

Bihar Kosi Flood Recovery Project

**Environment
and
Social Management Framework**

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**Bihar Disaster Rehabilitation and Reconstruction Society
(BDRRS)**

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Abbreviations

BDRRS	Bihar Disaster Rehabilitation and Reconstruction Society
BKFRP	Bihar : Emergency Kosi Flood Recovery Project
BRLP	Bihar Rural Livelihoods Project
DoEF	Department of Environment and Forests, Govt. of Bihar
DPR	Detailed Project Report
EA	Environment Assessment
EMP	Environment Management Plan
ESMF	Environment and Social Framework
GoB	Government of Bihar
GoI	Government of India
IDA	International Development Association
MoEF	Ministry of Environment and Forests, Govt. of India
ODRC	Owner Driven Reconstruction Collaborative
OP	Operational Policy (of World Bank)
PMU	Project Management Unit
RAP	Resettlement Action Plan
SA	Social Assessment
SC	Scheduled Caste
SPCB	State Pollution Control Board
ST	Scheduled Tribe
WB	The World Bank

Chapter 1 : Introduction

1.1 Project Background

On August 18, 2008, the Kosi River burst through its eastern embankment, 13 km upstream of the Kosi barrage in Nepal, 8 km north of the Indian border. This created major flooding in Bihar and Nepal. In Bihar, the flood catastrophe triggered one of the largest evacuation operations, with over 1,000,000 people evacuated, and about 460,000 persons accommodated in 360 relief camps. Significant damages to infrastructure including housing, rural roads, culverts and bridges as well as loss to livelihoods due to sand casting on agricultural land have been reported.

Although the flood event occurred in August 2008, there has not been any significant reconstruction till date. Reconstruction and recovery needs are still enormous and have remained largely unfulfilled due to lack of adequate financial support. In the absence of adequate and immediate reconstruction efforts, many households have had to abandon their land and relocate to neighboring areas. Therefore, it is urgent to restore the livelihoods of flood affected communities and to mitigate the risk of future floods in the Kosi affected districts of Bihar, including reconstruction of infrastructure damaged during August 2008 disaster.

The proposed 'Bihar: Kosi Flood Recovery Project' (BKFRP) will help finance the costs associated with helping the recovery of the areas affected by the Kosi flood and will support the efforts of the Government of Bihar in reviving the livelihoods of the affected people.

1.2 Project Objectives

The objective of the proposed project is to support the efforts of the Government of Bihar in helping communities recover from the impacts of the flood and reduce vulnerability from natural disasters by:

- 1) Reconstruction of houses that are earthquake and flood resistant
- 2) Enhancing connectivity by building and repairing roads and bridges
- 3) Strengthening flood management capacity in Kosi Basin and
- 4) Building social and financial capital by expanding livelihoods opportunities.

1.3 Project Components

A phased approach is being adopted for the Kosi Flood Rehabilitation and Reconstruction Programme. The first phase of the project is being processed as an emergency operation to provide focused support to Bihar's re-construction efforts in the short term. A programme for successive phases will be developed to support the state's long term needs on over-all disaster management, in particular for flood risk management.

The first phase of the project has been prepared in accordance with the World Bank's Operational Policy 8.50, Emergency Recovery Assistance, to expedite processing and provide immediate support through an International Development Association (IDA) credit of US \$ 220 million.

It has the following six components:

- 1) Owner Driven Housing Reconstruction
- 2) Re-construction of Roads and Bridges
- 3) Sustainable Flood Management
- 4) Improving Emergency Response Capacity
- 5) Livelihood Restoration and Enhancement and
- 6) Project Management, Implementation Support and Technical Assistance.

A short description of objectives and activities envisaged under each of the said components is given below:

1) Component A : Owner Driven Housing Reconstruction

The objective of this component is to reconstruct the damaged houses and reduce the vulnerability of the population from natural disaster risks. The component outcome is expected to result in reduced flood, windstorm and earthquake related vulnerability for about 1,00,000 households, whose houses will be reconstructed under the project. Using an owner driven reconstruction model, houses will be built with a brick and concrete plinth, bamboo superstructure and CGI sheet roofing.

2) Component B : Re-construction of Roads and Bridges

The objective of this component to restore the connectivity lost due to the Kosi floods by reconstruction of damaged roads and bridges, including construction of some new bridges that are required to restore the breaches due to creation of new streams and provide for bridges that were required but hadn't been constructed earlier, primarily on account of fund non-availability. The project under this component proposes reconstruct 90 bridges and culverts on the State Highways and Major District Roads and about 320 km of rural roads reconstruction across the flood affected districts, benefitting about 2.2 million people.

3) Component C : Sustainable Flood Management

The component will focus on strengthening the over-all flood forecasting and flood and erosion management capacity in Bihar by enhancing the knowledge, understanding and capacity of flood and sediment management. This will be achieved by implementing both structural and non-structural measures, mainly focusing on the Kosi River Basin, but with several activities benefiting flood management in the state as a whole. The component has three sub-components: (i) knowledge management and capacity building; (ii) flood forecasting and early warning; and (iii) structural investments.

4) Component D: Improving Emergency Response Capacity

Under this component, contingency funding will be provided for civil works, consultant services and goods required to respond in a case of future emergencies. The detailed investments will depend on the nature, location and priority needs of the specific emergency. In addition, the component allows the financing of public and private sector expenditures directly related to the Emergency Recovery Program.

5) **Component E: Livelihood Restoration and Enhancement**

The objective of the component is to build social and financial capital and expand the livelihood opportunities of the affected population. There is an on-going World Bank funded 'Bihar Rural Livelihood Project' (BRLP - JEEVIKA) in Bihar. JEEVIKA will be the implementing agency for this component and its existing models will be used for expansion of activities into 11 blocks¹ in the districts of Madhepura, Supaul and Saharsa.

As in JEEVIKA, this component will have four sub-components: (i) Community Institution Development; (ii) Community Investment Fund; (iii) Technical Assistance Fund; and (iv) Project Management. In all, 1,60,000 households are being targeted under this component. The expected outcome includes: expanded livelihood options, enhanced incomes and reduced debt levels for the at least 80 percent of the targeted households.

6) **Component F : Project Management and Technical Assistance**

The component's objective is to support project implementation through provision of necessary offices, including equipment and financing of associated incremental cost of team of the Project Management Unit at state level and its representative offices in the districts, support units for housing reconstruction, nodal units of various Implementing Agencies and the training and exposure visits of project staff.

This component would also finance the cost of related consulting services for design, planning and implementation support; management; quality, financial and third party audits and; evaluation and monitoring. The financial support for the component will also include technical studies and other project preparation expenses that may be required for the preparation of the Phase II of the project.

1.4 Purpose of Environment and Social Management Framework (ESMF)

The implementation of project components will include significant amount of reconstruction work and thus has a potential to trigger adverse environment and social impacts in the process. In order to deal with such unwarranted impacts, preparation of an Environmental and Social Management Framework (ESMF) for the project has been undertaken.

From a narrower project-specific perspective, the ESMF has been prepared in consideration of the emergency nature of the proposed rehabilitation and reconstruction operations, while incorporating the principles of due diligence in managing potential environmental and social risks.

Although the general thrust and broad project interventions are well understood, the specific details pertaining to planning and design of multiple sub-projects that the project envisages to support, will be known only later. In such a situation, where multiple sub-projects will be located across the five flood affected districts, the approach for an ESMF preparation has been adopted for the proposed project.

¹ **Madhepura:** Muraliganj, Madhepura, Biharganj, Gwalpara, Udakishanganj; **Supaul:** Basantpur, Pratapganj, Tribeniganj; **Saharsa:** Saurbajar, Patharghat, Sonebaser.

The framework describes the principles, objectives and approach to be followed in avoiding, minimizing and mitigating the adverse environmental and social impacts that are likely to arise as a result of the implementation of the various reconstruction activities under the Bihar: Kosi Flood Recovery Project.

The framework details out the various policies, guidelines and procedures that need to be integrated during the planning, design and implementation cycle of the Bank-supported project for recovery and reconstruction activities in the districts affected by Kosi floods in the state of Bihar. It also outlines the indicative management measures required to effectively address or deal with the key issues that have been identified. The required institutional arrangements for implementing the ESMF have also been outlined as a part of this framework.

1.5 Objectives of Environment and Social Management Framework

Good environmental and social management practices are essential and integral elements of sound project preparation and implementation. These are even more important in the context of a reconstruction scenario, where additional criteria must be considered, such as enhancing hazard risk management and strengthening natural resilience to climatic and natural events. The application and implementation of the ESMF therefore, is an attempt to respond to the needs of the reconstruction and the opportunity provided by it, and seeks to:

- 1) Support the integration of environmental and social aspects into the decision making process of all stages related to planning, design, execution, operation and maintenance of sub-projects, by identifying, avoiding and/or minimizing adverse environmental and social impacts early-on in the project cycle.
- 2) Support displaced persons in their efforts to restore their livelihoods and living standards and compensate any loss of livelihood or assets that may occur due to project execution
- 3) Enhance the positive/sustainable environmental and social outcomes through improved/ sensitive planning, design and implementation of sub-activities.
- 4) Minimize environmental degradation as a result of either individual sub-projects or through their indirect, induced and cumulative effects.
- 5) Protect human health and
- 6) Minimize impacts on cultural property.

The implementation of the ESMF will also support and assist with the achievement of compliance with applicable laws and regulations and with the relevant Bank policies on environment and social aspects.

1.6 Application of the ESMF

The ESMF framework needs to be integrated into the preparation and implementation stages of the various project components. It is an essential ingredient aligned with the project/sub-project activities and is to be followed through the entire project cycle from planning, including site identification; design; implementation and operation/maintenance. Specific steps that need to be followed to ensure environment and social management have been explained in detail in Chapter 5 and 6 respectively.

1.7 Revision/Modification of the ESMF

The ESMF will be an 'up-to-date' or a 'live document' enabling revision, when and where necessary. It is possible that certain aspects not envisaged at this stage of the project preparation are not included or covered in sufficient detail within this document. Unexpected situations and/or changes in the project or sub-component design would therefore be assessed and appropriate management measures will be incorporated by updating the ESMF. Such revisions will also cover and update any changes/modifications introduced in the legal/regulatory regime of the country/ state. However, under normal circumstances, the ESMF will be reviewed once in every year and during the mid-term review cycle of the project to assess the need for updating/revision.

Also, based on the experience of application and implementation of this framework, the provisions and procedures would be updated/modified as appropriate in consultation with the World Bank and the line agencies/departments.

1.8 Limitation of the ESMF

This Environment and Social Management Framework has been developed in line with applicable World Bank's Operational Policies (OPs) and is based on the national and state laws and regulations, as applicable at the time of preparation of this document. Any proposed modifications in the laws, regulations or guidelines that were notified as 'draft' at the time of preparation of this document have not been considered.

Chapter 2: Environment and Social Setting

This chapter provides an overview of the environmental over-view of the Kosi basin and the social setting across the five flood affected districts, where investments under the Bihar: Kosi Flood Recovery Project are being proposed.

2.1 State Profile

Bihar is the most flood-prone state of India, which itself is among the most flood-prone countries in the world. According to the historical data, 16.5 percent of the total flood-risk area of the country and 22.1 percent of the flood-risk population in India lives in Bihar. About 73 percent of the state's total geographical area is at risk from perennial floods. Recurrent floods account for thousands of human lives and livestock and have wiped out assets worth millions. In addition, the region is at-risk from geo-morphological risks as it largely falls in seismic Zone IV and V.

Northern part of Bihar is hydro-logically fragile as it is the junction where snow-fed rivers originating in the Himalayas and carrying heavy discharge of water and silt lose gradient, slow down, inundate and cause siltation as they flatten out in the plains. As the gradient is gradually increasing due to tectonic movements in the nascent mountains in sub-Himalayan Tibet and Nepal, this is bound to exacerbate over the years. About 76 percent of the population in North Bihar lives with the recurring risk of floods.

Economy of Bihar

The economy of Bihar is largely service oriented, but also has a significant agricultural base. The state has a small industrial sector. In 2008, agriculture accounted for 35%, industry 9% and service 55% of the economy of the state. Manufacturing sector performed very poorly in the state in the period 2002–2007, with an average growth rate of 0.38% as compared to India's 7.8%. Bihar has the lowest GDP per capita in India but there are pockets of higher per capita income - Patna, the capital city, has a per capita income greater than that of Bangalore or Hyderabad. The GSDP today stands at Rs 1124.24 billion (\$21 billion nominal GDP). The current annual growth in GSDP is 11.44 percent and per capita GSDP is Rs.10,415. In actual terms, Bihar state GDP is ranked 14th out of 28 states in 2008.

There is a North-South chasm in income distribution. Southern districts of Patna, Munger and Begusarai have far larger income profiles than the North Bihar districts which also suffer from chronic disasters. This explains why the per capita income of Bihar is \$ 148 against an all-India average of \$997, in spite of pockets of prosperity. 30.6 percent of Bihar's population lives below the poverty line against the all-India figure of 22.15 percent. The level of urbanization at 10.5 percent is far below the national average of 27.78 percent. Even with low urbanization, urban poverty in Bihar stood at 32.91 percent as compared to the national average of 23.62 percent.

Between 1999 and 2008, state GDP grew by 5.1 percent a year compared to the national average of 7.3 percent. However, in January 2010, the Indian government's Central Statistics Organization reported that in 2004-09, Bihar's GDP grew by 11.03 percent, making it the second fastest growing economy among Indian states, marginally behind Gujarat's growth of 11.05 percent. However, the perennial flood-risk erodes a substantial part of the growth in GSDP and also depletes human capital. The economic growth and

sustainable development are very fragile and require long-term measures to reduce vulnerability from exogenous shocks created by natural disasters with ominous regularity. Long term disaster risk reduction and mitigation with a simultaneous effort at disaster preparedness is required to firewall the fledgling growth story of Bihar and to ensure its sustainability in the long run.

