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1. EXECUTIVE SUMMARY

The project envisages (a) completion of a dam (Mandal Dam) on river North Koel near village Kutku of Latehar district in Jharkhand, (b) completion of barrage on the same river around 96 km downstream of Mandal dam site (c) completion of distributaries system originating from the two main canal (Left and Right) which are offtaking from Mohammadganj barrage.

The right canal of 109.34 km length (31 KM in Jharkhand and rest 78 km in Bihar) and 11.89 km of left main canal and 953.31 kms of distributaries, sub-distributaries and minors are in progress. Length of Left Main Canal is around 11.81 km fully in Jharkhand. Through these canals irrigation will be provided in 12470 ha in Palamu and Garhwa districts of Jharkhand and 111800 ha in Bihar. The total CCA under the North Koel project is 124270 ha. Once completed, the project will generate 24 MW electricity having two turbines of 12 MW each.

The CCA of the project is 124270 Ha hence the project requires Environmental Clearance from MoEF&CC. The proposed project attracts general condition as the project is an interstate issue between Government of Jharkhand and Government of Bihar and the Mandal dam location falls in the Palamau Tiger Reserve.

As the dam and its distributaries are in the forest area; hence the project attracts Wildlife clearance and Forest clearance.

The project would be helpful in providing drinking water to the people and water for industrial and agricultural purpose for both Jharkhand and Bihar states. The project will also generate 24 MW of electricity which will reduce the gap of existing supply and demand of power.

Government of Bihar vide their letter no PMC-04(Inter-State) 01-14/2014-300 dated 06.05.2015 has agreed upon to reduce the height of Mandal dam by 4 meter in FRL which will reduce the submergence area of Betla Tiger Reserve. These recommendations were given by JSAC constituted by National Tiger Conservation Authority, New Delhi. The WRD, Jharkhand is currently re-assessing the effect of this reduction in height of dam on submergence area (both forest and no-forest land), change in command area in both the states and effect on electricity production etc.

Table 1 : Salient features of the project

Project name	North Koel Project
Location (with layout plan)	Dam in Kutku village, Latehar District
Latitude	23 ⁰ 43'23.46" N
Longitude	83 ⁰ 59.9'16" E
Toposheet number	Study Area (10 KM Periphery from the dam) Toposheet No: 64M13, 64M14, 73A1, 73A2
Land use	Private Land, Govt Land, Forest Land
Proposed CCA	124270 Ha.
Proposed Hydropower Generation	2 X 12 MW
Design flood Discharge	0.19 Million cumecs
No of working days in a year	300
Water demand	46 m ³ /sec
Sources of water	North Koel River (Tributary of Sone River & Sub-Tributary of Ganga River)
Nearest railway station	Barwadih Station
Nearest state highway/national highway	NH-75 (Connects Gwalior in Madhya Pradesh & Ranchi in Jharkhand, passing through Daltonganj)
Nearest air port	Ranchi (150 kms)
Seismic zone	Zone III
Total Expenditure upto 2011	750 crores approx.
Revised cost (under scrutiny of CWC)	1289.50 crores approx.

2. INTRODUCTION OF THE PROJECT / BACKGROUND

INFORMATION

2.1 Identification of the Project Proponent

Water Resources Department, formerly known as Irrigation Department is one of the major establishments of Government of Jharkhand. It protects the right of State in sharing Water of Inter State Rivers/Basins. The department of Water Resources, Government of Jharkhand is involved in the management of the Water Resources of the State in such a sustainable way so as to provide optimal benefit to the people of the State. Water Resources Department is one of the major Public work Department of the Government of Jharkhand. The Department is engaged in construction and maintenance of Major, Medium and Minor Irrigation Schemes, Flood Protection work, Ground water Conservation/ Reclamation and providing Industrial water to Industries. It protects the right of the State in sharing water of Interstate Rivers/ Basins. The Department is also working in the field of Interlinking of various river basins in order to supply water to water starved areas from water surplus basins. (Source: http://wrджharkhand.nic.in/about_us.html)

2.2 Brief Information about the Project

The project consists of (a) completion of dam across river North Koel near village Kutku, (b) a barrage on the same river, 96 km downstream of Kutku dam and (c) completion of the remaining work of main canal and their distributaries. The right canal of 109.34 km length and 11.89 km of left main canal and 953.31 kms of distributaries, subdistributaries and minors are in progress. The total CCA under the North Koel project is 124270 ha. Most of the barrage and main canal works have been completed. Installation of gates and some distributaries work are yet to be completed. The project also envisages generation of 24 MW of electricity which will be shared between Jharkhand (90% share) and Bihar (10% share). A memorandum of understanding (**MoU**) has been signed between the Governments of the States of Bihar and Jharkhand for further completion of work and sharing of cost expenditure and benefit from the project (**Annexure-I**).

2.2.1 Statutory Compliance

The entire statutory requirement related to the proposed project is provided as per the chronological sequence in the tables given below:

Table 2 : Statutory Requirement

Particulars	Details
Planning Commission	Ref .No. 11-15(1)(10/75-1) Dated:16.05.1975
MoU b/w Govt of Bihar and Govt of Jharkhand	MoU dated 26.06.2006
Forest Clearance	Yet to apply
Wild Life Clearance	NBWL Clearance yet to apply for Palamau Tiger Reserve

2.3 Need for the Project and Its Importance to the country or Region

The proposed project is one of the long pending irrigation projects, the state government would like to get it executed as early as possible. Projects like North Koel reservoir has been pending for more than three decades. The Government of Jharkhand wants to get the project completed so that farmers get water while the government has concern over successive drought years and an uncertain monsoon in 2011. The project is very important for the Daltonganj and Palamu regions, an area which has witnessed 10 major famines since 1935.

