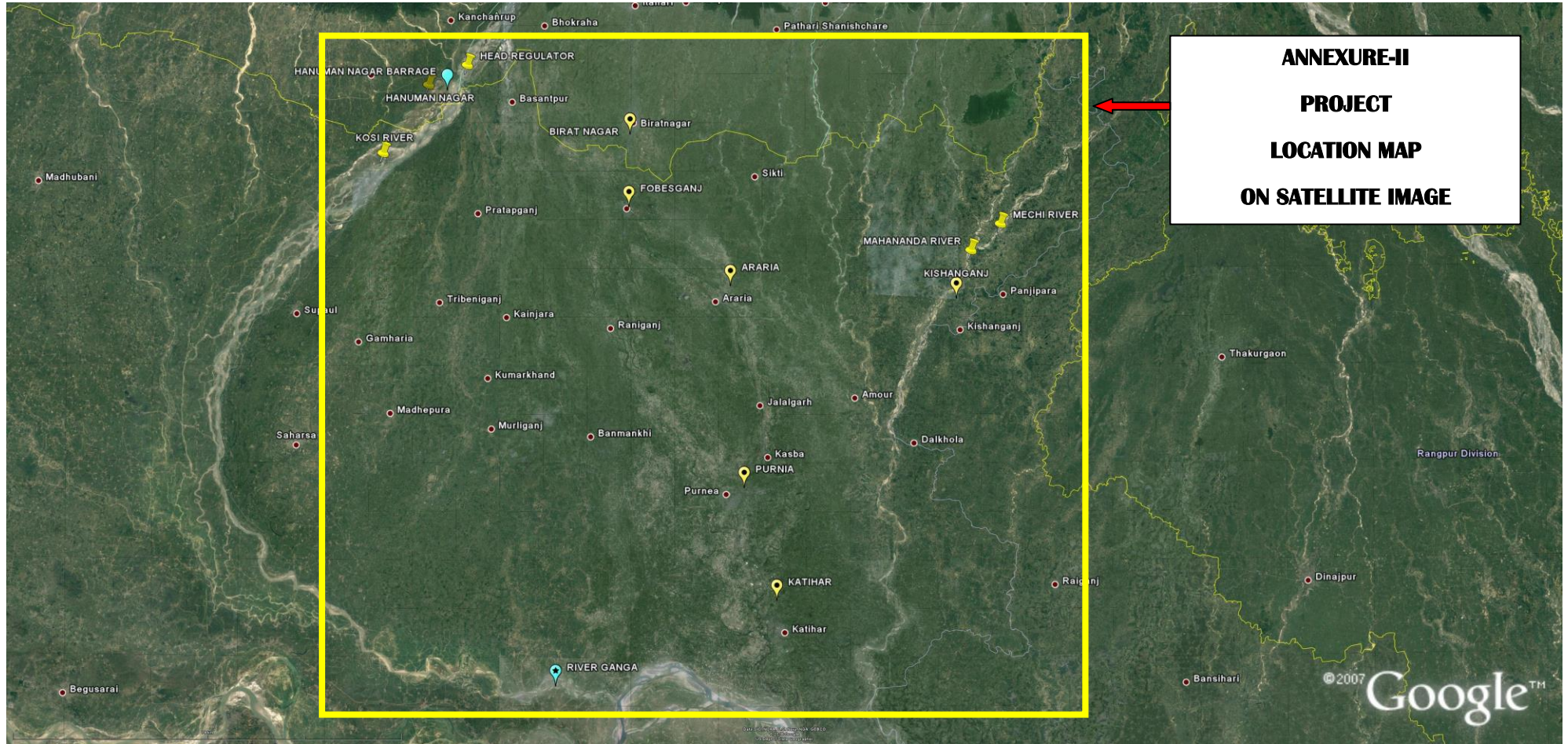
**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**

**ANNEXURE-1  
LOCATION MAP**





**PRE-FEASIBILITY REPORT FOR IRRIGATION PROJECT OF KOSI-MECHI INTRASTATE LINK PROJECT (CCA 214812 HA) FOR PROVIDING IRRIGATION FACILITIES IN FOUR DISTRICTS OF BIHAR**



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