State's Disaster Risk Profile

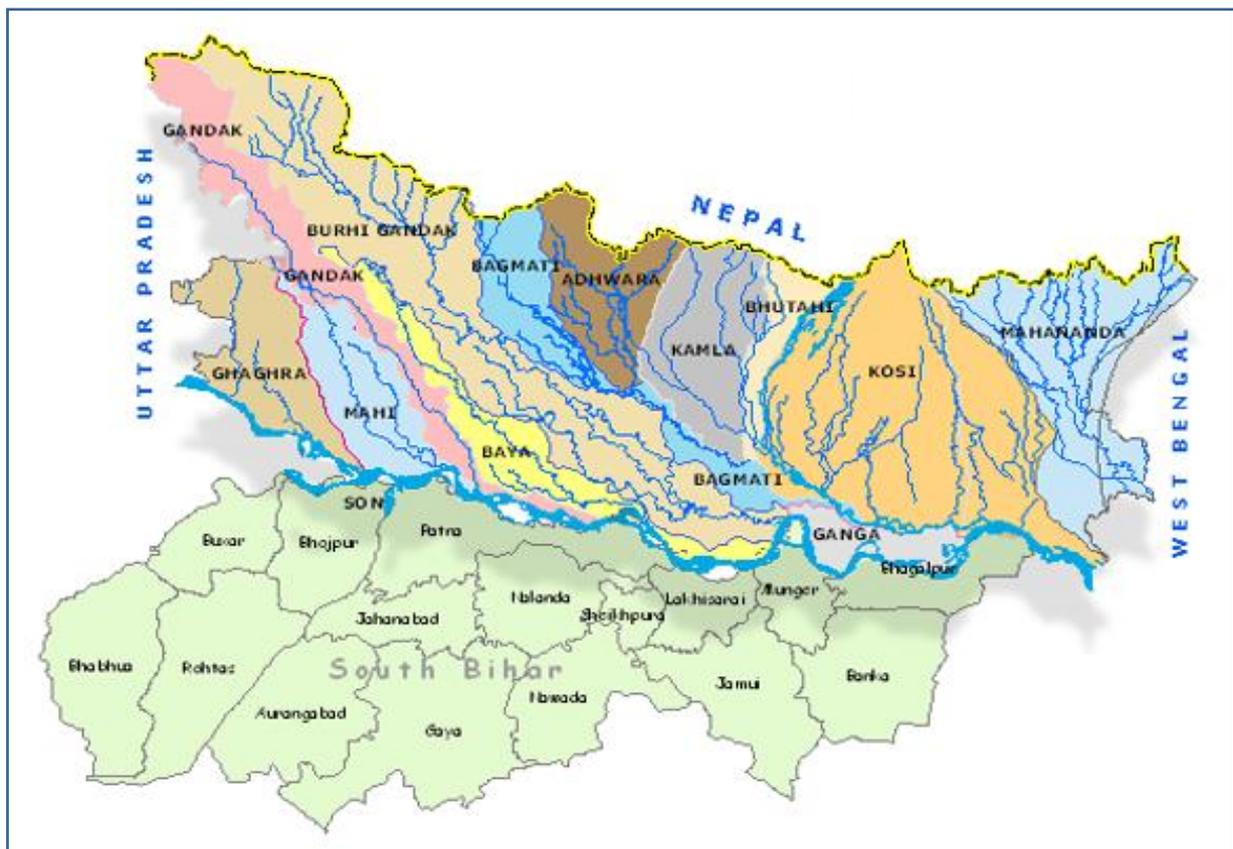
The plains of Bihar bordering Nepal are drained by a number of rivers with catchments in the steep and geologically nascent Himalayas. Kosi, Gandak, Burhi Gandak, Bagmati, Kamla Balan, Mahananda and Adhwara Group of rivers originate in Nepal, carry high discharge and very high sediment load and drop it down in the plains of Bihar. About 65 percent of the catchment area of these rivers falls in Nepal and Tibet and only 35 percent in Bihar. However, as the gradient flattens out in India, the susceptibility to floods is far more on the Indian side.

The plains of north Bihar have recorded the highest number of floods during the last 30 years. In recent times, Bihar witnessed high magnitudes of floods in 1978, 1987, 1998, 1999, 2004, 2007 and 2008. The total area affected by floods has also increased during these years. In 2004, an area of 23,490 sq. km was devastated by the floods of Bagmati, Kamla and Adhwara groups of rivers and left 800 dead, even when Ganga, the master drain, was flowing low. In 2007 and 2008, the floods were marked by unprecedented severity. A brief timeline of floods in Bihar is presented below:

- In 1998, maximum discharge in July in most rivers in North Bihar damaged the embankment along Burhi Gandak, Bagmati, Adhwara and Kosi rivers. Total deaths were 381 and damage to property was estimated at Rs 1 billion while crops worth Rs 3.67 billion were destroyed.
- In 1999, exceptional precipitation in October in the Nepal catchments caused flooding of Kamla Balan and Kosi rivers. Crop damage was estimated at Rs 2.5 billion and property damage was reported for another Rs 0.5 billion.
- In 2000, heavy rainfall in Kamla Balan and Bhutahi Balan catchments in July caused the Eastern Kosi Afflux Bund to give way, inundating 12,351 villages and destroying crops worth Rs 0.8 billion.
- In 2001, heavy rain in Nepal catchments of rivers caused the Western Kosi embankment, Bhutahi Balan right embankment, Bagmati left embankment and Burhi Gandak left embankment to breach. Crop worth Rs 2.6 billion and property worth Rs 1.8 billion were destroyed.
- In 2002, north Bihar experienced serious flooding due to overtopping in Kamla Balan left embankment and Khiroi right embankment. There were 489 deaths. Crops worth Rs 5.1 billion and property worth Rs 4 billion were destroyed.
- In 2003, the Ganga surpassed the earlier 1978 HFL of 34.18 m at Bhagalpur and at Gandhighat, Patna the 1994 HFL of 50.27 m at Patna.
- In 2004, the catchment area of north Bihar Rivers received heavy rainfall in July and surpassed the 1987 flood levels. Bagmati and Burhi Gandak surpassed all time high flood levels. There were as many as 53 embankment breaches in Bagmati, Burhi Gandak, Kamla Balan, Bhutahi Balan and Adhwara group of rivers, causing severe

flooding and loss of life and property. Crop damage was assessed at Rs 5.2 billion and property damage at Rs 10 billion. There were 885 deaths.

- In 2007, heavy rainfall in the catchment of all rivers caused serious flooding due to 28 breaches in Burhi Gandak and Bagmati river basins, causing extensive damage to life and property.
- The 2008 Kosi flood, the most disastrous floods in the history of India, occurred due to a breach in the Kosi embankment near Indo-Nepal border (at Kushaha in Nepal) on August 18, 2008. The river changed its course and inundated areas which had not experienced floods in last many decades. The flood affected over 2.3 million people in the northern part of Bihar.



In addition to flooding, north Bihar is also vulnerable to the other hydro-meteorological disaster risk of windstorms. The flood affected districts are also exposed to geomorphological disaster risks from earthquakes. Araria and Supaul lie in seismic hazard Zone V while Madhepura, Saharsa and Purnea lie in Zone IV.

2.2 The Kosi River and Hydrology of its Catchment

The River Ganges, which is the main drainage system for the state, flows in an easterly direction and stretches 432 km across Bihar, bisecting the state. North Bihar, the plain located north of the Ganges, is interspersed with eight major river basins - Ghaghra, Gandak, Burhi Gandak, Bagmati, Adhwara group of rivers, Kamala, Kosi, and Mahananda. All the rivers in North Bihar share basins either with another Indian state or with Nepal and Tibet.

The flat terrain and the huge seasonal variations in water volume in the rivers cause extensive flooding in the North Bihar plains. Gradients vary from 22 cm per km near the Indo-Nepal boundary to 7.5 cm per km near the confluence of the rivers with the Ganges. The difference between minimum and maximum flows in Himalayan Rivers is high. During normal years, the rivers carry between 10 and 20 times more water during the monsoon than in winter but, during periods of intense rainfall in the catchment areas, they can increase a hundred-fold in size. The heavy downpour in the mountains scours the slopes and result in the swift waters carrying large amounts of sediment during the monsoon. As they reach the plains and lose momentum, the rivers deposit their loads and begin to meander and therefore a shift in courses is a regular feature of north Bihar Rivers.

River Kosi originates at an altitude of over 7000 m above mean sea level in the Himalayas. The upper catchment of the river system lies in southern Tibet and eastern Nepal in mountainous terrain. Mount Everest and the Kanchenjunga are in Kosi's catchment. The river is known as Sapta Kosi in Nepal. It enters India near Hanuman Nagar in Nepal. It drains into River Ganga in the Katihar district of Bihar. It drains the catchment of 74,030 sq. km, of which only 11,410 sq. km lies in India. The catchment population in India is 6.6 million while its total catchment discharge is about 52,200 MCM. The catchment has an average annual rainfall of 1456 mm. The Kosi has a total length of 260 km in Bihar and services an area of 8,694 sq km. Its main tributaries are Bagmati, Kamla Balan, Bhutahi Balan, Trijuga, Fariani Dhar and Dhemama Dhar.

Tectonic forces are elevating Kosi's gradient by about 1 cm per year. This uplift progressively aggravates erosion, inundation and sedimentation. Empirical measurements of the river's sediment load have yielded estimates of 100 million cubic meters annually. River gradient ranges from more than 10 meters/km for mountainous tributaries to as little as 6 cm/km as the Kosi approaches the Ganga. As the gradient flattens, the current decelerates and causes the sediments to settle out and get deposited on the riverbed. This process eventually raises Kosi's channels above adjoining terrain. This causes the river to break out to lower terrain, which it again begins to elevate by siltation. Thus a conical alluvial fan has been evolving with predictable periodicity - in fact the Kosi's is one of world's largest. It covers some 15,000 sq km.

Floodwaters naturally spill over the surface of this cone. Flows over 25,000 cumecs (cubic meters per second) have been measured where the Kosi exits the Himalayan foothills, enough to create a flow of water 30 km wide. At this rate, in one week enough water would accumulate to cover the entire alluvial mega fan to a depth of 1.5 meters. These approximations give a rough index of the severity of flood vulnerability of the catchment population living in the flood path of Kosi and its tributaries.

River Kosi has moved westwards by 120 km in the past 250 years through more than 12 distinct channels. The river which used to flow near Purnea in the late eighteenth century, flows east of Saharsa now. The unstable nature of the river is attributed to the heavy silt which it carries during the monsoon season. It is quite clear that the flood flow of the Kosi River during the monsoon season historically has been creating serious problems of widespread destruction and devastation. Cities and villages have faced extensive damage, along with devastation to agricultural land in Nepal as well as India.

The Kosi Barrage with earth dams across river, afflux bunds and embankments above and below the river confines the river to flow within embankments. Embankments on both sides downstream of the barrage with a length of 246 km (153 mi) have been constructed to check the westward movement of the river. The embankments have been kept wide

apart, about 12 to 16 km, to serve as a silt trap. Despite the additions in the total length of embankments, Bihar remains one of the most flood-prone states in India and has the highest number of flood-affected people per capita.

2.3 Kosi Barrage and its Breaches

The Kosi embankments were built in late 1950s to contain the river, which is a trans-boundary river between Nepal and India and one of the largest tributaries of the Ganga. According to a bilateral agreement between Governments of India and Nepal, the responsibility of maintaining these embankments rests with the Government of Bihar on behalf of the Government of India.

- 1963: The first breach on the western embankment in Nepal in 1963 near the village Dalwa.
- 1968: Breach at five places in Darbhanga due to the unprecedented flow of 913,000 cusecs.
- 1971: The Bhatania Approach Bundh, constructed in 1968-69, collapsed between 10th to 19th kilometer south of Bhimnagar in 1971. Many villages were washed away.
- 1980: Breach south of Bhimnagar on the eastern embankment in Saharsa District near 121st kilometer.
- 1984: The eastern embankment in Saharsa district, 75 kilometer south of Bhimnagar barrage gave way. It displaced half a million people and washed away 96 villages in Saharsa and Supaul districts.
- 1991: Breach in the western embankment near Joginia in Nepal.
- 2008: Heavy rainfall coupled with poor barrage and embankment maintenance caused a breach in the embankments inside Nepal.

Flooding of River Kosi – August 2008

On 18 August 2008, the manmade left embankment failed. The river then abandoned the perennial western channel for an old channel near the median of its alluvial fan. Water gushed at an estimated 129,800 cumsecs. Simultaneously, due to heavy discharge and riverbed elevation due to siltation, it spread out widely and inundated towns, villages and standing crops on the densely populated alluvial fan. The flood submerged most of the Kosi alluvial fan area, which is very fertile and has dense agrarian population. Flooding caused substantial loss of life and property in the south east Terai region of Nepal and five districts of north Bihar. In all, more than 2.5 million people were impacted.

The worst impacted districts were Madhepura, Supaul, Saharsa, Araria and Purnea. Supaul was the worst-hit district where the floods overwhelmed 1,000 square kilometres (247,000 acres) of farmlands, destroying standing wheat, paddy and other crops. The total crop damage has been estimated at Rs 8 billion for the five districts. In all, 993 villages spread over 412 Gram Panchayats were affected. The loss of life has been estimated at 1000 deaths while 454 dead bodies could be recovered. The total figure of missing persons was reported at 3500. A UNDP study (2008) showed that some 493 persons (275 men, 218 women) died in the surveyed villages because of the floods. Recurrent flooding on the Kosi contributes disproportionately to India's historical record of suffering more flood deaths than any other country except Bangladesh.

2.4 Underlying Causes of Recurrent Flooding in Bihar

The Kosi River is one of the main reasons for the recurrent floods in Bihar. Nepal has a hilly topography and the river runs through a steep gradient in Nepal. Rainfall in the Kosi catchment in Nepal overloads dams. When the water level rises too high, Nepal opens the sluice gates of the Kosi Barrage to protect the structures. This leads to flooding and water-logging in the Gangetic plains of Bihar. The large amount of water discharged from Nepal through Kosi Barrage mainly reaches the Bagmati, Budhi Gandak and Ganga rivers, causing them to break the banks and over flow. In addition, this also carries enormous amounts of sandy silt that gets deposited over arable land and renders it fallow.

The following reasons contribute to and exacerbate the flood risk profile of Bihar:

a) Lack of Upstream Disaster Risk Management and Flood Management measures

A substantial part of the disaster risk of north Bihar emanates from the lack of adequate upstream containment and mitigation measures in Nepal and Bihar. Lack of comprehensive integrated flood management strategy is one of the leading causes of continual woes of the people in the river basin.

b) Embankments

Although India has built over 3000 km of embankments in Bihar over the last few decades, the flooding propensity has increased by 2.5 times during the same time period. Empirical evidence also yields the cold fact that that embankments fail with a sad regularity during each major flooding event.

In 1954, when the Bihar flood policy was first introduced, Bihar had approximately 160 km of embankments. At that time, the flood-prone area in the state was estimated to be 2.5 million hectares. Upon the completion of the system of embankments, 3,465 km of such structures had been constructed. However, the amount of flood-prone land increased to 6.89 million hectares by 2004. Thus, the present embankment system has not achieved its stated purpose.

The embankments straitjacket the river. In the case of Kosi, the river bed is actually several feet higher than adjacent lands due to progressive siltation. The high and low lands separated by embankments have created a situation where the low lands have become permanently waterlogged. Sixteen per cent of the land mass of north Bihar therefore suffers from permanent water-logging. This pattern implies that the embankments have to be better planned, better executed and better maintained.

c) Deforestation

The geologically nascent Himalayas give up a large amount to silt due to the high soil content in the catchment mountain system. This is further exacerbated by deforestation in the catchment area. The total catchment area of the Kosi is 74,030 sq km, excluding the catchment areas of its two important tributaries, the Kamla (7,232 sq km) and the Bagmati (14,384sq km). The average rainfall in the upper catchment of the Kosi is 1,589 mm while in the lower areas it is 1,323 mm. The average annual silt load of the river is 92,400 acre-feet.

d) Farrakha Barrage

The Farakka Barrage has disturbed the dynamic equilibrium of the river by hindering the natural oscillation of the river. The meandering belt of Ganga in Malda and Murshidabad in adjacent West Bengal is 10 km wide. The water level of the Ganga rises about 8 m upstream of the Farakka Barrage. The river that flowed in a South Easterly course between Rajmahal and Farakka in the pre-Farakka Barrage period has now formed a meander loop concentration to accommodate the additional discharge accumulated due to the barrage. Due to the obstruction caused by the Barrage, nearly 640 million tons of silt is accumulated in the riverbed per annum. In the last three decades this has resulted in the accumulation of nearly 18.5 billion tons of silt.

Farakha barrage might have led to the following problems upstream of the barrage:

- Interception of the flow channel/ changed from straight to oblique
- Sedimentation (640 x10⁶ metric tonnes/year)
- Reduction of the cross-sectional area
- Declining slope of the long profile
- Widening of the river and increasing length
- Increase in flood frequency and magnitude.