The proposed project will make the Government to reach out to the unirrigated area of about 124270 Ha that will help farmers to increase the agro productivity and their social status eventually.

2.4 Demand-Supply Gap

Due to growth and development of agriculture and allied sectors in Jharkhand, serious scarcity of water for domestic and industrial purposes is being envisaged. As per the Jharkhand Economic Survey 2010-11 the acute shortage of irrigation water and shrinking watershed areas in forest regions pose additional problems. The survey said surface water for agriculture was not sufficient due to inadequate storage facilities and ground water availability was poor due to little recharging by natural process and absence of artificial recharging facilities. The state government is implementing several schemes to reduce the adverse effect of water scarcity like rain water harvesting, enhancing efficiency of canal irrigation system, ground water management and watershed management (Source: Oneindia, 24.03.2011).

2.5 Export Possibility

The export possibility is not envisaged as the dam shall be used for irrigation and power production purpose in the Bihar and Jharkhand states.

2.6 Domestic / Export Markets

The proposed project is primarily an irrigation project which focuses upon to meet the water requirement of local farmers. The purpose of the project does not intend to sell and/or purchase of water hence no market potential is envisaged. The domestic water supply may be envisaged through the existing reservoir in the command area and the deficit in the reservoir shall be met through water from this project.

2.7 Employment Generation

As the proposed project is almost complete and operational except few components of the project to be completed, a well trained human resource of WRD Jharkhand is already in place to look after the current and proposed operations, Around 500 labourer and semi skilled persons are likely to be employed during completion of remaining project activities i.e. installation of gates, construction of canal and their distributaries etc.

3. PROJECT DESCRIPTION

3.1 Type of Project Including Interlinked and Interdependent Projects, If Any

The proposed project is a major irrigation scheme which has the total culturable command area of 124270 hectares.

As per the EIA notification, 2006 and its subsequent amendment, the project is a “Category A” project along with applicability of the General Condition because;

1. CCA > 10,000 Ha
2. The project component falls in two states; hence it attracts interstate issues with Bihar.
3. The dam and its submergence fall in notified Palamau Tiger Reserve.

3.2 Location (Map Showing general location, specific location and project boundary with project layout) with coordinates

The proposed project is an irrigation project which has many components i.e. two main canal along with sub-canals and reservoir. A location map of the project is attached as **Annexure-II**. The index plan and key map of proposed project are attached as **Annexure-III** & **Annexure-IV**. A 10 KM study area from the mandal dam is shown in **Annexure-V**. The Mandal Dam on Wildlife Institute of India sheet is also attached as **Annexure-VI**.

Table 3: Location (Coordinates) of Various Project Components

S.No.	Project Component	Latitude	Longitude
1.	Dam in Kutku Village, Latehar	23 ⁰ 43'23.46" N	83 ⁰ 59.9'16" E
2.	Barrage in Mohammadganj	24 ⁰ 24'37.40" N	83 ⁰ 51'11.5" E
3.	Canals	Main canals are offtaking from Mohammadganj Mohammadganj barrage which would irrigate the area of Gaya and Aurangabad district of Bihar and Palamau and Garhwa districts of Jharkhand.	