2.5 Environmental Setting of the Project Area

Key Environmental Features

Environmental Issues (Pre-Kosi Flood of 2008)

Tectonic forces are elevating Kosi's gradient by about 1 cm per year. This uplift progressively aggravates erosion, inundation and sedimentation. Empirical measurements of the river's sediment load have yielded estimates of 100 million cubic meters annually. River gradient ranges from more than 10 meters/km for mountainous tributaries to as little as 6 cm/km as the Kosi approaches the Ganga. As the gradient flattens, the current decelerates and causes the sediments to settle out and get deposited on the riverbed. This process eventually raises Kosi's channels above adjoining terrain. This causes the river to break out to lower terrain, which it again begins to elevate by siltation. Thus a conical alluvial fan has been evolving with predictable periodicity - in fact the Kosi's is one of world's largest. It covers some 15,000 sq km.

As mentioned earlier, about 73 percent of the area of north Bihar is prone to flooding. The lateral movements of the river cause erosion and loss of land. At the same time new land is continuously formed. These new chaur (low-lying lands), however, remain waterlogged for years before they become productive. Kosi river accounts for about 25 percent of the county's total river run-off and causes soil erosion equivalent to nearly 50 percent of Nepal's total sediment loss. According to some estimates, an area of approximately 3000 sq. miles has been made bare by the river with sand deposit over the years. This is due to

the nature of silt (primarily sandy in character) brought-in by Kosi, which unlike other river systems in the state or country, does not add fertility to land.

Also, a considerable portion of the land in Bihar is waterlogged, a phenomenon that has been exacerbated by development. Natural drainage has been impeded by embankments, canals, roads, and railway tracks – often due to poor design and insufficient attention to the larger hydrological setting of the region as a whole. Official records suggest that nearly one million hectares of land in Bihar, 85 percent of it in North Bihar, is waterlogged. The 8,35,000 hectares of waterlogged area constitutes about 16 percent of the total area of north Bihar, which has a population of 52.3 million people and an area of 52,312 sq.km.

Apart from the natural factors linked to geomorphology and hydrology of the Kosi basin, human interventions (both in Nepal as well as in Bihar) have impacted changes in sediment load or run-off through water resource management schemes such as bunds, barrages and embankments and accelerated erosion in the upper watershed due to deforestation and development works.

The current disaster mitigation paradigm revolves around downstream embankments and river-training meant to confine the river to a fixed channel. It is also expected that faster flow along this channel would keep sediments in suspension. However, past efforts at mitigation have not been effective according to the evidence. The conventional flood-control measures have changed the agro-ecology of the Kosi basin. Flood-prone and waterlogged areas have increased, and erosion and sand casting has temporarily or permanently made huge areas of land uncultivable; and this, in turn, has increased landlessness and distress amongst the local community.

2.6 Social Setting of the Project Area

Chapter 3 : Regulatory Framework

This section is provided as a reminder that all activities under the proposed project must be consistent with all applicable laws, regulations, notifications that are judged to be relevant in the context of the rehabilitation and reconstruction effort. It is the responsibility of the PMU and Implementing Agencies to ensure that project activities are consistent with the regulatory/legal framework, whether national, state or municipal/local. Additionally, it is also to be ensured that activities are consistent with World Bank policies and guidelines. This section is not a legal opinion on the applicability of the law but serves as guidance in the application of the law to the current project context.

3.1 National Laws, Rules and Regulation

The following paragraphs highlight some salient features of select laws, which have a particularly important bearing on the design and implementation of the proposed project.

1) Environment (Protection) Act, 1986 and EIA Notification, 2006

The Environment (Protection) Act, 1986 was introduced as an umbrella legislation that provides a holistic framework for the protection and improvement to the environment. In terms of responsibilities, the Act and the associated Rules requires environmental clearances to be sought for specific types of new / expansion projects (addressed under Environmental Impact Assessment Notification) and for submission of an environmental statement to the State Pollution Control Board annually.

As per section 3 of EIA Notification S.O. 1533 dated 14th September 2006, the Central Government forms a State Level Environment Impact Assessment Authority (SEIAA). All projects and activities are broadly categorized into two categories as Category A and B.

All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification

All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, *will* require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. In the absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be treated as a Category 'A' project.

The application of the Act on the proposed project components would be as follows:

Embankments: Considering the embankment as an open construction, if the area (base x width) is $\geq 20,000$ sq. m and $< 150,000$ sq. m, then prior Environmental Clearance as per the EIA notification of 2006 will be required.

Road/Culverts/Bridges: Most of the road /culverts / bridges will mainly fall in the rural link roads category and will not require a prior clearance. However, if the proposed road passes through or in close proximity of any ecologically sensitive or protected area, it would require prior EA. The clearance requirement of such cases shall be established on a case to case basis.

2) Forest (Conservation) Act, 1980

Forest (Conservation) Act, 1980 pertains to the cases of diversion of forest area and felling of roadside plantation. Depending on the size of the tract to be cleared, clearances are applied for at the following levels of government:

- If the area of forests to be cleared or diverted exceeds 20 Ha (or, 10 Ha in hilly area) then prior permission of Central Government is required.
- If the area of forest to be cleared or diverted is between 5 to 20 Ha, the Regional Office of Chief Conservator of Forests is empowered to approve.
- If the area of forest to be cleared or diverted is below or equal to 5 HA, the State Government can give permission.
- If the area to be clear-felled has a forest density of more than 40 percent, permission to undertake any work is needed from the Central Government, irrespective of the area to be cleared.

Restrictions and clearance procedure proposed in the Forest (Conservation) Act applies wholly to the natural forest areas, even in case the protected/designated forest area does not have any vegetation cover.

The application of the Act on the proposed project components is as follows:

Embankments/Roads/Culverts/Bridges: If the proposed activities under the project require temporary and or permanent use/diversion of forest resources to non forest activities, then the PMU/implementing agency/line department needs to take the necessary clearances from the state forest Department/MoEF.

3) Water and Air (Prevention & Control of Pollution) Acts

Water Act and Air Acts provide for the prevention and control of water and air pollution respectively. These acts empower the Pollution Control Boards to collect effluent and emission samples, entry to industrial units for inspection, power to prohibit on use of any water bodies for waste disposal and creation of new discharge outlets, provide consent to set up and operate certain facilities likely to create air and water pollution including power to give directions and prosecuting offenders.

The application of the Act on the proposed project components is as follows:

Embankments/Roads/Culverts/Bridges: The Air and Water Act are particularly applicable to all civil works activities. All construction work contractors need to obtain the consent-to-establish and consent-to-operate for plants i.e. concrete batching, stone crushing and hot mix plants and other machinery that they may be required for the purpose of construction. The NOC certificates need to be obtained from the regional offices of the SPCB. Wherein the existing plants are used, the contractor shall ensure that all applicable consents are obtained for operating the plant/equipment.

Note

Should there be any changes in the provisions in the various acts rules or notifications enacted by the Government of India/Government of Bihar during the course of implementation of the project, then compliance to the amended rules and regulations as applicable on the sub-projects will become mandatory.

4) Ramsar Convention on Wetlands of International Importance 1971

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands i.e. to stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value.

The application of the Act on the proposed project components would be as follows:

Embankments/Roads/Culverts/Bridges/Housing: According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in the country which are required to be protected. Activities undertaken in the proximity of these wetlands should follow the guidelines of the convention.

5) Land Acquisition Act (LA) of 1894 (amended in 1985)

The private land acquisition will be guided by the provisions and procedures outlined in this Act. As per the LA Act, the District Collector or any other officer designated will function as the Land Acquisition Officer on behalf of the Government. There is a provision for consent award to reduce the time for processing if the land owners are willing to agree for the price fixed by the Land Acquisition Officer. The option of acquiring lands through private negotiations is also available.

The application of the Act on the proposed project components would cover:

Embankments/Roads/Culverts/Bridges: Any land acquisition required for the activity should be in compliance with the aforesaid Act, and the policy that is adopted by the respective state government. The Policy for the project is prepared based on the national, state and World Bank policies (OP 4.12 and OP 4.10) on land acquisition, resettlement and rehabilitation.

6) Ancient Monuments and Archaeological Sites and Remains Rules, 1959

As per the Act, area within a radius of 100m and 300m from the "protected property" are designated as "protected area" and "controlled area" respectively. No development activity (including mining operations and construction) is permitted in the "protected area" and all development activities likely to damage the protected property are not permitted in the "controlled area" without prior permission of the Archaeological Survey of India (ASI). Protected property entails the site/remains/ monuments are protected by ASI or the State Department of Archaeology.

The application of the Act on the proposed project components will cover:

Embankments/Roads/Culverts/Bridges/Housing: Activities in protected areas should not be undertaken. If activities are to be done in the controlled area of protected properties, then the PMU/implementing agency/line department needs to undertake the necessary clearances from ASI.

7) National Rehabilitation and Resettlement Policy, 2007

This policy strikes a balance between the need for land for developmental activities and protecting the interests of land owners and others. The benefits under the new policy are available to all Project Affected Persons (PAPs) and families whose land, property or livelihood is adversely affected by land acquisition, involuntary displacement due to natural calamities etc.

The application of the policy covers the following proposed project components:

Embankments/Roads/Culverts/Bridges: All PAPs for the sub-projects should be compensated accordingly.

3.2 World Bank Policies

The World Bank's environmental and social safeguard policies (ten of them) are a cornerstone of its support to sustainable poverty reduction. The objective of these policies is to prevent and mitigate undue harm to people and the environment in the development process. These policies provide guidelines for the identification, preparation, and implementation of programs and projects. The following policies are relevant for consideration for the Kosi Flood Recovery Project:

1) Environmental Assessment (OP 4.01)

Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank's lending operations early-on in the project cycle. The policy states that Environment Assessment (EA) and mitigation plans are required for all projects having significant adverse environmental impacts or involuntary resettlement. Assessment should include analysis of alternative designs and sites, or consideration of "no option" and require public participation and information disclosure before the Bank approves the project. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted and their concerns addressed. The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) 4.01: Environmental Assessment.

2) Natural Habitat (OP 4.04)

The policy implementation ensures that Bank-supported development projects give proper consideration to the conservation of natural habitats, in order to safeguard their unique biodiversity and ensure the sustainability of the environmental services and products which natural habitats provide to human society.

This policy is applicable when a project (including any subproject under a sector investment or financial intermediary loan) with the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

3) Forest Policy (OP 4.36)

The implementation of the policy ensures that envisaged forest sector activities and other Bank sponsored interventions which have the potential to impact significantly upon forested areas:

- (a) Do not encroach upon significant natural forest areas that serve important social, environmental or local economic purposes.
- (b) Do not compromise the rights of local communities to continue their traditional use of forests in a sustainable fashion.
- (c) Do not finance commercial logging operations, in the case of primary tropical moist forest, nor any purchase of equipment for this purpose.

4) Involuntary Resettlement (OP 4.12)

The Bank's Operational Policy 4.12 on Involuntary Resettlement is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts. It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement. The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

Land acquisition, resettlement and rehabilitation for the project will comply with the provisions of the OP 4.12.

5) Indigenous Peoples (OP 4.10)

The World Bank Policy on indigenous peoples, OP/BP 4.10, Indigenous Peoples, underscores the need for borrowers and Bank staff to identify indigenous peoples, consult with them, ensure that they participate in, and benefit from Bank-funded operations in a culturally appropriate way - and that adverse impacts on them are avoided, or where not feasible, minimized or mitigated.

6) Cultural Property (OP 4.11)

The World Bank Policy OP/BP 4.11 defines physical cultural resources as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community.

The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements.

The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process.

7) International Waterways

Chapter 4: Potential Environmental Impacts

The avulsion of the Kosi River on August 18, 2008 draining the parts of north Bihar in eastern India may well be regarded as one of the greatest avulsions in a large river in recent years. The breach at Kusaha occurred at a discharge of 144,000 cusecs which is much less than the design discharge of 950,000 cusecs for the barrage upstream and the afflux bunds. The river avulsed following the breach, occupied one of its palaeo channels and inundated large areas as the channel capacity of the new course was very small.

4.1 Environmental Impacts - Kosi Flood in August 2008

In addition to the damage to dwellings and infrastructure, the flood has resulted in a number of environmental impacts. The key direct adverse environmental impacts resulting due to the flood include: (a) sand casting, which has affected nearly 2,73,679 acres of land; (b) soil erosion, particularly along embankments, roads and bunds; (c) debris/rubble removal and disposal, primarily arising from the damage caused to housing and infrastructure facilities; (d) impact to water and water management resources and; (e) damage to plantation. Among indirect environmental impacts, the more significant issues pertain to: (a) pressure on environmental resources in areas affected by in-migration, including issues related to poorer sanitation and waste management practices; (b) increase in environmental degradation, including pollution due to reconstruction activities requiring large quantities of construction materials; (c) changes in land-use due to sand casting. Indirect adverse environmental impacts are also associated with temporary shelter set-up.

Several factors make it difficult to assess the specific environmental impacts, including the lack of comprehensive baseline ecological data and the fact that many impacts will only manifest themselves in the medium to long-term.

Table 4.1: Key Environmental Impacts of Kosi Flood of August 2008

Type of Impact	Severity of Impact	Extent of Damage	Recovery Time	Recovery Cost
Physical/Natural Environment				
• Sand Casting	Very Severe	Extensive	Long Term	Vey High
• Soil Erosion/ Destabilization	Severe	Extensive	Long Term	High
• Sedimentation into water bodies	Moderate	Extensive	Long Term	Incalculable
• Washing of debris onto land & water bodies	Low	Local	Medium Term	Moderate
• Contamination of water	Moderate	Local	Medium Term	Moderate
Biological/Social Environment				
• Ill effect on human health	Very Severe	Extensive	Medium Term	High
• Loss/damage of vegetation cover	Moderate	Moderate	Medium Term	Moderate
• Effects on animal life (primarily livestock)	Severe	Extensive	Medium Term	High

The long-term impact on the ecosystem of the region is one such area, where the environmental impact is not yet clear. This may require detailed environmental assessment and systematic monitoring. Table 4.1 provides an over-view of the key adverse environmental impacts of the Kosi flood of August 2008 that have been identified as part of this needs assessment exercise.

A brief description on the key environmental impacts resulting from the Kosi floods in 2008 is provided in the sub-section given below.

Sand Casting

The impact associated with sand casting is proving to be a huge issue because of the sheer volume and associated costs. The problem is potentially so serious that there are no immediate viable solutions in sight. This is particularly true in case of farmland where the depth of sand deposits is a couple of feet or more. Table 4.2 provides details about the area affected by sand casting. This has resulted in severe long-term and perhaps irreversible damage (at least in few areas) to farmland affecting livelihoods of a large number of people. This in turn leads to out-migration and results in pressure on environmental resources of the areas witnessing in-migration.

Table 4.2: Area Affected By Sand Casting

S. No.	District	Area Affected (in acres)
1	Supaul	116562
2	Madhepura	146004
3	Saharsa	5269
4	Purnia	0
5	Araria	5844
Total		2,73,679

While there is a close relationship between damage assessment in the agriculture and fishery sectors and environmental damage assessment, in terms of quantification and evaluation of damage, the direct damage and loss to agriculture is being accounted under the sectoral description. The impact on environment due to sand casting resulting in changes in environmental services such as carbon sequestration, water flow regulation, fishery habitat and agro-forestry systems is not very clear on account of paucity of data/information.

Sanitation and Waste Management

Open defecation is a common practice for the majority of the population. The majority of households do not have latrines and access to safe and dry places for defecation became a key issue, especially in flood-affected and waterlogged villages. During the flood, villagers generally used a certain portion of the high land (commonly known as 'tila') within the village for defecation. In other areas, elevated areas like roads and railway embankments or even boats were also used for defecation. Apart from personal hygiene issues, this created unhealthy and unhygienic conditions leading to diarrhea and other water-borne diseases.

Poor sanitation, unhygienic conditions and lack of safe access to potable water in the immediate aftermath of the flood have led to water borne diseases, creating casualties as well. Adverse impact on health and hygiene has been reported both in case of temporary camps that were set-up to provide shelter to the people and also in case where people made their own temporary establishments without proper access to safe drinking water and sanitation arrangements.

Debris/Rubble

The amount of rubble in rural areas is mainly linked to the collapse of housing, public buildings and damage to infrastructure facilities. No estimates are available on this account. Even though the disposal of rubble in a rural setting is less concentrated and less in volume (smaller units and smaller buildings) at the individual village level, nevertheless, given the large number of rural villages affected and the level of damage to houses and huts, the total volume of rubble is expected to be significant. It has been noted that clearing efforts often lead to haphazard disposal of debris and other wastes along roads, in open fields, into drainage ditches and water catchment areas creating unwarranted environmental impacts.

Vegetation Cover (update using GoB data given on July 29)

Plantation and other vegetative cover are essential to prevent soil erosion and scouring due to the fragile nature of the soil cover (sandy loam) of the region. Additionally, the local population (mostly poor) depend on timber, bamboo and fuel wood for various domestic needs. The flood has impacted vegetation in the flood affected area both directly and indirectly. For example, out of 3,06,000 saplings planted mostly along the canals and roads during 2008 under the Virpur Forest Division in Supaul district, 2,03,125 saplings were damaged in the Kosi flood - a damage of 66.36 percent. Additionally, saplings and other plantation materials in the nurseries were also damaged due to inundation. Details about damages from other forest divisions and districts were not available to the mission. Further damages occurred on account of lopping for fuel wood and for construction of temporary shelter during and after the flood.

Impact to Water and Water Management Resources

Water management infrastructure was also greatly affected and has been assessed in detail (refer section on irrigation). Environmental impacts and risks associated with the damaged water resource infrastructure include: (a) damage to surface water sources due to contamination, bund damage and sedimentation, leading to issues related to water quality, systems productivity and reduced storage capacity and; (b) possible contamination of ground water sources due to poor sanitation, waste management and improper disposal of animal carcasses.

Environmental Degradation linked to Reconstruction Activities

Reconstruction activities will require the production, transport and usage of a large quantity of construction materials (cement, bricks, earth, water etc.) leading to additional impacts on the environment. Intensive production of construction materials in the affected area could lead to significant increases in the level of pollution, particularly from the sectors such as brick-making, which have a record of poor environmental performance.

Changes in Land Use

The impacts of the changing landscape and nature of floods on the general well-being of the people have been immense. People's livelihoods, mostly related to agriculture, have been affected adversely due to the increase in waterlogged areas, sand casting and due to the land lost to erosion. This may result in a likely change in the land-use pattern, which also ultimately link-up to environmental damages from the flood. This is specifically true for areas where extensive sand deposits and water logging curtail possible rehabilitation to productive use merely due to the severity and scale of the impact and related cost implications. Also, a change in type and/or intensity of land utilization in other areas may occur due to increased pressure from population seeking alternative shelter and livelihood.

4.2 Potential Environmental Impacts due to BKFRP

While the Kosi Flood Recovery Project is expected to benefit the communities in the five flood-affected districts in north Bihar, the implementation of the proposed components of the project could lead to some adverse environmental impacts in the region. This section identifies the likely adverse environmental impacts that may result from the proposed project interventions, considering the over-all geographical and hydrological context of the region, as described in Chapter 2.

The early evaluation of such impacts helps in integrating suitable avoidance, minimization and/or mitigation measures into sub-project planning, design and implementation. The environmental impacts identified are broad in nature and need to be assessed in detail for each of the sub-projects as part of the preparatory activities. Considering the nature of the sub-project activities, this chapter identifies the positive and negative impacts of the various proposed project components. The likely potential impacts from the proposed components are defined below:

As mentioned earlier in the report, the project has six components viz (i) Owner Driven House Re-construction; (ii) Reconstruction and restoration of roads and bridges; (iii) Sustainable Flood Management; (iv) Improving Emergency Response Capacity; (v) Livelihood restoration and enhancement and; (vi) Project management, Implementation Support and Technical Assistance. A description of the activities provided in Chapter 1 indicates that the implementation of these sub-projects is not expected to lead to significant adverse irreversible long term environment impacts. However, this would require that environmental issues are identified early-on in the project cycle and addressed adequately during planning, design and implementation of the project components.

Among the proposed project activities, integration of environmental aspects needs to be carried out for Components I, II and III to avoid, minimize and better manage the likely adverse environment impacts associated with the said components. The impacts, if managed properly, are expected to be minor, localized and temporary in nature.

However, from the perspective of managing large-scale, long term and severe environmental issues of the river basin, a comprehensive integrated flood (and development) strategy needs to be developed and adopted for the region. While the project will support some technical studies and capacity building to undertake such work, such issues may not entirely addressed through this project and in the limited time frame under which this needs to be executed to support the flood affected communities.

The adverse environmental impacts as well as other positive impacts likely to arise due to execution of the component sub project have been summarized in Table 4.1 presented here:

Table 4.1 : Project Induced Likely Environmental Impacts

S. No.	Project Component	Possible Adverse Environment Impacts	Positive Impacts
I	Owner driven housing reconstruction	<ul style="list-style-type: none"> • Even though the houses will be built on beneficiaries own land, from the environment perspective, location or siting factors need to be to avoid undesirable impacts on ecologically important features and to sustain the infrastructure facilities created. • Temporary impact on resource availability and likely damage to indigenous gene pool due to large scale and unplanned/pre-mature harvesting of bamboo. • Storage and use of chemicals for bamboo and other vegetative building material treatment • Disposal of residual materials post treatment may result in some health and local level pollution issues. 	<ul style="list-style-type: none"> • Multi hazard proof safe shelter, particularly for poor and vulnerable population. • Scope to enhance local level health conditions through provision of sanitation facilities and increasing awareness on such related issues.
II	Reconstruction of roads/bridges and culverts	<ul style="list-style-type: none"> • Impacts on natural drainage pattern due to inadequate cross drainage works. • Possible diversion of small amount of forest land/plantation belts. • Impact due to tree cutting and clearance of vegetation in some areas. • Impacts of physical environment (air, water and noise) due to construction activities and increase in traffic during the operation stage. • Impacts due to borrowing of earth and quarrying of materials such as stone for embankment strengthening. • Construction stage temporary impacts resulting from establishment of camp/plant sites; improper stacking/storage of materials and issues related to lack of proper debris/wastes disposal. • Issues of road safety and increased accidents due to faster movement of vehicles / increased traffic. 	<ul style="list-style-type: none"> • Connectivity to main roads and/or shelters via restored linkages (new roads and bridges) will help both during normal times and during emergencies/natural disasters like floods.
III	Sustainable Flood Management	<ul style="list-style-type: none"> • Impacts on natural drainage pattern due to inappropriate planning and design – lack of appreciation for the larger hydrological setting of the river basin. • Possible diversion of small amount of forest land/plantation belt area. • Impact due to tree cutting and clearance of vegetation in some areas. • Impacts due to borrowing of earth and quarrying of materials such as stone for embankment strengthening. • Impacts of physical environment (air, water and noise) due to construction activities. 	<ul style="list-style-type: none"> • Protection of agriculture lands and habitation from inundation. • Will provide connectivity to main roads and evacuation routes.

S. No.	Project Component	Possible Adverse Environment Impacts	Positive Impacts
IV	Improving Emergency Response Capacity	No adverse impacts envisaged.	<ul style="list-style-type: none"> Capacity building in disaster management
V	Livelihood restoration and enhancement	No significant adverse impacts envisaged.	<ul style="list-style-type: none"> Increased access to finance through SHGs and improved employment opportunities in farm and non- farm sectors
V	Project Management, Implementation Support and Technical Assistance.	No adverse impacts envisaged.	<ul style="list-style-type: none"> Capacity building in disaster management

Potential Construction Stage Impacts of Sub-Projects

The likely adverse environmental impacts associated with the construction activities, which are common for Roads, Bridges, Irrigation and Flood Management Works have been summarized in Table 4.2 presented here:

Table 4.2 : Project Induced Likely Construction Stage Environmental Impacts

Site Clearance and Preparation
1. Loss of top soil and vegetative cover
2. Loss or disturbance to local habitat
3. Impacts on local drainage due to disposal of debris and other waste matter in the local water bodies
Setting up Construction Camp, Plant and Other Associated Facilities
1. Loss of vegetation during setting of a camp/plant site
2. Impacts on local water resources due to increased demand for water and discharge of untreated sewage and wastes from the camp/plant site/s.
3. Deterioration of Ambient air (including dust) and noise levels due to various activities at the construction facilities and increased vehicular movement
4. Impacts on local resources due to fire wood collection by construction workers
5. Soil and water contamination due to spillage of lubricants, oils, chemicals and other substances from the construction facilities.

Construction Activities

1. Damage of local access roads due to movement of increased and/or heavy vehicular traffic
2. Impacts on local land use and environment due to quarrying and borrowing materials (such as earth) for the project
3. Possible conflicts with the local community due to impacts on local resources/activities
4. Deterioration of ambient air and noise levels in the project area due to construction activities and associated vehicle movement.
5. Impacts on natural drainage pattern and increase in water logging due to temporary diversion/s or blockage of local water bodies
6. Temporary disruption to the movements of traffic and people in the influence area of construction activities.
7. Impacts on quality of surface water resources due to improper disposal of debris and other construction waste.

Occupational Health and Safety Issues

1. Health impacts on construction personnel due to exposure to increased dust, noise, chemicals and other construction risks
2. Accident risks for workers and other staff/engineers
3. Safety and accident risks due to construction activities to the population in the neighbourhood

Chapter 5: Environment Management

5.1 Reconstruction Strategy

This section proposes key principles to be considered in the design and implementation of an environmentally sustainable rehabilitation and reconstruction program for flood-affected areas in Bihar. These principles propose a framework for considering issues, remedial options and opportunities to enhance environmental management and outcomes associated with man-made and natural systems. The key recommendations for consideration during the recovery and reconstruction phase include the following:

5.1.1 Mainstreaming environmental considerations into sectoral interventions

There are environmental dimensions to practically every sector affected by the Kosi flood. This requires consideration of environmental issues in the sectoral reconstruction planning and action, particularly in the way roads and water management structures are designed. Actions related to reconstruction and recovery should seek to ensure that the ecosystem functions are not compromised, and are ideally enhanced as the goods and services they provide underpin livelihoods and immediate welfare of a large population that depends on it. Wherever possible, 'soft' options with fewer adverse environmental impacts should be favored over 'hard' options that may involve changes to river hydrology and other natural processes.

5.1.2 Learning lessons from the flooding events

Lessons drawn from studying the nature, causes and distribution of major impacts should be used to guide further development of disaster risk management strategies for the Kosi river system. The present situation offers an opportunity to assess and monitor the resilience of natural and modified ecosystems to such flooding events, which in turn will help plan mitigation of the potential impacts of a range of natural risks and hazards. Such monitoring is a key to identifying damage to environmental services and its linkage and prioritization to the over-all reconstruction and rehabilitation plan.

5.1.3 Focus on localized site-specific solutions

Economic, environmental, social and cultural factors must all be taken into account when developing disaster risk mitigation strategies and solutions must be anchored in the prevailing circumstances of local situations.

5.1.4 Need for comprehensive/integrated water resource management approach

Human alterations of the river systems has many important consequences, primarily because these are dynamic and highly integrated and, any change in any part of the river can easily propagate and affect the whole system. An integrated approach to planning for sustainable supply of environmental goods and services needs to reflect the dynamic nature of the Kosi basin. This in turn will support the objectives of poverty reduction in the region, reduce vulnerability to natural hazards and provide coping mechanisms to deal with livelihood issues. In the immediate context, all recovery and reconstruction activities should also be framed within the context of an integrated water resource and flood management strategy.

5.2 Environment Mitigation/Management

To ensure effective implementation of environmental management plan, some specific guidance on the approach to be taken during planning, design and implementation of project components is being provided in Table 5.2.

Table 5.2 : Project Induced Likely Environmental Impacts

S. No.	Project Component	Possible Adverse Environment Impacts	Environment Mitigation / Management Plan
1.	Owner driven housing reconstruction	<ul style="list-style-type: none"> Location or siting factors to avoid undesirable impacts on ecologically important features and to sustain the infrastructure facilities created. 	<ul style="list-style-type: none"> Develop and use a set of location/siting criteria and include such criteria in the Technical Guidelines for the Housing Component.
		<ul style="list-style-type: none"> Temporary impact on resource availability and likely damage to indigenous gene pool due to large scale and unplanned/pre-mature harvesting of bamboo. Storage and use of chemicals for bamboo and other vegetative building material treatment Disposal of residual materials post treatment may result in some health and local level pollution issues. 	<ul style="list-style-type: none"> Guidelines for sustainable supply of vegetative materials stating procedures that help in: <ul style="list-style-type: none"> (a) preserving the indigenous gene pool of bamboo; (b) sustainable harvesting; (c) providing guidance on proper handling and storage of chemicals used for treatment of vegetative building materials and; (d) ensure safe disposal of residual chemicals/waste post-treatment. (e) Support of bamboo plantation/afforestation activities under the livelihoods component (JEEVIKA).
II	Reconstruction of roads/bridges and culverts	<ul style="list-style-type: none"> Impacts on natural drainage pattern due to inadequate cross drainage works. 	<ul style="list-style-type: none"> Provision of the required cross and longitudinal drainage during DPR preparation.
		<ul style="list-style-type: none"> Possible diversion of small amount of forest land/plantation belts. 	<ul style="list-style-type: none"> Identification of the type and extent of forest land area that would be required in the DPR. Review to check if this can be avoided. Timely submission of application (prior to award of works) for obtaining the required permission. .
		<ul style="list-style-type: none"> Impact due to tree cutting and clearance of vegetation in some areas. 	<ul style="list-style-type: none"> Identification of the type and extent of tree cutting that would be required in the DPR. Review to check if this can be minimized through small adjustment in design without affecting road safety factor. Submission of application in time for obtaining the required permission.

S. No.	Project Component	Possible Adverse Environment Impacts	Environment Mitigation / Management Plan
		<ul style="list-style-type: none"> • Issues of road safety and increased accidents due to faster movement of vehicles / increased traffic. 	<ul style="list-style-type: none"> • Follow good /safe road design practices. • Provide for safety features, as necessary.
		<ul style="list-style-type: none"> • Impacts of physical environment (air, water and noise) due to construction activities and increase in traffic during the operation stage. • Impacts due to borrowing of earth and quarrying of materials such as stone for embankment strengthening. • Construction stage temporary impacts resulting from establishment of camp/plant sites; improper stacking/storage of materials and issues related to lack of proper debris/wastes disposal. 	<ul style="list-style-type: none"> • An environment management plan that takes care of construction stage impacts by clearly stating the precautions and practices that need to be adhered to by the contractor in line with environmental regulations of the country. Refer Annexure 5.4
III	Flood management and irrigation infrastructure reconstruction	<ul style="list-style-type: none"> • Impacts on natural drainage pattern due to inappropriate planning and design. 	<ul style="list-style-type: none"> • Provision of the required drainage structures during DPR preparation to avoid/minimise issues pertaining to water logging and local hydrology.
		<ul style="list-style-type: none"> • Possible diversion of small amount of forest land/plantation belt area. 	<ul style="list-style-type: none"> • Identification of the type and extent of forest land area that would be required in the DPR. Review to check if this can be avoided. • Timely submission of application (prior to award of works) for obtaining the required permission.
		<ul style="list-style-type: none"> • Impact due to tree cutting and clearance of vegetation in some areas. 	<ul style="list-style-type: none"> • Identification of the type and extent of tree cutting that would be required in the DPR. Review to check if this can be minimized through small adjustment in design. • Submission of application in time for obtaining the required permission.
		<ul style="list-style-type: none"> • Impacts due to borrowing of earth and quarrying of materials such as stone for embankment strengthening. • Impacts of physical environment (air, water and noise) due to construction activities. 	<ul style="list-style-type: none"> • An environment management plan that takes care of construction stage impacts by clearly stating the precautions and practices that need to be adhered to by the contractor in line with environmental regulations of the country. Refer Annexure 5.4

The impact identification exercise has been used for preparing a generic environmental management plan for the project components (refer Annexure 5.4). It primarily applies to the project components pertaining to reconstruction of roads, culverts, bridges and embankments and can be readily used/incorporated into the Bid Documents.