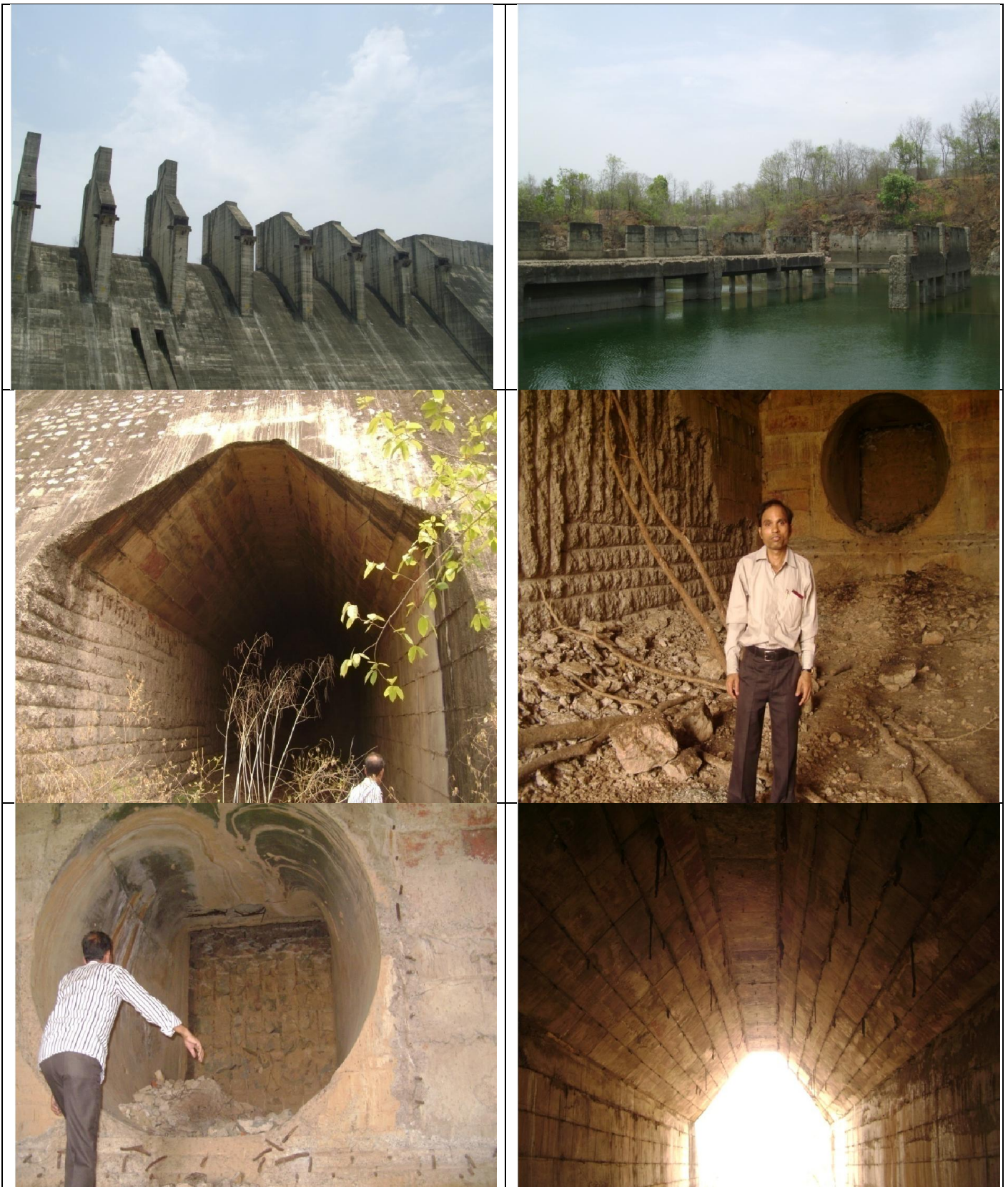


Figure 1 :Mandal Dam Site Photograph-1



Figure 2: Mandal Dam Site Photograph-2

3.3 Details of Alternate Sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted

There is no provision for alternative site as the proposed project i.e. construction of Mandal Dam has been pending for almost more than last two decades. The dam construction was stopped due to a tragedy happened at the site. The installation of gates in spill way, outlet of Dam and deck slab and piers of Barrage are yet to be completed.

3.4 Size or Magnitude of Operation

The total culturable command area of the project falling in Palamau and Garhwa districts in Jharkhand and, Gaya and Aurangabad districts in Bihar is 124270 ha.

3.4.1 Geology

The district is underlain by hard rock belonging to the Precambrian period and recent alluvium along river courses. The geology and structure of underlying basement controls the occurrence and movement of groundwater. The groundwater occurs in secondary porosities like joints, fractures and their inter connected extensions.

Groundwater occurs in the district within weathered mantle of hard rocks. The limited volume of groundwater in alluvial deposits occurs along the Sone and North Koel rivers. The thickness of weathered mantle varies from 5 to 16 mbgl in general. The source of groundwater recharge is entirely by rainfall. As the rivers of the district are effluent which do not contain appreciable amount of water during lean period to recharge groundwater at lower reaches. The rainfall over the area is fairly high but because of its topography major part of the rainwater goes as run off (Adopted from CGWB, October 2009).



Figure 3: Geology of the Site

3.5 Project description with process details (a schematic diagram / flow chart showing the project layout, components of the project should be given)

The project is envisaged to draw water from the river North Koel river as per the MoU signed on 26.06.2006 for sharing the river water among the states Bihar and Jharkhand (**Annexure-D**). Government of Bihar vide their letter no PMC-04(Inter-State) 01-14/2014-300 dated 06.05.2015 has agreed upon to reduce the height of Mandal dam by 4 meter in FRL which will reduce the submergence area of Betla Tiger Reserve. These recommendations were

given by JSAC constituted by National Tiger Conservation Authority, New Delhi. The WRD, Jharkhand is currently re-assessing the effect of this reduction in height of dam on submergence area (both forest and no-forest land), change in command area in both the states and effect on electricity production etc (**Annexure X**). There are seven major project components which are as follows:

S.No	Particulars	Details
a	Location	23 ⁰ 43'26.8" N; 83 ⁰ 59'06.4" E
b	Hydrology	
	Catchment area	2885 sq-m
	Average Rainfall (annual)	147 CM
	Design Flood Discharge (routed)	0.19 million cumecs
	Routed Flood Discharge over spillway	0.16 million cumecs
	Mean Annual Runoff	1.30 Lac Hect. Mt.
c	Reservoir	
	Maximum Reservoir Level	El 368.50 m
	Full Reservoir Level	El 367.28 m (New 363.28 m)
	Dead Storage Level	El 330.10 m
	Dead Storage	0.21 Lac Hect. Mt.
	Live Storage	0.96 Lac Hect. Mt.
	Gross Storage at F.R.L	1.17 Lac Hect. Mt.
	Reservoir area at MWL	7120 feet
d	Masonry cum Concrete Dam	
i	Spillway Portion	
	Length of Spillway including piers	163 m
	Clear Waterway 9 x 15 M	135 m
	Total Width of piers 8 x 3.5 M	28 m
	No. of Spillway blocks including abutment	9 Nos of 18.5 M each

	No of Spillway	9 Nos of 15 M each
	Type of spillway buckets	Ski-jump
ii	Non-Spillway Portion	
	Left side (length)	102 m in 5 ½ blocks
	Right side (Length)	78 m in 4 ½ blocks
iii	Common	
	Top level of dam	El 372.0 m
	Height of dam from lowest river bed	67.86 m
	Bottom width at maximum spillway section	73.74 m
	Top width of dam	8.75 m
	Total length	343 m
	Instruments	190 numbers
iv	Outlet works	
	Construction Sluices	2 Nos. of 2.5 m X 3 m each
	Low level sluices	2 Nos. of 2 m X 3 m each
	Irrigation sluices	4 Nos. of 2 m X 3 m each
	Average discharge	20 cu.Mt./second for each
v	Gates	
	Construction sluice gates	2 Nos. of 2.5 m X 3 m
	Low level sluice gates	2 Nos. of 2 m X 3 m
	Irrigation sluice gates	9 Nos. of 2 m X 3 m
	Average discharge	9 Nos. of 15 m X 15 m
e	Right Masonary cum concrete Dyke	
	Total Length	278 m
	Maximum height	36.00 m
	Instruments	69 numbers
f	Right Earthen Dyke	

	Total length	270 m
	Average height	16.50 m
g	CCA	
	CCA in Bihar	111800 Ha
	CCA in Jharkhand	12470 Ha
	Total CCA	124270 Ha

3.5.1 Common Components of the Project for Inter-State Consideration

Both the Governments of Bihar and Jharkhand agree that common components of the Project shall be a joint project. The common components of the joint projects are as follows (Source: MoU):

Unit I – Dam

- a. All associated balance Civil and Mechanical works viz. Dam, Spillway and Gates etc.
- b. Balance land Acquisition and Rehabilitation & Resettlement works, Environmental & Ecological works including Cost of transfer of non-forest land and compensatory afforestation.
- c. Cost of land acquisition and the cost of Resettlement and Rehabilitation of the project affected people associated with common components of the projects.

Unit II – Barrage

All associated balance civil and mechanical works pertaining to Barrage etc.

Unit III – Distribution

The common carrier canal off taking from Mohammedganj barrage upto the border of Jharkhand with Bihar and the structures of this carrier canal.

3.5.2 Main Components of the scheme and their present status

DAM (Masonry + Concrete) :	100%
Spillway :	100%
Gates :	NIL

Barrage	:	95% complete (Only casting of deck slabs of barrage remaining out of 40 slabs)
Right Main Canal	:	100%
Distribution System (Right Main Canal)	:	40%
Left Main Canal	:	50%
Distribution System (Left Main Canal)	:	NIL

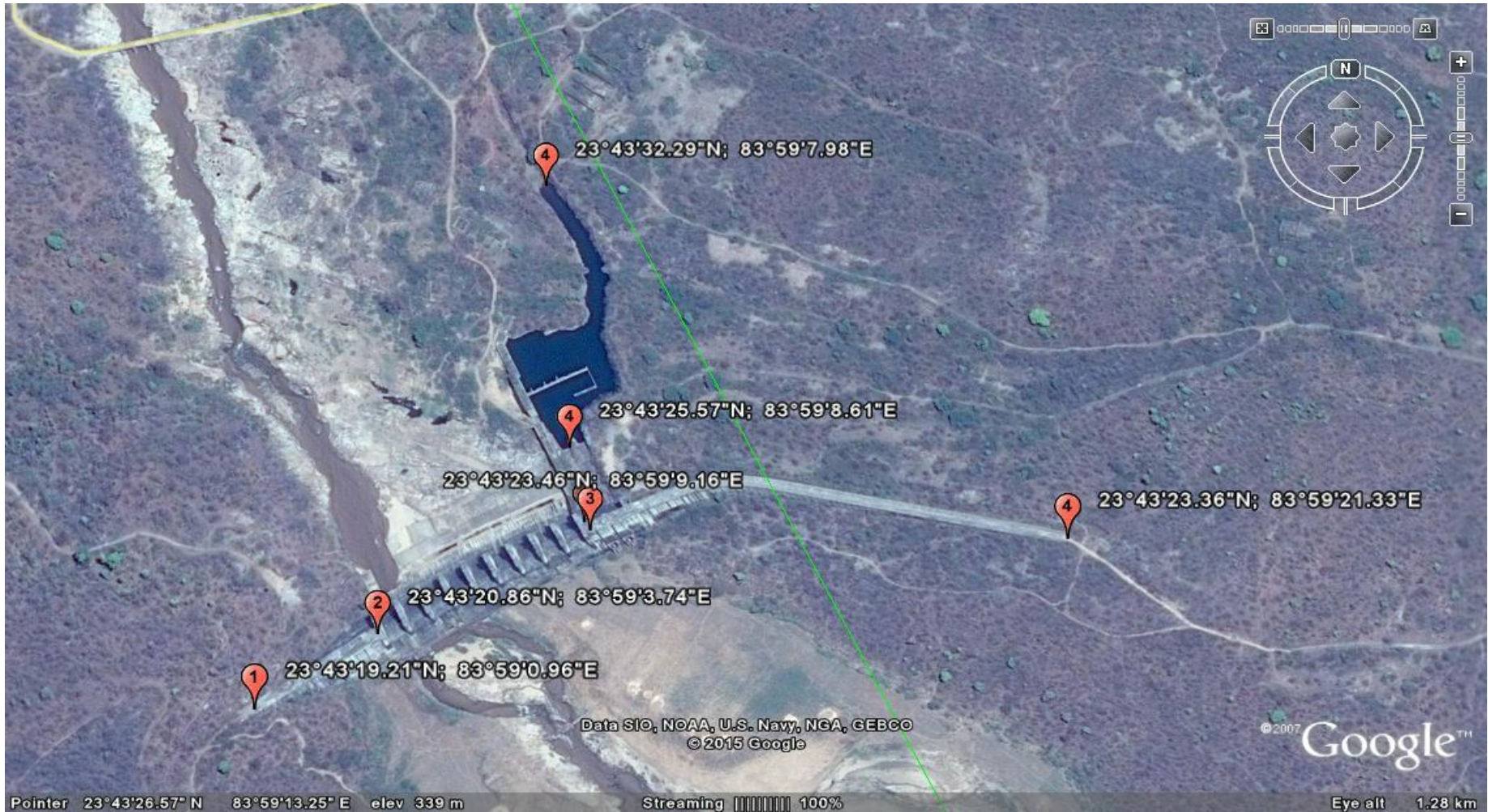


Figure 4: Schematic Diagram of North Koel Project (adopted from Google)

3.6 Raw Material Required Along With Estimated Quantity, Likely Source, Mode of Transport of Raw Material

Enormous quantities of construction material viz. fine aggregate, coarse aggregate, cement and steel etc. would be required for various project components, i.e., dam, Ducts and open channel Structures. Material like coarse and fine aggregates can be obtained within an average distance of 10 km from project area. With the communication links available, it should be possible to arrange for early start of supply of other materials like cement and steel.