Sub-projects with the potential for significant environment impacts are expected to be very few in number. If any issues are identified through the sub-project screening mechanism that is to be applied at the time of DPR preparation, sub-project specific environmental and social assessment will be conducted and will be reviewed and approved by the World Bank.

Chapter 6: Potential Social Impacts and Management Measures

Bihar with its huge population size and high dependence on land for economic pursuit presents constraints in land availability for development works. People's desire for possessing land as social and economic asset is enormous. Small land holdings and high density of population are the typical features of the state Bihar.

6.1 Social Impacts due to the Kosi Flood

The five flood-affected districts are among the poorest districts in India with about 90 percent of population dependent on agriculture, which is largely subsistence farming. The population in these districts is overwhelmingly rural, ranging from 91.7 percent in Purnia and Saharsa to close to 95 percent in Araria, Madhepura and Supaul. The proportion of people belonging to Scheduled Tribes is very small, but the proportion of Scheduled Castes is high, especially in Madhepura and Saharsa.

The social fabric of the flood hit areas has been devastated by the human deaths and injuries. The livelihoods of many families have been disrupted, particularly among those residing in the worst affected towns and villages. It has most adversely affected the livelihoods of those that were already poor. The disaster has thus, further accentuated the vulnerability of these communities. Additional impacts include high social costs of homelessness, under-scored by psychological trauma, poor health, fear of occupying damaged houses, and loss of earnings for those families whose home also served as a place of work.

In the foregoing context, Bihar Emergency Kosi Flood Recovery Project (BKFRP) focuses on reducing the vulnerability of flood hit districts through restoring and rebuilding of appropriate infrastructure and livelihoods, which can restore and improve the social and economic life of the flood hit region and thus help in mitigating the adverse impacts that resulted on account of the Kosi flood in August 2008.

6.2 Potential Social Impacts due to the Project

While the Project is expected to benefit the flood hit communities, the implementation of proposed components of the project could lead to possible some undesirable impacts on people and land. This section identifies the adverse social impacts of the sub-project activities with a view to facilitate early evaluation of such impacts and integrate suitable mitigation measures during sub-project planning and implementation.

As mentioned in Chapter 1, the project has six components viz (i) Owner Driven house construction; (ii) Reconstruction and restoration of roads and bridges; (iii) Sustainable Flood Management; (iv) Improving Emergency Response Capacity; (v) Livelihood restoration and enhancement and; Improving Emergency Response Capacity; and (vi) Project management, Implementation Support and Technical Assistance.

A description of the activities provided in Chapter 1 indicates that the implementation of these sub-projects is not expected to lead to significant adverse social impacts. Among all the components, it is only in case of Component II and III, minor adverse social impacts are expected. The impacts, if any, are expected to be minor, localized and can be readily managed. The adverse social impacts as well as other positive impacts likely to arise due to execution of the component sub project have been summarized in Table 6.1 presented here:

Table 6.1 : Project Induced Likely Social Impacts

S. No.	Project Component/ Activity	Possible Adverse Social Impacts	Positive Impacts
I	Owner Driven Housing Reconstruction	No adverse impacts. Since the houses are built on beneficiaries own land, no land acquisition and displacement is required.	<ul style="list-style-type: none"> • Multi hazard proof safe shelter.
II	Reconstruction of roads/bridges and culverts	<ul style="list-style-type: none"> • Acquisition/use of small amount / linear strips of lands – public/private • Impacts to non title holders on public lands • Damages to standing crops and plantations • Loss of existing structures and community property. • Loss of livelihoods 	<ul style="list-style-type: none"> • Connectivity to main roads or shelters via restored linkages - new roads and bridges.
III	Sustainable Flood Management	<ul style="list-style-type: none"> • Acquisition/use of small amount / linear strips of lands – public/private • Impacts to non title holders on public lands • Damages to standing crops and plantations • Loss of existing structures and community property. • Loss of livelihoods • Resettlement of families 	<ul style="list-style-type: none"> • Protection of agriculture lands and habitation from inundation • Connectivity to main roads and evacuation routes
IV	Improving Emergency Response Capacity	No adverse impacts	<ul style="list-style-type: none"> • Capacity building in disaster management
V	Livelihood Restoration and Enhancement	No adverse impacts	<ul style="list-style-type: none"> • Increased access to finance through SHGs and improved employment opportunities in farm and non- farm sectors
VI	Project Management, Implementation Support and Technical Assistance.	No adverse impacts	<ul style="list-style-type: none"> • Capacity building in disaster management

6.3 Guiding Principles for Addressing Social Issues

Land acquisition and involuntary resettlement will be kept to a minimum, and will be carried out in accordance with these guidelines. Sub-project proposals that would require acquisition of productive lands and demolition of structures will be carefully reviewed to minimize or avoid their impacts through avoidance or minimization process. The principal objectives to handle resettlement issues are as follows:

- a. Involuntary resettlement will be avoided or minimized by exploring all possible options that have least impacts in terms of land acquisition and resettlement ;

- b. In unavoidable circumstances, the affected persons irrespective of their legal status will be assisted in their efforts to improve their livelihoods and standards of living or at least restore them in real terms to the pre-affected levels; and,
- c. The compensation and assistance to the project affected people are based on the principle that people shall not suffer net losses as a result of the project.

6.4 Involuntary Resettlement Support Principles/Entitlements

The project implementation agencies will ensure timely provision of compensation and resettlement assistance to the project affected people. The land acquisition process will be a voluntary, transparent and negotiated process. Individuals may elect to voluntarily contribute land or assets provided the persons making such contributions do so willingly and are informed that they have the right to refuse such contributions.

6.4.1 Eligibility for Benefits

Project Affected Persons (PAPs) are defined as persons whose livelihood or shelter is directly affected by the project activities due to acquisition of the land owned or used by them. PAPs deemed eligible for compensation and assistance are:

- (a) Those who have formal legal rights to land, water resources or structures/buildings, including recognized customary and traditional rights;
- (b) Those who do not have such formal legal rights but have a claim to usufruct rights rooted in customary law; and
- (c) Those whose claim to land and water resources or building/structures do not fall within (a) and (b) above, are eligible to resettlement assistance to restore their livelihood.

6.4.2 Entitlements

The entitlement for broad category of impacts is summarized below.

Type of Impact	Entitlements
Loss of private agricultural land and immovable assets	<ul style="list-style-type: none"> • The Government will compensate the lost assets at their replacement cost • The option of voluntary donation is available to the asset owners.
Loss of private non agricultural land and immovable assets	<ul style="list-style-type: none"> • The Government will compensate the lost land at their replacement cost. • The Government will compensate the lost structure (partial/full) in accordance with the Public Works Department's current Schedule of Rates for new construction of similar quality without depreciation. PAF whose structures are partially affected shall be eligible for assistance for repairing/ strengthening cost of remaining structure. • The option of voluntary donation is available to the asset owners • Each PAF shall get assistance for shifting building materials, belongings etc. or shall get financial assistance of Rs 500 towards the same.

Type of Impact	Entitlements
contd... Loss of private non agricultural land and immovable assets	<ul style="list-style-type: none"> • In case loss of house of a vulnerable PAF (SC, ST, Women Headed Households, Physically Challenged and poor), a house shall be offered in lieu of the acquired house. • Right to salvage materials from the demolished structure. • A month notice shall be given for the removal of structures. The owner/tenant (in cases where a tenant occupies the structure) shall be given the right to salvage material from the structure.
Loss of livelihood or income opportunities	<ul style="list-style-type: none"> • Monthly subsistence allowance equivalent to 20 days minimum agricultural wages per month for a period of six months.
Non titleholders	<ul style="list-style-type: none"> • Will receive no compensation for land but replacement cost for structures to the vulnerable groups (SC, ST, Women Headed Households, Physically Challenged, and poor). Such assistance shall be given only to residential and commercial properties • Encroachers/squatters will be notified a time in which to remove their assets • Right to salvage materials from the demolished structure.
Unidentified impacts	<ul style="list-style-type: none"> • Unforeseen impacts will be documented and mitigated based on the provisions of the policy applicable for the project.

6.4.3 Land Acquisition and Payment of Compensation at Replacement Cost

Land acquisition is likely to take place through combination of several methods. Identification of available vacant government lands will be most preferred method. ***The private land acquisition will be made through voluntary donations, or using the land acquisition process. The expected price by the seller should be quoted, the guideline value for the site to be informed to the land owner by the District Administration.*** Based on the above support principles, the individual entitlements will be proposed and included in the Resettlement Plan.

6.4.4 Voluntary Land Donation

Individuals may also elect to voluntarily contribute land or assets, provided the persons making such contributions do so willingly and are informed that they have the right to refuse such contributions. Procedures will be in place to ensure that all donations are voluntary and freely given; that the donor is the legitimate owner of the land; and that the donor is fully informed of the nature of the project, the implications of donating the property, and his entitlements as provided for in the land acquisition and resettlement policy being adopted by the project. As principle, to the possible extent land donations from vulnerable groups will be avoided. Should the small strips of land owned by these groups is required, the land should be purchased through private negotiations or the land acquisition process extending complete assistance as per the ESMF. The following measures will have to be applied in dealing with land donations, based on their relevance to the cases being encountered:

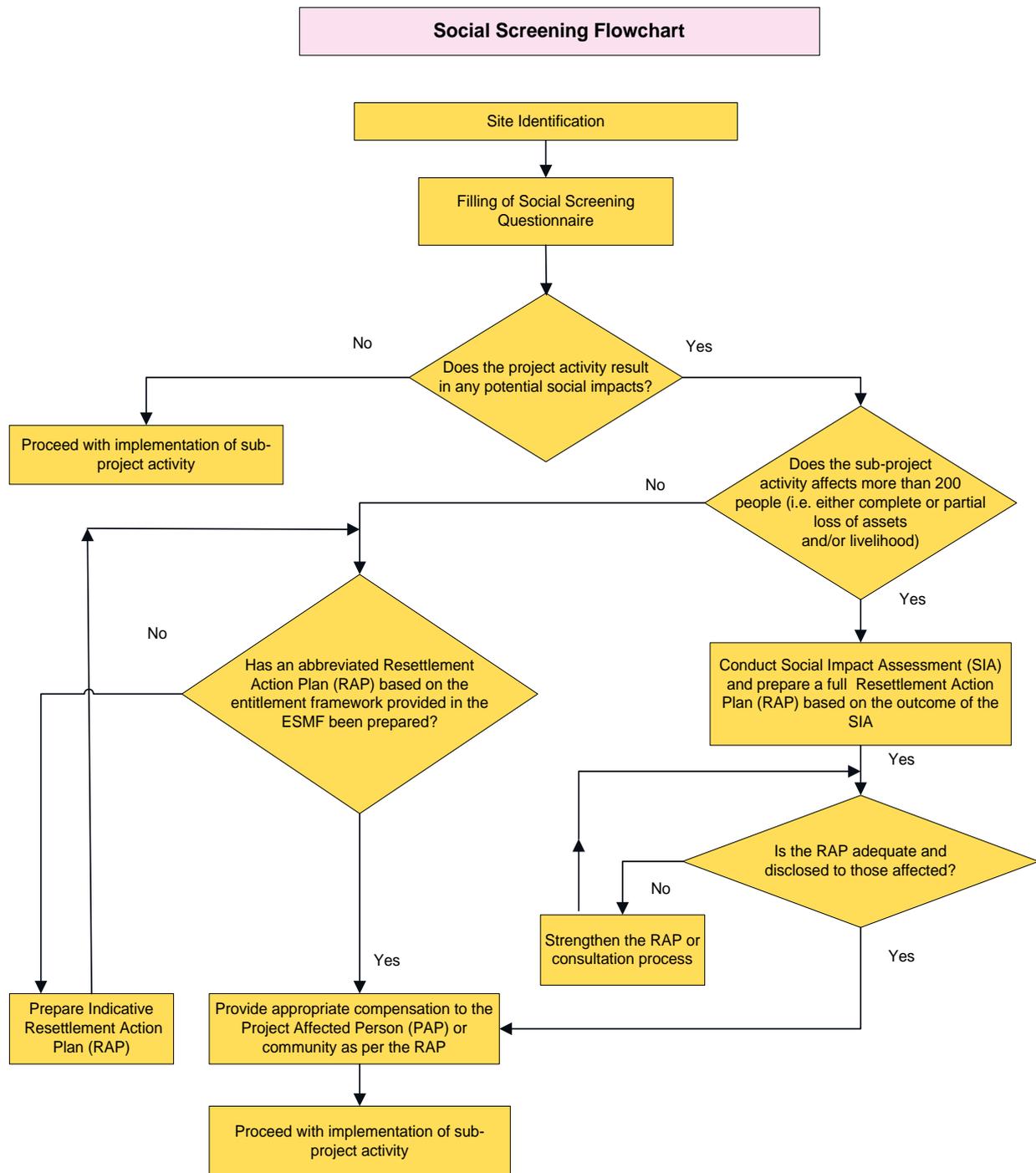
- i. Proof of meeting where the land acquisition and resettlement policy has been discussed with the affected person and acknowledgement by the affected person of his knowledge of the land acquisition and resettlement policy.
- ii. Certification from the government body that the land is free of claims or encroachments from any third party;
- iii. Deed of donation to the proponent concerned, as witnessed by the government officials and an independent witness, duly registered in the name of the Government;
- iv. Waiver of rights/quit claim (for plants, trees, houses, structures claimed by tenants, informal settlers)

6.5 Social Screening : Identification of Impacts

Screening is the first step in the ESMF process. The purpose of screening is to get an overview of the nature, scale and magnitude of the issues in order to determine the need for conducting SIA and preparing Resettlement Action Plan (RAP). After identifying issues, the applicability of the Bank's environment and social safeguard policies is established along with Government of India's regulatory requirements. Based on this, boundaries and focus areas for the SIA along with the use of specific instruments are determined.

Though it is envisaged that the subproject activities will have very generic social issues that are manageable through standards and codes of practice, there might be some sub-project activities proposed in due course, that carry a higher risk social disruptions and/or impacts. The possibility of such an issue arising in the sub-project site will be identified during the screening process. The screening format (Annex 6.2) has been designed to identify sub-project/s with potential social issues that may need to be addressed at the project planning stage.

The outcome of the screening process will help prioritize the various investments and where required, start the clearance process in a timely manner e.g. project sites (in particular requiring Forest Clearance etc) wherein clearance process is expected to take longer duration can be sequenced/phased later in overall project implementation but the clearance process for such sites is initiated at the start of the overall project. This shall help ensure that no sub projects are dropped merely due to delay in the clearance procedures. The environmental and social screening flowcharts depicted below illustrate the overall screening process.



6.6 Preparation of Resettlement Action Plans (RAPs)

Having identified the potential impacts of the relevant sub-projects, the next step is to develop action plans to mitigate the impacts. The RAPs provides a link between the impacts identified and proposed mitigation measures to realize the objectives of involuntary resettlement. The RAPs will take into account magnitude of impacts and accordingly prepare a resettlement plan that is consistent with this framework for Bank approval before the sub-project is accepted for Bank financing.