3.7 Resource Optimization/recycling and reuse envisaged in the project

To optimize the construction and use of the project, both the Governments of Bihar and Jharkhand agree that:

- i. The installed capacity of power generation at the Dam shall be 24 MW (2 X 12 MW).
- ii. The power generated shall be shared between the States of Bihar and Jharkhand in the inverse proportion to the ratio of CCA.

3.8 Availability of Water Its Source, Energy / Power Requirement & Source Water requirement

Both the Governments of Bihar and Jharkhand agree that the 75% dependable water availability of the river system at the North Koel Reservoir is 987 MCM (0.82 MAF).

1. 987 MCM (0.82 MAF) available water shall be shared between the States of Bihar and Jharkhand in proportion to the irrigation and M&I (Municipal & Industrial) benefits derived.
2. There will be some years in which the actual inflows will be in excess or in deficit. The Governments of Bihar and Jharkhand agree in principle that the excess or deficit based on 10 – daily requirement shall also be shared by these two States in proportion to the irrigation and M&I benefits derived.
3. The State of Jharkhand shall have the right for development of aquaculture and Lift Irrigation from the reservoir without affecting the regulation and life of the dam. These shall be extended to the oustees settled near to the fringe line of the reservoir.

4. The Govt. of Jharkhand shall have the right for the development of tourism, recreational activities and also drinking water purposes for riverain from the free catchment in between Kutku Dam and Mohammadganj Barrage.

3.8.1 Power requirement

Construction power requirements will be met by existing transmission networks in the nearby areas and DG sets, which will be useful during O&M stage for providing starting power in case of grid failure.

3.9 Quantity of Wastes to Be Generated (Liquid and Solid) and Scheme for Their Management/ Disposal

A large quantity of muck is likely to be generated as a result of construction activities. The field investigation is underway and expected quantity of muck generated from the major activities of the project shall be furnished along with a comprehensive muck management plan during preparation of EIA, EMP reports of the project. The muck will be disposed in the low-lying areas along North Koel River and other small nallas/rivulets that falls outside the forest area.

3.10 Schematic representations of the feasibility drawing which give information of EIA purpose

Detailed schematic representations of the feasibility covering the purpose of EIA will be given in the **Annexure VII**.

4. SITE ANALYSIS

4.1 Connectivity

The dam can be reached by the existing road from Medninagar. The nearest railway station is at Barwadih which is 35 KM away from the dam site. The airport in Ranchi district is 150 km from the project site.

4.2 Landform, Land use & Land Ownership

The Mandal dam falls in the area of Palamau Tiger Reserve which is land of Forest department of Palamau Division. About 119 sqkm of the forest of Palamau Tiger Reserve will be submerged. As the project falls in one of the forest rich states, significant amount of Forest land is to be acquired. The exact land ownership will be worked out during Forest and Wildlife clearance.

4.3 Topography

The Palamau division generally lies at a lower height than the surrounding areas of Chota Nagpur Plateau. On the east the Ranchi plateau intrudes into the division and the southern part of the division merges with the Pat region. On the west are the Surguja highlands of Chhattishgarh and Sonbhadra district of Uttar Pradesh. The Son River touches the north-western corner of the division and then forms the state boundary for about 72 kilometres. The general system of the area is a series of parallel ranges of hills running east and west through which the North Koel River passes. The hills in the south are the highest in the area, and the picturesque and isolated cup-like Chhechhari valley is surrounded by lofty hills on every side. Lodh Falls drops from a height of 150 metres from these hills, making it the highest waterfall on the Chota Nagpur Plateau. Netarhat and Pakripat plateaux are physiographically part of the Pat region (source: wikipedia).

4.4 Existing Land use Pattern

As most of the project components are already constructed, the existing land use can be defined as the Waterbody. The submergence area of the project after closure of Gates will fall in the area of Palamu Tiger Reserve. Almost 30 villages are to be relocated from their existing place, their existing land which is currently agricultural and habitat land will be submerged and may become waterbody.

4.4.1 Environmental Sensitivity

S.No.	Sensitive Ecological Features	Name	Approximate Aerial Distance (in km.) from the project boundary
1.	Forests	1. Latehar Forest	0 KM as the project is located in the Latehar Range
		2. Protected Forest, Barichastan	14 KM in NNE of Mandal Dam
		3. Daltonganj Hill Forest	3.5 KM, NW of Mandal Dam
2.	National Park/Wildlife Sanctuary	--	--
3.	Tiger Reserve/Elephant Reserve / Turtle Nesting Ground	Palamu Tiger Reserve (PTR)	The Mandal Dam and its submergence area fall in the PTR.
4.	Core Zone of Biosphere Reserve	--	--
5.	Habitat for migratory birds		
6.	Lakes/Reservoir/Dams	--	--
	Stream/Rivers	Burha River	1.3 KM, u/s of the Mandal dam
	Estuary/Sea		
7.	Mangroves	--	--
8.	Mountains/Hills	Chhota Nagpur Plateau	The project falls in the Plateau.
9.	Notified Archaeological sites	--	--
10.	Industries/Thermal Power Plants	--	--
11.	Defense Installation	--	--
12.	National / State Highways	SH-03	0.50 KM North

Environmental Sensitive map is attached as **Annexure VIII**

4.5 Existing Infrastructure

Most of the project work is complete i.e. dam, barrage and main canals. The status of existing infrastructure of the project is as follows:

DAM (Masonry + Concrete) : 100%

Spillway : 100%

Gates : NIL

The dam drawing is attached as **Annexure IX**.