- a) Sub-projects that will affect more than 200 people due to land acquisition and/or physical relocation and where a full Resettlement Action Plan (RAP) must be produced.
- b) Sub-projects that will affect less than 200 people will require an abbreviated RP.
- c) The above plans will be prepared as soon as subproject is finalized, prior to Bank's approval of corresponding civil works bid document.
- d) Projects that are not expected to have any land acquisition or any other significant adverse social impacts; on the contrary, significant positive social impact and improved livelihoods are exempted from such interventions.

The terms of reference for conducting a Social Impact Assessment are indicated as Annexure 6.3. The indicative outline of Resettlement Action Plans is provided in Annexure 6.4.

6.7 Sub-Project Approval

In the event that a subproject involves land acquisition against compensation or loss of livelihood or shelter, the implementing agency shall:

- a) not approve the subproject until a satisfactory RP has been prepared and shared with the affected person and the local community; and
- b) not allow works to start until the compensation and assistance has been made available in accordance with the framework.

6.8 Cultural Property Resources

All utilities and common property resources likely to be affected due to the project will be relocated with prior approval of the concerned agencies before start of construction. Similarly, cultural properties whose structure is likely to get affected, will be relocated at suitable locations, as desired by the community before construction starts. Local community need to be contacted and discuss relocation aspects, siting as well as their maintenance.

All necessary and adequate care shall be taken to minimize impact on cultural properties (which includes cultural sites and remains, places of worship including temples, mosques, churches and shrines, etc., graveyards, monuments and any other important structures as identified during design and all properties/sites/remains notified under the Ancient Sites and Remains Act. No work shall spillover to these properties, premises and precincts.

6.9 Indigenous People

"Indigenous Peoples" as defined for the purposes of the OP 4.10, are members of distinct indigenous cultural group, collective attachment to geographically distinct habitats or ancestral territories, customary cultural, economic, social or political institutions that are separate from those of dominant society and culture and have an indigenous language different from the official language of the country or the region. Under Article 342 of the Indian Constitution, the following characteristics define indigenous peoples [Scheduled Tribes (STs)], (i) tribes' primitive traits; (ii) distinctive culture; (iii) shyness with the public at large; (iv) geographical isolation; and (v) social and economic backwardness before notifying them as an ST. IPs have a social and cultural identity distinct from the

'mainstream' society that makes them vulnerable to being overlooked or marginalized in the development processes.

All sub-projects are being implemented in the rural areas which consist of ST population. Impacts on these groups would be addressed in line with the principles and approach of OP 4.10 of the World Bank and GoI policies on STs.

6.10 Consultation

Implementing agencies will ensure that all occupants of land and owners of assets located in a proposed subproject area are consulted. Community meetings will be held in each affected villages to inform the local population of their rights to compensation and options available in accordance with these guidelines.

6.11 Information Disclosure

The mechanism of information dissemination will be simple and accessible to all. The means that may be explored include briefing material and organization of community consultation sessions. The briefing material (to be prepared in local language) can be in the form of: a) brochures (including project information, land acquisition and details of entitlements including compensation and assistance to be given to the PAPs) that can be kept in the local Government office; b) posters to be displayed at prominent locations and; c) leaflets that can be distributed throughout the length of the project corridors. Consultation meetings should also be organized at regular intervals by the PIU to acquaint the PAPs of the following:

- Timeline and progress of the project;
- Information on compensation and entitlements;
- Information on land acquisition;
- Time line for acquisition.

Also, the opinion and consensus of the community needs to be sought for common and cultural property relocation.

The ESMF and subsequent implementation plans as well as studies for investments will be disclosed on the government websites and other public places accessible to the local people and NGOs in English and local language.

6.12 Grievance Redressal

6.12.1 Land Acquisition and Payment of Compensation

In the project all efforts will be made so that the compensation package for PAF's is decided in consultation with the community so as to avoid any dispute. In case of a potential dispute the matter will be brought to the notice of local tehsildar/Sub Divisional Magistrate (SDM). He shall hear the case in presence of (a) the affected party, (b) the incharge of line department who is acquiring the land/ incharge of the sub-project activity and (c) Pradhan of the village where the sub-project is being implemented. He/she will try to reach an amicable solution to the issue.

However, in case of non-satisfactory solution, the matter will be brought to the notice of the District Collector and he/she is the final authority to decide the case. The hearing will be attended by all members present for hearing with the SDM as well as the Social Management Specialist of the PMU. The Social Management Specialist will be responsible for maintaining a record of the proceedings and the final decisions.

6.12.2 Grievances on Housing

All the households who were sanctioned a compensation of Rs. 10,000 (fully damaged kucha houses) are eligible for housing reconstruction assistance. The lists are being re-verified by the Block Development Officers for both exclusions and inclusions into the program. ODRC will ensure grievance redress in the process of re-verification.

Communities will be made aware of the grievance redress mechanism in place at the village level Gram Sabha as well as the level of the concerned District Collector for them to make use of, should they wish to seek redress regarding having been excluded despite being technically "eligible" or in the case of inclusion of ineligible houses/beneficiaries in the list. The list of eligible houses and beneficiaries has been widely publicized by the District Collector at public places accessible to all concerned villagers and all grievances/requests for review would be received formally and reviewed for due consideration by a widely publicized deadline. Gram Sabha meetings held with the attendance of a majority of community members in each of the habitations shall formally confirm in writing that all eligible houses and beneficiaries have been included and these formal agreements shall have the signatures of all those who attended these meetings and particularly including each of the selected beneficiaries. A copy of these agreements for each participating habitation will be sent to the PMU by the DIU/District Collector by an agreed deadline.

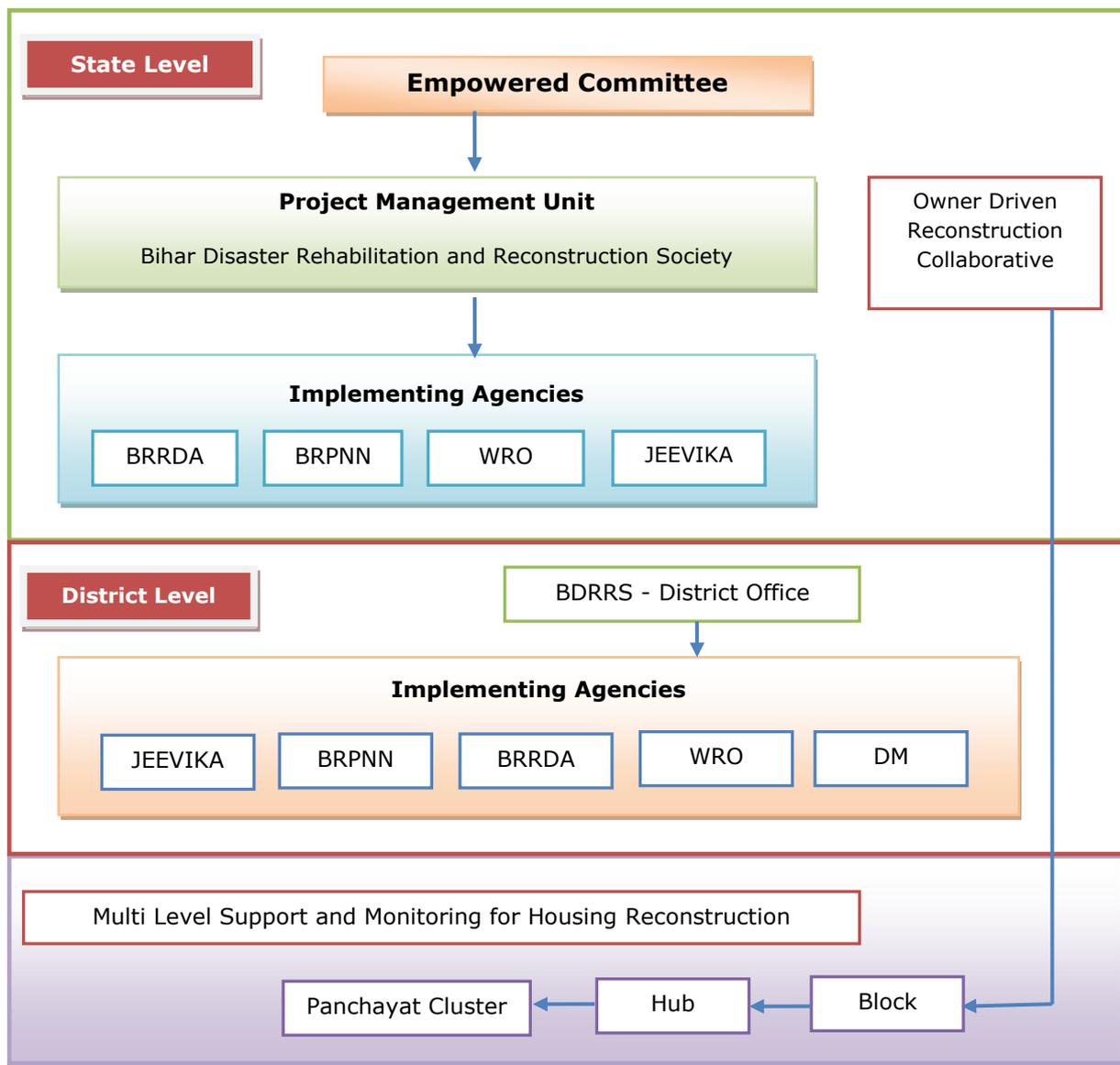
The established system for grievance redress at the District Collector's office would also be available for beneficiaries to report any deviations from the proposed implementation mechanism that they have been made aware of including aspects such as design of houses, construction quality, use of appropriate materials as per design, timely construction, delays in implementation etc.

Chapter 7: Institutional Arrangements

The ESMF needs to be applied and implemented at all project stages.

7.1 Project Implementation Structure

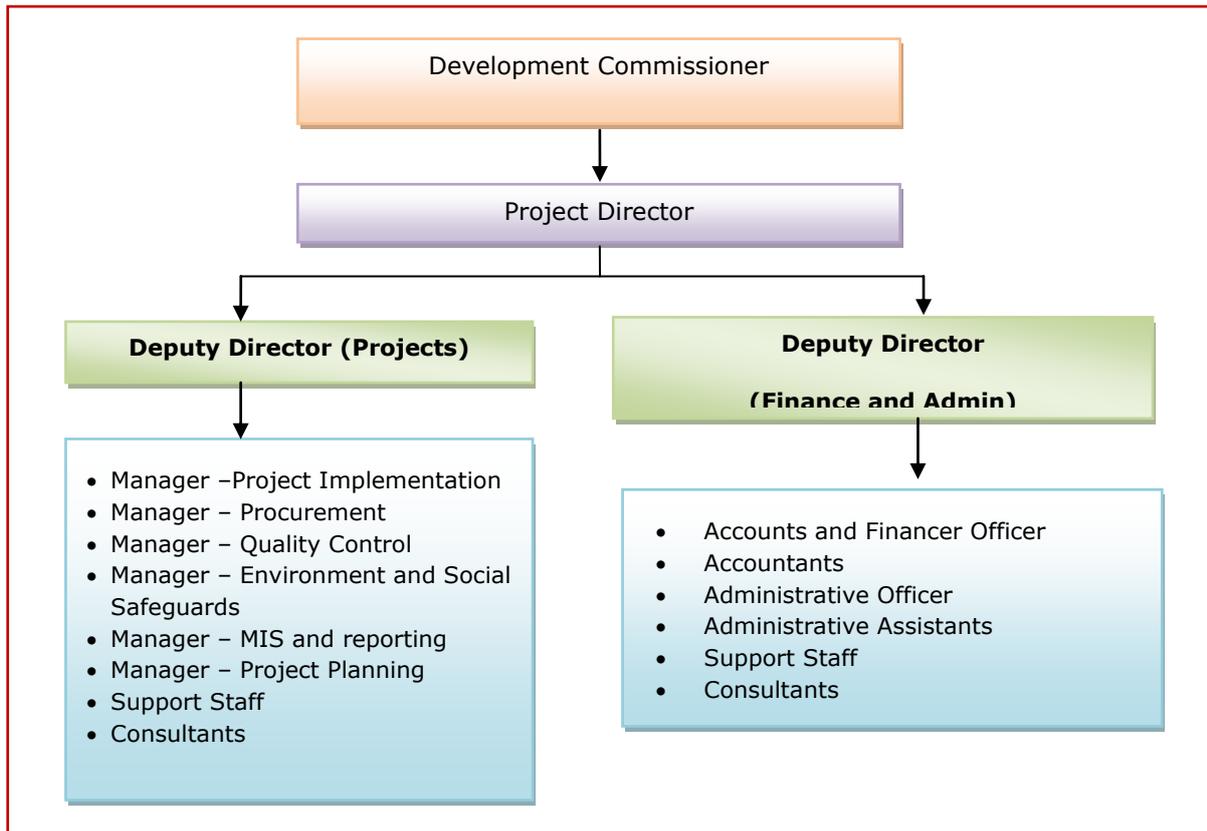
The over-all project implementation structure is depicted in the following diagram:



7.2 Project Management Unit (PMU)

The Government of Bihar (GoB) has constituted the Project Management Unit as a Registered Society: 'Bihar Disaster Rehabilitation and Reconstruction Society (BDRRS)' which is headed by a Project Director. This society will act as Project Management Unit, and will be primarily responsible for the implementation of the project. Ex-Officio Chairperson of the Society is the Development Commissioner, Govt. of Bihar.

The structure of the society is indicated in the following diagram:



BDRRS will have three level structures with representative offices at the district and block level as well. However, five other departments/agencies would be involved in implementing the project components. These are:

- a) District Administration led by the District Magistrate for implementation and monitoring of the Housing Reconstruction component. This will be supported by the Owner Driven Reconstruction Collaborative (ODRC) and the Multi Level Support and Monitoring including g the district/block level office of the BDRRS.
- b) Road Construction Department (RCD) through its implementation arm the 'Bihar Rajya Pul Nirman Nigam (BRPNN)' which will construct the bridges on the State Highways and Major District Roads.
- c) Rural Works Department (RWD) that will implement rural road works through its implementation arm, the 'Bihar Rural Road Development Agency (BRRDA).
- d) Water Resources Department (WRD) implementing the flood management and irrigation works and capacity building initiatives for Flood Management; and
- e) Project Management Unit for the Bihar Rural Livelihood Project known and 'Jeevika' which will be responsible for implementation of the Livelihood Support and Enhancement component.

7.3 Functions of the Project Management Unit

The primary functions of the PMU will be:

- A. To assist in preparation of the Bihar: Kosi Flood Recovery Project (Phase I and II) and implement the same.
- B. To coordinate with the World Bank and line agencies in both preparation and implementation phase and be singularly responsible for reporting to the Bank on project progress, procurement control, financial management, audit & disbursement aspects, results monitoring and evaluation of the project and ensuring that the project is implemented in accordance with agreed procedures and guidelines of the Bank (Procurement, Financial, Environment, Social etc.)

The district and block level of BDRRS offices will ensure coordination, monitoring and reporting functions. The more detailed list of envisaged functions of the PMU (BDRRS) includes the following:

- 1) Coordination with line agencies, progress monitoring and acting as Employer under the contracts.
- 2) Procurement Control (Approval of Bidding Documents and approval of contract award recommendations from the implementing agency that come through nodal officers).
- 3) Quality assurance through third party audits and social audit.
- 4) Ensuring compliance with agreed ESMF, implementation procedures and other Bank requirements.
- 5) Payments (direct to contractors and consultants; and cash transfers to beneficiaries through district administration), and Financial Management.
- 6) Financial audit and reporting to Bank.
- 7) Maintaining MIS and Quarterly reporting.
- 8) Appointment of technical assistance consultants and management of consultancies.