Barrage	:	95% complete (Only casting of deck slabs of barrage remaining out of 40 slabs)
Right Main Canal	:	100%
Distribution System (Right Main Canal)	:	40%
Left Main Canal	:	50%
Distribution System (Left Main Canal)	:	NIL

4.6 Soil Classification

The soil of the project area is (37) which is shallow, well drained, loamy soils on gently sloping undulating plateau with loamy surface texture and severe erosion associated with deep, moderately well drained fine soils with loamy surface texture and moderate erosion.

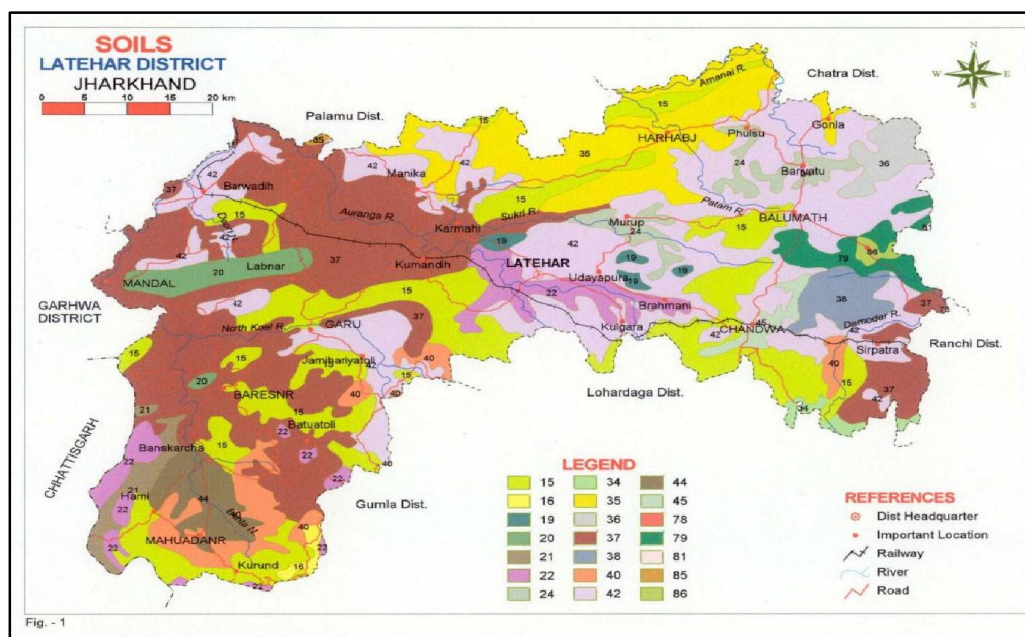


Figure 5: Soils of district Latehar (Source: <http://www.sameti.org>)

4.7 Climatic data from Secondary sources

The Chota Nagpur Plateau has an attractive climate. For five to six months of the year, from October onward the days are sunny and bracing. The mean temperature in December is 23 C

(73 F). The nights are cool and temperatures in winter may drop below freezing point in many places. In April and May the day temperature may cross 38 C (100 F) but it is very dry and not sultry as in the adjacent plains. The rainy season (June to September) is pleasant. The Chota Nagpur Plateau receives an annual average rainfall of around 1,400 millimetres (55in), which is less than the rain forested areas of much of India and almost all of it in the monsoon months between June and August.

4.8 Social Infrastructure

Latehar is predominantly a tribal district with almost 45.54% of the population belonging to the schedule tribes and more than 66 % of total population comprises SCs and STs. The total area of the district is 3,622.50 Sq. Km and one of the block headquarters is more than 200 K.M. away from the district headquarters. There are nine Community Development Blocks in the district within which distantly located villages are scattered amidst the dense forest, hilly terrains and agricultural fields. The number of Scheduled Castes and Scheduled Tribes is predominantly high here and Latehar comes under Tribal Sub Plan Area.

As per 2011 census, various abstract data is shown below:

Table 4: Population and Sex Ratio of the Latehar District (Source: NIC)

S.N.	Block	No. of Household	Population			Sex Ratio	Population 0 - 6			Sex Ratio 0-6
			Male	Female	Total		Male 0-6	Female 0-6	Total 0-6	
1	Latehar	2,1742	59,281	58,233	1,17,514	982	11,349	10,989	22,338	968
	Latehar NAC	5,315	14,152	12,829	26,981	907	2,120	1,897	4,017	895
2	Chandwa	19,232	54,168	52,485	1,06,653	969	10,234	9,938	20,172	971
3	Balumath	15,972	45,313	43,699	89,012	964	8,551	8,163	16,714	955
4	Manika	16,185	44,923	43,172	88,095	961	9,046	8,840	17,886	977
5	Garu	5,905	15,227	15,047	30,274	988	3,179	3,123	6,302	982
6	Barwadih	19,127	50,556	48,436	98,992	958	9,704	9,405	19,109	969
7	Mahuadanr	13,543	37,915	36,817	74,732	971	6,137	5,816	11,953	948
8	Bariyatu	10,381	30,359	29,736	60,095	979	5,999	6,050	12,049	1,009
9	Herhanj	5,979	17,772	16,858	34,630	949	3,652	3,507	7,159	960
Total		1,33,381	3,69,666	3,57,312	7,26,978	967	69,971	67,728	1,37,699	968

Table 5: Scheduled Cast & Scheduled Tribe Population (Source: NIC)

S.N.	Block	Total Population	Scheduled Cast				Scheduled Tribe			
			Male	Female	Total	%	Male	Female	Total	%
1	Latehar	1,17,514	9,644	9,429	19,073	16.23	29,496	29,551	59,047	50.25
	Latehar NAC	26,981	2,626	2,542	5,168	19.15	1,389	1,436	2,825	10.47
2	Chandwa	1,06,653	13,101	12,951	26,052	24.43	22,191	22,032	44,223	41.46
3	Balumath	89,012	10,877	12,235	21,535	24.19	12,226	12,075	24,301	27.30
4	Manika	88,095	10,299	9,900	20,199	22.93	22,079	21,455	43,534	49.42
5	Garu	30,274	761	714	1,475	4.87	12,048	12,151	24,199	79.93
6	Barwadih	98,992	10,117	9,775	19,892	20.09	25,619	25,213	50,832	51.35
7	Mahuadanr	74,732	1,198	1,196	2,394	3.20	29,604	29,198	58,802	78.68
8	Bariyatu	60,095	12,233	12,235	24,468	40.72	7,433	7,366	14,799	24.63
9	Herhanj	34,630	7,410	7,244	14,654	42.32	4,342	4,192	8,534	24.64
Total		7,26,978	78,266	76,644	1,54,910	21.31	1,66,427	1,64,669	3,31,096	45.54

5. PLANNING BRIEF

5.1 Planning Concept (type of industries, facilities, transportation etc) town and country planning/development authority classification

The project is an irrigation project comes under the purview of Water Resources Department, District Latehar, Jharkhand. It involves construction of Dam at Kutku, two main canals and distributor network. There is a high power committee to look after the progress in the various components of the projects i.e. progress in the investigation survey, progress in the Environmental Clearance work. The proposed project for Environmental Clearance will be headed by Executive Engineer, WRD, Medninagar.

Both the Governments of Bihar and Jharkhand agree that the remaining works of the common components of North Koel Reservoir Project i.e. a dam across River North Koel near Kutku and a Pick-up barrage near Mohammadganj in Palamau District, Jharkhand, shall be constructed, operated and maintained under the overall guidance of a two-tier Committees constituted for the purpose and the benefits derived thereupon to be shared between the States of Bihar and Jharkhand. The common components of the project shall be constructed by the concerned department of Government of Jharkhand as a deposit work and its cost can be shared between the States of Bihar and Jharkhand in proportion to the irrigation benefits and other uses as per DPR to be derived by them from this project. The State of Bihar shall deposit its share, as per the approved programme of implementation, to the state of Jharkhand at the beginning of every quarter of the financial year. However, the construction & maintenance work of the incomplete canals other than the common components of the Project and distribution network falling in the jurisdictions of the respective States, shall be carried out by themselves from their own funds.

5.2 Population Projection

The project envisages negligible increase in population during construction and operation phase of the project as most of the project work is almost over. To complete the job, local people will be preferred based on the job requirement.

5.3 Land use planning

Due to installation of gates, the impounded water in the upstream would be available for the use of wildlife of Palamau Tiger Reserve. Area of submergence, after receding of water, may develop into grassland and would benefit the herbivore population of the Tiger Reserve.

5.4 Assessment of Infrastructure Demand (Physical & Social)

As per the reconnaissance survey conducted till present, improvement in the health and education is envisaged. The state is considered among one of the backward states of India, a detailed and comprehensive infrastructure development plan shall be prepared as per the ToR granted by MoEF&CC for conducting the EIA studies and preparation of various management plan for EMP.

5.5 Amenities/Facilities

Proper site services such as First Aid, Canteen / Rest Shelter, Drinking Water, etc. will be provided to the construction workers. Various facilities to be provided during construction and operation of the project are as follows:

1. Electricity shall be provided by transmission lines and DG sets.
2. Drinking water will be provided to the workers by Tankers during construction.
3. To provide the first aid for any sort of injuries encountered during the mining operation, one small first aid room shall be provided. First aid kit and sufficient stock of material / medicines needed for first aid shall be provided as per requirement.
4. In future if women workers are employed, arrangement for a small crèche shall be made as per the requirement.
5. Necessary arrangement shall be made for conducting refresher course as laid down in vocational training rules to upgrade skills of the persons involved in the project.

6. PROPOSED INFRASTRUCTURE

6.1 Industrial Area (Processing Area)

The project works are planned to be awarded on contract. The earth moving and other equipment required for the works are to be procured and maintained by the Contractors. The project will have at its disposal only small and minimum equipment required for support services, maintenance of transports for project personnel and power house. As such, small workshops are planned for repair and maintenance purpose only. Besides workshops, construction of explosive magazine, warehouse or storage area for cement, steel and other construction material are envisaged.

6.2 Residential Area (Non Processing Area)

To facilitate project construction, residential and office facilities would require to be created, keeping in mind the facilities required during O&M stage also. For this a residential complex and a main office complex may be constructed at Kutku Village. In addition to this, to facilitate construction activities, site offices at dam, reservoir, offtake points are proposed. Provision for offices and residences shall be made in accordance with organization chart proposed for Operation & Maintenance. Colonies for labours and construction facilities are to be developed by the contractors at project site for which specific clause/clauses would be stipulated in the contract documents. The existing residential buildings and offices being used by the water resource department have also been considered while proposing accommodations to be provided during construction and O&M stage.

6.3 Green Belt

The construction of project components will require forest land along with other government and private land; hence a compensatory afforestation is proposed to compensate the loss of forest land. However, it is also proposed to develop greenbelt around the periphery of various project components. Detailed greenbelt plan will be prepared as per the guidelines published by CPCB 2000 during preparation of EIA/EMP studies. The proposed greenbelt plan will be in line with the following features:

1. Plantation of local and indigenous plants and shrubs.
2. Plantation of trees on both sides of the project roads.

3. Plantation of trees and shrubs those are economically important and of soil binding in nature.
4. Provision of bamboo sticks around the small trees and fencing all along the greenbelt.