The Project Management Unit will also hire support consultants using pre-agreed Terms of References, for:

- Financial Management and Procurement support
- Impact Evaluation and Monitoring
- Quality Audit of Works
- Social and Environment Audit

7.4 Functions of the Implementing Agencies

The functions of the Implementing Agencies are listed below:

- 1) Design and Planning: Preparation of DPRs, cost estimates and bidding documents.
- 2) Procurement: Receipt of tenders; opening and preparation of preliminary bid evaluation reports jointly with Society's District Representatives; review and check by nodal officers and forwarding to PMU for final decision.
- 3) Implementation of works and Contract Management (acting as 'Engineer' under the contract).

- 4) Supervision of works and quality assurance.
- 5) Supervision of ESMF implementation and reporting
- 6) Recommendation for payments.

7.5 Role and Responsibilities of PMU and Implementing Agencies for Application and Implementation of ESMF

The PMU has functional and management teams comprising of the Project Managers, Engineers, Procurement Specialists, Financial Specialist, Environment & Social Manager and support staff. The PMU shall implement the sub project activities through the relevant line departments.

7.5.1 PMU's Environmental and Social Manager

The roles and responsibilities of the Environment and Social Manager shall include:

1. Updating of the ESMF document.
2. Training and orientation of the PMU and implementing agency teams on the requirement, application and implementation of the ESMF.
3. Reviewing the monitoring reports submitted by the implementing agencies to check compliance with the ESMF, including EMP and the RP, as applicable to the sub-component/activity.
4. Regularly visit project sites to review compliance of ESMF.
5. Provide guidance and inputs to the PMU and implementing agency teams on environment and social management aspects.
6. Act as a single point of contact for resolving queries related to environment and social issues.

The Environment and Social Manager of the PMU shall provide regular feedback based on the field visits, monitoring activities undertaken and third party audits to the respective implementing agencies and to the Project Director.

7.5.2 Line departments/ Implementing Agencies

The line departments/agencies shall be responsible for the execution of the contracted work either through the contractors or internally by the department staff. The line department will ensure during the day-to-day functioning and contract administration that the ESMF, including the EMPs and the RAPs are implemented on their respective sub-projects. The tasks of the line departments/implementing agencies will include, but will not limit to:

1. Preparation of environment and social checklists and their integration into DPRs and Bid Documents.
2. Support preparation of the EA / EMP documents along with DPRs, as applicable either internally or through external consultants.
3. Regular on-site supervision for compliance of the EMP and the RAP.
4. Provide reports on status and progress on EMSF implementation from time to time (as decided) to the PMU.

7.5.3 Technical (Third Party) Auditor

Third party auditors will be appointed by the PMU to provide independent assurance on compliance of ESMF, including EMPs and the RPs across project sites. The third party auditors shall:

1. Preparing the environment and social audit plan.
2. Conduct random field visits in case of environmentally or socially sensitive areas.
3. Review the performance of the project through an assessment of periodical monitoring reports submitted by the line department/PIUs.
4. Prepare report/s for sub-component/sub-project activities after reviewing compliance of ESMF and other statutory/regulatory requirements, as applicable through scheduled or unscheduled audits. Also, provide specific recommendations, as and if required to improve compliance on environment and social management aspects during planning, design and implementation of sub-project activities/works.
5. Share audit findings with the PMU to aid timely decision making and adopting appropriate mitigation action, as and if necessary.

7.6 Project Monitoring and Reporting

The following aspects shall be monitored and reported as per the frequency provided in table below. Corrective actions shall be initiated in a planned manner as appropriate to ensure compliance to the EMP / GEMP measures.

S. No	Particulars	Frequency	Reporting Responsibility	Monitoring responsibility
1	Compliance Status Report: Environmentally & socially sensitive sites, status of conduct of EIA/SIA, and status of compliance at these sites			
2	Environment and social site visit report encapsulating- a. plan vs actual b. exceptions noted in visit			
3	Verification of land to be acquired and status of land acquisition			
4	Distribution of entitlements			

S. No	Particulars	Frequency	Reporting Responsibility	Monitoring responsibility
	and assistances			
5	Community consultations			
6	Progress of grievance redressal			

7.7 Budget for the ESMF

To effectively implement the environmental and social management measures suggested as part of the ESMF, necessary budgetary provisions will be made in the DPRs for the individual sub-projects. Tentative budget for each of the project should include the environmental management costs along with the good engineering practices, cost of environmental and resettlement monitoring. All administrative costs for implementing the ESMF shall be budgeted for as part of the PMU costing.

7.8 Training Support for ESMF Implementation

A training plan will be prepared incorporating the project specific needs of the PMU, Line Departments and other associated entities such as ODRC and contractors. The plan will consist of different training modules specific to the needs of various target groups. An outline of this plan has already been provided in the ESMF. The capacity enhancement initiative also includes provision for induction modules to take care of staff turn over issues during the course of the project.



ANNEXURES

Annexure 1.1 : Project Component Description

Component C : Sustainable Flood Management

The component will focus on strengthening the overall flood forecasting and flood and erosion management capacity in Bihar by enhancing the knowledge, understanding, and capacity of flood and sediment management. This will be achieved by implementing both structural and non-structural measures, mainly focusing on the Kosi River Basin, but with several activities benefiting flood management in the state as a whole. The component has three subcomponents: (i) knowledge management and capacity building; (ii) flood forecasting and early warning; and (iii) structural investments.

The main tasks include:

- a. Conducting a series of technical studies, mathematical and physical modeling, geo-technical and other investigations and setting-up a Center of Excellence for water resources and flood management Research and Development, all aimed at improving the knowledge of river, flood and sediment management in Bihar and of constructing and maintaining flood embankments in a more sustainable manner, by using modern design parameters and standards and more suitable construction materials.
- b. Establishment of an embankment asset management system, including training on inspection of embankments.
- c. Development of a flood and sediment management master plan that will provide an over-all framework for flood management in the state.
- d. Enhancing the flood forecasting and early warning capacity in the state, including development of a digital elevation model (DEM) for the Kosi River Basin to prepare hazard and risk maps and assessments, development of an automatic hydro-meteorological monitoring system, development of rainfall-runoff models and development of a flood early warning and emergency system as well as community-based flood preparedness measures and
- e. Strengthening of 8 km of Kosi left embankment and piloting of river training, erosion control and strengthening of sections of embankments using more adaptable and suitable materials and construction techniques as mentioned in point (a) above.

Component D: Improving Emergency Response Capacity

Under this component, contingency funding will be provided for civil works, consultant services and goods required to respond in a case of future emergencies. The detailed investments will depend on the nature, location and priority needs of the specific emergency. In addition, the component allows the financing of public and private sector expenditures directly related to the Emergency Recovery Program. A list of goods, both domestic and imported, that fall under this category is included in the Operational Manual.

Annexure 5.1 : Procedure for Conducting Environment Assessment

The following process is to be followed for sub-project activities, wherein the requirement for an Environment Impact Assessment has been determined:

1. As per The World Bank's operational policy OP.4.01, an Environmental Assessment study is required to be carried out for Category A and B projects only. However, if an EIA (which is same as 'EA' as per The World Bank's terminology) needs to be carried out as per the EIA Notification, 2006 of Government of India, the same needs to be carried out as per the requirements of the said notification and should also comply with the requirements of Bank's OP 4.01.
2. An Environmental Assessment (EA) report should focus on the significant environmental issues of a project (the word project here implies 'sub-project' in the context of BKFRP) and should include an Executive summary concisely discussing significant findings and recommended actions. The other components of the EA report are indicated below.

- **Policy and Legal Framework Applicable to the Project**

Discuss the policy, legal, and administrative framework within which the EA is carried out, including applicable environmental regulations (such as Environment Protection Act, EIA Notification, Water Act, Air Act) and applicable World Bank policies (such as OP 4.01).

- **Project Description**

Describe the proposed project, including description of the proposed sub-components/activities and its geographic, ecological, social and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, water supply, housing and raw material and product storage facilities) for project execution. Indicate the need for any resettlement plan or indigenous people's development plan. Also, include a map showing the project site and the project's area of influence.

- **Baseline Data**

Assess the baseline conditions of the study area and describe relevant physical, biological, hydrological and socio-economic conditions, including any changes anticipated before the project commences. Also, consider current and proposed development activities within the project area but not directly connected to the project. Since the proposed investments will be in floodplains, conduct necessary baseline studies on the ecology of the project area, which could include studies pertaining to aquatic ecology and flora/fauna (particularly fish) or any specific study relevant in the context of the project activities and location. Sampling and frequency of any specific study should justify the reliability of the baseline studies and associated impact predictions. Wherever, not feasible, secondary data could be utilized.

- **Environmental Impacts**

Predict and assess the likely positive and negative impacts of the project in quantitative terms to the extent possible with suitable modelling and analysis. Identify mitigation measures and any residual negative impacts that cannot be mitigated. Explore opportunities for environmental enhancement. Identify and estimate the extent and quality of available data, key data gaps, and uncertainties associated with predictions, and specific topics that may require closer attention.

- **Analysis of Alternatives**

Evaluate and compare feasible alternatives to the proposed project in terms of location, technology, design and operation, including the "without project" situation, in terms of their potential environmental impacts. The feasibility of mitigating these impacts; their capital and recurrent costs; suitability under local conditions; and the institutional, training, and monitoring requirements should also be detailed out. For each of the alternatives, quantify the environmental impacts to the extent possible, and attach economic values, where feasible. Justify the basis for selecting a particular project design and recommended approaches to reduce possible environmental impacts. Since the proposed project interventions would be in a flood plain, the EA approach and analysis should ensure that no adverse impacts are created on the environmental, ecological, social and cultural resources of the area.

- **Environmental Management Plan (EMP)**

The EMP should include a set of mitigation, monitoring, and institutional measures to eliminate adverse environmental impacts to offset or reduce them to acceptable levels. The plan also should include actions needed to implement these measures. Specifically, the EMP should:

- a. Identify and summarize all anticipated significant adverse environmental impacts.
- b. Describe (with technical details) each mitigation measure, including the type of impact to which it relates and the conditions under which it is required, together with designs, equipment description, and operating procedures, as appropriate.
- c. Estimate any potential environmental impacts of these measures.
- d. Provide linkage with other mitigation plans (e.g., for involuntary resettlement, indigenous peoples, or cultural property) as required for the project.
- e. Identify monitoring objectives and specify the type of monitoring, with linkages to the impacts assessed in the EA report and the mitigation measures described in the EMP.
- f. Recommend monitoring program that provides a specific description and technical details of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, detection limits (where appropriate), and definition of thresholds that will signal the need for corrective actions.

- **Stakeholder Consultation**

The record of stake holder consultation carried out during the EA process shall be provided in the report along with the minutes of these meetings, views of stake holder agencies, affected people and local nongovernmental organizations (NGOs) and as to how their views/issues have been incorporated/addressed.

- **Monitoring and Reporting Procedures**

Establish procedures to: (i) ensure early detection of conditions that necessitate particular mitigation measure/s, and (ii) furnish information on the progress and results of mitigation.

- **Institutional Arrangements**

The EMP should also provide specific description of institutional arrangements and support that will be required for effective EMP implementation i.e. who is responsible for implementing the mitigation measures; supervision and enforcement; monitoring and reporting; financing; and staff training.

To strengthen environmental management capability in the agencies responsible for implementation, EMPs may suggest (a) technical assistance programs; (b) procurement of equipment and supplies; and (c) organizational changes.

- **Integration of EMP into project sub-planning and design**

For all the above mentioned three aspects (mitigation, monitoring, and capacity development), the EMP should provide: (a) an implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with over-all project implementation plans; and (b) capital and recurrent cost estimates; (c) sources of funds for implementing the EMP. All these cost estimates should be integrated into the total project cost estimate.

The EMP should be integrated into the project's over-all planning, design, budget, and implementation, by including the EMP in the project contract and by establishing that the EMP within the project's plan receives funding and required supervision along with the other components.

Annexure 5.2 : Generic Terms of Reference for Conducting Environment Assessment

Environment Assessment (EA) is a decision support mechanism to ensure that the project design and implementation are environmentally sound and sustainable. During the preparation phase, the objective of the EA is to provide inputs to the selection of sub-projects, feasibility study; preliminary and detailed design as well as assist development of a holistic development of the project package. During the implementation phase, environmental management plans (developed as a part of the EA during the preparation phase) are to be used for executing the environmental mitigation, enhancement and monitoring measures.

Objectives of EA

In the preparation phase, the EA shall achieve the following objectives:

1. Identify and analyze upstream environmental issues that may affect the project and the sector.
2. Establish the environmental baseline in the study area, and identify any significant environmental issues (direct/indirect/induced/cumulative)
3. Assess impacts of the project, and provide for measures to address the adverse impacts by the provision of the requisite avoidance, mitigation and compensation measures
4. Integrate the environmental issues in the project planning and design; and
5. Develop appropriate management plans for implementing, monitoring and reporting of the suggested environmental mitigation and enhancement measures.

The environmental assessment studies and reporting requirements to be undertaken under these TOR must conform to the GoI/GoB regulations and the Bank guidelines.

Description of the Project

(Include description of the project; covering geographical location, type of development envisaged, including a description of project activities. Also include current status of the project. Provide brief information on any other study already completed/on-going or proposed) ... to be added by Client.

Scope of Work

The EA comprises the following 3 components: (i) Environmental screening for the entire project; (ii) Environmental Assessment (EA) for the individual project/sub-projects, as required; and (c) Environmental Management Plans (EMPs) for the individual project/sub-projects.

The following section gives the detailed scope of work in each of these stages.

Inception

The Consultants shall use the inception period to familiarize with the project details. The Consultants shall recognize that the remaining aspects of the project, such as engineering and social, would be studied in parallel, and it is important for all these aspects are

integrated into the final project design to facilitate their successful project implementation. The Consultants should also recognize that due care and diligence planned during the inception stage helps in improving the timing and quality of the EA reports.

During the inception period the Consultants shall: (a) study the project information to appreciate the context within which the EA has to be carried-out; (b) identify the sources of secondary information on the project, on similar projects and on the project area; (c) carry out a reconnaissance survey and (d) undertake preliminary consultations with selected stakeholders.

Following the site visits and stakeholder consultations, as well as a review of the conditions of contract with the Client, the consultant shall analyse the adequacy of the allocated man-power, time and budget and shall clearly bring out deviations, if any. The Consultant shall study the various available surveys, techniques, models and software in order to determine what would be the most appropriate in the context of this project.

The Consultant shall interact with the engineering and social consultants to determine how the EA work fits into the over-all project preparation cycle; how overlapping areas are to be jointly addressed; and to appropriately plan the timing of the deliverables of the EA process. These shall be succinctly documented in the Inception Report.

Environmental Screening

Consultants shall summarise the known sub-project/s into different categories that relate to the magnitude potential environmental impacts. During such categorisation, consideration shall be paid to: (i) location of sub-project with respect to environmentally sensitive areas; and (ii) volume, nature and technology of construction. The screening parameters should be such that their identification and measurement is easy, and does not involve detailed studies. The screening criteria shall also contain exclusion criteria, for sub-projects, which should not be taken up due to potential significant environmental impacts that cannot be mitigated (including, but not limited to, permanent obstruction to wildlife corridors, or opening up increased access to threatened biodiversity resource hotspots, or construction on top of eroded and vulnerable flood embankments).