6.4 Social Infrastructure

Any habitation established on remote area is usually lack of the facilities habitation on the flat plains enjoys. Lack of infrastructure, unemployment, poor roads, scarcity of medical and educational facilities and dependency on the woods for fuel are some of the major problems, people faces daily. Hence, it is proposed to initiate and/or rejuvenate awareness and training programs to strengthen the education and medical facilities, to provide equal job opportunities and to provide a better livelihood with sustainable development.

6.5 Connectivity

The dam can be reached by the existing road from Medninagar. The nearest railway station is at Barwadih which is 35 KM away from the dam site. The airport in Ranchi district is 150 km from the project site.

6.6 Drinking Water Management

Being an irrigation project, the water demand for the domestic purpose during construction phase is very negligible as compared to project operation phase. This demand will be met by providing water through tankers at the construction site. During operation phase, the water demand for irrigation purpose will be taken from the Kutku dam. During O&M, the potable water & water required for sanitary drainage shall also be taken from reservoir constructed.

6.7 Sewerage System

The project proponent will provide sufficient numbers of soak pits and toilets for the labour camp and residential complexes along with a provision of STP of adequate capacity. Sewage collected from these areas will be treated in the STP before final disposal into the river.

6.8 Industrial Waste Management

Muck generated from the construction activities will be used as aggregate for construction to the maximum possible extent, if found suitable from laboratory tests. The balance muck will be dumped in a proper manner with due compaction in layers in the designated dumping

areas. Further, after completion of excavation works of the major components, the dump areas will be covered with vegetation and side slope with or stone pitching so as to minimize rain cut/soil erosion thus making the slope stable. The generated muck to some extent will be useful for the construction of roads, land development of low-lying areas, aggregate for concrete work etc.

6.9 Solid Waste Management

Apart from muck generation, other material i.e. scraps; inert concrete waste and plastic waste generation is envisaged. These waste materials will be separated at source and then collected in suitable bins. Covered trucks shall be put in place for collection of these waste from different locations and transfer it to disposal site. Various disposal options i.e. landfill waste to energy or incineration etc are available. This will be studied in detail during preparation of EIA/EMP report.

6.10 Power Requirement & Supply/ Source

Construction power requirements will be met by existing transmission networks in the nearby areas and DG sets, which will be useful during O&M stage for providing starting power in case of grid failure.

7. REHABILITATION AND RESETTLEMENT (R&R) PLAN

Seventeen villages will be submerged due to closure of dam. Another 13 villages are likely to be landlocked and resettlement of these would also be required. A detailed Resettlement & Rehabilitation plan shall be formulated based on the National R&R Policy (NRRP) 2007, GoI for project affected families (PAFs). Compensation to the PAFs whose land will be acquired for this project will be given as per the Land acquisition act 2013. Identification of vulnerable persons, PAFs and the relevant compensation package will be studied in detail during preparation of EIA & EMP reports.

8. PROJECT SCHEDULE & COST ESTIMATES

8.1 Likely Date of Start of Construction and Likely Date of Completion

The work has been pending since the year of 1995. Once started, the remaining work is likely to be complete within 27 months from its commencement..

8.2 Estimated Project Cost Along With Analysis In Terms Of Economic Viability of the Project

Both the Governments of Bihar and Jharkhand recognize that major share of water available is allocated to the State of Bihar and Hydropower generated to the State of Jharkhand, hence the sharing of cost on civil works and hydropower generation need not be the same and the total cost considered for sharing shall be the balance cost of common components of the project as referred in **Annexure-I** on the date of signing of the MoU. The sharing of cost of civil works and hydro-power generation shall be as follows:

- a. The total capital cost of balance Civil and Mechanical Works in Unit 1-dam shall be shared in the ratio of CCA referred above and its operation and maintenance cost shall be shared between the States of Bihar and Jharkhand in the proportion of the irrigation and M&I benefits derived by the respective States based on the storage utilization.
- b. The cost of Land Acquisition and Resettlement and Rehabilitation of the Oustees from the reservoir area shall be done as per the National/Jharkhand Rehabilitation policy and cost to be shared in the ratio of CCA.
- c. The total cost of civil and mechanical works in Unit II-Barrage and its operation & maintenance cost shall be shared between the States of Bihar and Jharkhand in the proportion of the benefits derived by the respective States on CCA consideration.
- d. The total cost of the balance civil works in common carrier canal Unit III- canal and its operation & maintenance cost shall be shared between the States of Bihar and Jharkhand on cusec-mile basis.
- e. Since the hydropower generation shall involve operation of irrigation water, a percentage of expenditure on Unit I dam will be re-imbursed from the hydropower generating agency. This percentage shall be in the ratio of Irrigation water utilization for power

generation divided by Water utilization for irrigation purposes. Accordingly, this reimbursed amount shall be distributed between the states in proportion to the cost sharing as indicated above.

As the project has been pending for more than two decades, the cost of the project has been revised several times. The fifth time revised cost of the project is estimated around 1289.50 crores, and the same has been yet to be approved by CWC. Around 750.0 crores INR has been spent on the project.

9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

9.1 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 such as construction, sizing (sieving) transportation and plantation activities. The job and emoluments will be decided on the basis of qualification and experience of the people. Due to their involvement of this multipurpose project, skills of the person involved in this project will be enhanced significantly which will help them in uplifting their living standard. Various project activities will also provide a good opportunity for small business at local level.

The benefits of closure of the gates of dam are as follows (ref.STRIPES Sep-Oct 2011):

1. Irrigation benefit to roughly 1, 11,800 ha of agricultural land in Aurangabad and Gaya districts of Bihar and 14,790 ha in Jharkhand.
2. The project would also be helpful in providing drinking water to the people and water for industrial use.
3. The project would also generate 24 MW hydro-electric power.
4. The impounded water would be available for the use of the wildlife of the Palamau Tiger Reserve.
5. Area of submergence, after receding of water, may develop into grassland and would benefit the herbivore population of the Tiger Reserve.