Environmental Scoping

Based on result of the environmental screening exercise, consultants shall suggest the scope of Environmental Assessment to be undertaken. It shall include a listing of other environment issues that do not deserve a detailed examination in the project EA (covering, for example, induced impacts that may be outside the purview of the client) along with a justification. The scoping needs to identify and describe the specific deviations or inclusions vis-à-vis the EA ToR provided, if any, along with a justification; modify this ToR for the sub-project EA, if required; and recommend studies that need to be conducted in parallel but are outside the EA process.

Baseline

All regionally or nationally recognized environmental resources and features within the project's influence area shall be clearly identified, and studied in relation to activities proposed under the project. These will include all protected areas (such as national parks, wildlife sanctuaries, reserved forests, RAMSAR sites, biosphere reserves, wilderness

zones), unprotected and community forests and forest patches, wetlands of local/regional importance not yet notified, rivers, rivulets and other surface water bodies. and sensitive environmental features such as wildlife corridors, biodiversity hotspots, meandering rivers, flood prone areas, areas of severe river erosion, flood embankments (some of which are also used as roads). Consultants shall consolidate all this information in a map of adequate scale.

Stakeholder Identification and Consultation

Consultation with the stakeholders shall be used to improve the plan and design of the project rather than merely having project information dissemination sessions. The consultants shall carry out consultations with Experts, NGOs, concerned Government Agencies and other stakeholders to: (a) collect baseline information; (b) obtain a better understanding of the potential impacts; (c) appreciate the perspectives/concerns of the stakeholders; and (d) secure their active involvement during subsequent stages of the project.

Consultations shall be preceded by a systematic stakeholder analysis, which would: (a) identify the individual or stakeholder groups relevant to the project and to environmental issues; (b) include expert opinion and inputs; (c) determine the nature and scope of consultation with each type of stakeholders; and (d) determine the tools to be used in contacting and consulting each type of stakeholder group. A systematic consultation plan with attendant schedules will be prepared for subsequent stages of project preparation as well as implementation and operation, as required.

Identification of Relevant Macro/Regional Level Environmental Issues

Consultants shall determine the Valued Environment Components (VECs) considering the baseline information (from both secondary and primary sources), the preliminary understanding of the activities proposed in the project and, most importantly, the stakeholder (and expert) consultations, which would need to be carefully documented. Use of iterative Delphi techniques is recommended.

Based on the identification of VECs, consultants shall identify information gaps to be filled, and conduct additional baseline surveys, including primary surveys. The consultants shall conduct a preliminary analysis of the nature, scale and magnitude of the impacts that the project is likely to cause on the environment, especially on the identified VECs, and classify the same using established methods. For the negative impacts identified, alternative mitigation/management options shall be examined, and the most appropriate strategy/technique should be suggested. The preliminary assessment should clearly identify aspects where the consultants shall also analyse indirect and cumulative impacts during all phases and activities of the project. For the positive measures identified, alternative and preferred enhancement measures shall be proposed.

Environmental Assessment

The Consultants shall undertake necessary impact analysis on the basis of primary and secondary information and outputs from the stakeholder consultation process.

In the cases of very significant environmental losses or benefits, the consultants shall estimate the economic/financial costs of environment damage and the economic/financial benefits the project is likely to cause. In the cases, the impacts or benefits are not too

significant, qualitative methods could be used. In addition, wherever economic and financial costs of the environmental impacts cannot be satisfactorily estimated, or in the cases of significant irreversible environmental impacts, the consultants shall make recommendations to avoid generating such impacts.

Environmental Management Plan

The consultants shall prepare an EMP to address identified planning, design, construction and operation stage issues. For each issue, the consultants shall prepare a menu of alternative avoidance, mitigation, compensation, enhancement and/or mitigation measures, as required/necessary. Consultants shall provide robust estimates of costs for environmental management measures. These costs shall be verified for common works items in line with the rate analysis for other works. The consultants shall organize consultations with line departments and will the finalize the EMP.

Environmental Inputs to Feasibility Study and Preliminary Project Design

The EA consultants shall make design recommendations, related to alignment, cross-sections, construction material use, mitigation and enhancement measures. The EA consultants shall interact regularly with the Client and familiarize themselves with the project's over-all feasibility analyses models, so that the EA inputs are in conformity to the needs of the over-all feasibility study.

Capacity Building and Training Plan Preparation

Based on the preliminary findings of the environmental screening, stakeholder consultations and institutional analysis of the implementing agency's capacity to manage environmental issues, the consultants shall prepare a Capacity Building Plan to mainstream environmental management in the implementing agency's activities by the end of project implementation period. Earmarking staff for environmental management and improving their skill-sets would be simultaneously pursued during project preparation and implementation. In addition, recommendations should be made concerning any changes to guidelines, standards and regulations, which would improve medium and long term environmental management in the line departments works.

A detailed training plan shall be prepared to develop and strengthen environmental capacities of the client and other associated agencies/departments. The strategy should include a mix of hands-on training for key staff involved in project preparation, site visits to similar projects, and whenever required, full-fledged academic programs on environmental management at well-recognized institutions. The consultants shall conduct orientation training for the key client, early in the assignment. Periodic training at various levels should continue during project preparation to ensure that the knowledge, skills and perspectives gained during the EA assignment are transferred to the Client and are utilized effectively during project implementation.

Mechanisms for improved co-ordination between Client and Line departments

The consultants shall examine the various options available for improved and timely co-ordination between various state government departments. These could take the form of written MoUs for specific activities, apex co-ordination committee of top bureaucrats, or

any such mechanism that can be effective in reducing delays in ancillary activities such as, but not limited to, shifting of utilities and obtaining required regulatory permissions.

Co-ordination among Engineering, Social, Environment and Other Studies

The consultants, with assistance from the Client, shall establish a strong co-ordination with the other project-preparation studies – engineering, social and/or institutional development. The consultants shall keep in mind the specific requirements of the project in general, and the engineering/design studies in particular, and shall plan their outputs accordingly. It is recommended that some of the consultation sessions may be organised in co-ordination with the social and engineering consultants, as feasible, and when the stakeholders consulted are the same.

The consultant shall review the contract documents – technical specifications, and rate analysis, to ensure that there are minimal conflicts between the EMP stipulations and specifications governing the execution of works under the project.

Public Disclosure

The consultants shall prepare a non-technical EA summary report for public disclosure and will provide support to the client in meeting the disclosure requirements, which at the minimum shall meet the World Bank's policy on Public Disclosure. The consultants will prepare a plan for in-country disclosure, specifying the timing and locations; translate the key documents (including executive summary of EA/EMP) in local language; draft the newspaper announcements for disclosure; and help the client to place all the EA reports in the client's website.

Consultant's Inputs

The Consultants are free to employ resources as they see fit. Additional expertise, shall be provided as demanded by the context of the project. The consultants are encouraged to visit the project area and familiarize themselves, at their own cost, before submitting the proposal; and propose an adequate number and skill-set for the senior specialists and technical support staff for the EA assignment. Further, the consultant will allocate adequate number of field surveyors, distinct from the technical support staff, to complete the study in time. Timing is an important essence for any EA study, which shall be closely co-ordinated with the works of the engineering and social teams, simultaneously involved in preparation of the project.

The consultants shall provide for all tools, models, software, hardware and supplies, as required to complete the assignment satisfactorily. These should be widely recognized or accepted. Any new model or tool or software employed should be field-tested before use or the purpose of this EA.

The consultants shall make formal presentations, co-ordinated by the client, at key milestones on the (a) proposed work plan after submitting the Inception Report; (b) recommendations from the environmental screening; and (c) EA findings, design and EMP recommendations. All supporting information gathered by the consultant in undertaking these terms of reference would be made available to the client.

Consultant's Outputs

The consultant is expected to provide the following outputs, as per the schedule given in the ToR. The Consultants are expected to allocate resources, such as for surveys, keeping this output schedule in mind.

Inputs to be provided by the Client

The Client will provide all necessary and reasonable support to the consultant to collect secondary data, such as issuing authorization letters. The Consultant will be responsible for any translation of documents and for processing of data. The Client will designate an officer to act as the main liaison officer and participate as possible in the study.

(The client may designate/depute a team of professionals to work within the consultants' team for long term capacity building within the client's organization).

The client will ensure the timely flow of information and documents from one consultant to other, if this be the case. The client will also help in organizing the formal presentations from all consultants engaged in project preparation.

Annexure 5.3 : Format for Conducting Environment Screening

Part A: General Information

1. Type of proposed sub-project activity (tick the applicable option)	
▪ Reconstruction of roads/bridges	
▪ Flood management and Reconstruction of Irrigation infrastructure	
2. Location of the sub-project	
▪ Name of the State	
▪ District	
▪ Taluka	
▪ Village	
3. Implementing Agency Details (sub-project level)	
▪ Name of the Department/Agency	
▪ Name of the designated contact person	
▪ Designation	
▪ Contact Number	
▪ E-mail Id	
4. Details about the Social Screening Exercise	
▪ Date	
▪ Name of the Person	
▪ Contact Number	
▪ E-mail Id	

Part B: Environment Information

Annexure 5.4 : Incorporation of Environment Management Plan into Contract Documents

The purpose of the annex is to provide some guidance on the integration of the EMP/GEMP into the contract documents of a sub-project.

Environment requirements in the pre-bid documents

1. The project implementing agency, i.e. PIU / the Line Departments issue the pre-bid documents to shortlist a few (usually six) contractors, based on their expression of interest and capability. While details on environmental requirements are really not required in the pre-bid stage, it is useful to mention that the contractor is expected to have good environmental management capability or experience.

Incorporating EMP in the Bid Document

2. The project implementing agency (line department) issues the bid documents to the pre-qualified contractors. There are two kinds of bid documents, for International Competitive Bids (ICB) and National Competitive Bids (NCB). In Bank projects, these documents are prepared based on templates (separate for ICB and NCB) provided by the Bank. The ICB documents are based on the FIDIC (i.e., an acronym for the International Institute of Consulting Engineers) guidelines, while the NCB is closer to the national contracting procedures, i.e. the Central PWD contract documents in India. The bid documents contain separate volumes. For instance, a typical ICB document contains:(i) General Conditions of Contract, which is based on the FIDIC; (ii) Technical Specifications, which is based on the applicable specifications in India for similar infrastructure related works; (iii) Bill of Quantities and (iv) Drawings. The EMP parts/sections should be included in the relevant locations of the bid documents in the following way:

- Mitigation/enhancement measures & monitoring requirements tables

The cross-reference to these tables should be included in the “conditions of particular application (COPA)”, which is a part of the General Conditions of Contract (e.g. Section IV, Item 19.1 of the ICB). As a standard practice, there is an over-all reference to the laws that have to be followed in this section/item. The relevant laws need to be mentioned here. In addition, the adherence to the mitigation/enhancement measures and table on monitoring requirements should be included. The two tables will have to be added as Annexes or the entire EMP (without cost and drawings) as a whole should be attached. Either the Annexes or the appropriate section in the EMP should be cross-referred in the description of this item.

- Modifications/additions to the technical specifications

Due to the mitigation/enhancement measures included in the EMP, there may be (a) additions/alterations required to the applicable specifications and/or (b) there may be a need to add new specification/s. These are to be referred in the section on “Supplementary Specifications” in the Technical Specifications Volume of the bid document. Generally, the GoI applicable specifications are already referred/listed and are not repeated in the bid documents. However, changes and

additions to these specifications are made through the inclusion of a section "Supplementary Specifications." This section should also include additional technical specifications related to the EMP or should provide a cross-reference to the specific section of the EMP.

➤ Cost table

All the items in the EMP cost table relevant to the contractor have to be referred in the Bill of Quantities (BoQ) table, which is a separate volume of the bid documents. It is to be noted that the BoQ table in the bid document includes the various tasks to be done by the contractor under different categories. Against each task, the contractor will have to indicate a unit rate while completing the bid documents.

➤ Drawings

All EMP drawings are to be reflected in the 'Drawings' volume of the Bid document. If the drawings are included in the EMP, then a cross-reference should be provided in the Drawings Volume.

Developing the EMP to suit the bid/contract document

3. As one of the intentions is to integrate the EMP requirements into the bid documents/contract Agreement, the EMP should be developed keeping the following in mind:
 - a. Mitigation/enhancement measures: In the Mitigation/Enhancement Measure table, the text describing each measure should not include/repeat what is already covered under the technical specification/s, and this should only be cross-referred. The text should be short, clear and succinct. The description should focus on "what" and "where" of the mitigation / enhancement measure as the "how" of the measure is covered under the specification.
 - b. Monitoring requirements table: There are certain monitoring requirements for the contractor. While developing the Monitoring Requirement table, those that pertain to the contractor should be clearly mentioned.
 - c. Technical specifications: The modifications to the specifications and the additional specifications should be separately listed. These should be included as Annexure in the EMP. The (added or modified) technical specifications should be adequately detailed to avoid problems (including that of interpretations) at site.
 - d. Drawings: The modifications to the drawings and the additional drawings should be included as Annexure in the EMP. It is important to note that all drawings included/ added should be "execution drawings" detailed as per requirement of the particular item so as to execute at site with adequate quality control and workmanship. Also, it is important to note that the quality of BoQ [or cost estimate] and technical specifications part of the contract document depends on the degree of detailing in the drawings.
 - e. Cost table: The items pertaining to the contractor should be clearly separated from the expenditures that are to be incurred by the project implementing agency, supervision consultant and/or any other agency/organization.

- f. Timing for finalizing EMP: It is best to finalize the EMP before the finalizing the bid documents. This is required to fully reflect the sections of the EMP relevant to the contractor in the bid document and to ensure its proper integration.

Other notes

Once the completed bids have been received from prospective contractors, the project implementing agency takes a decision based on the costs and the technical merit of the bids. Following the decision, the implementing agency and the chosen contractor sign and counter-sign the completed bid documents. It becomes the contract agreement thereafter. If issues have been missed in the bid documents, it cannot be amended at the time of signing the contract agreement stage unless there is a really strong justification for the same. If there is an EMP cost item that is not reflected in the BoQ of the signed contract agreement, the supervision consultant/engineer may issue a variation order, if such case has merit. Contractor will quote a rate and the task gets done. This issue of variation orders is a standard practice and can be used, if found necessary. However, the intent of the good contracting practices should be to minimize variation orders and therefore EMP should be carefully prepared and integrated in the bid document.

Annexure 6.1 : Land Acquisition Monitoring Sheet

1. Name of the sub-project:
2. Village, Panchayat and Taluka:
3. Name of the Land Owner and Survey Number:
4. Area of land acquisition (Ha):
5. Type of Land
 - (a) Irrigated
 - (b) Non-irrigated
 - (c) Homestead
 - (d) Temple
 - (e) Donated
 - (f) Barren
 - (e) Other (specify)
6. Compensation Details
 - (a) Market value (in Rs/Ha)
 - (b) Guideline Value..(in Rs/Ha)
 - (c) Date of latest revision of guideline value
 - (d) Negotiated Price (in Rs/Ha)
 - (e) Total Compensation Paid and Percentage of Guideline Value
7. Date of Negotiations
8. Date of Registration of Sale Deed
9. Payment Details (Cheque No., Date etc.)
10. Details of standing crops affected and compensation payment details
11. Details of any other properties affected such as wells or trees or structures affected
12. Area of left over land holding
13. Option for surrendering left over land if it is residual
14. Long term rehabilitation measures (if required)
15. Remarks

Signature of District/Sector ESMF Co-coordinator

Annexure 6.2 : Format for Conducting Social Screening

Part A: General Information

1. Type of proposed sub-project activity (tick the applicable option)	
▪ Reconstruction of roads/bridges	
▪ Flood management and Reconstruction of Irrigation infrastructure	
2. Location of the sub-project	
▪ Name of the State	
▪ District	
▪ Taluka	
▪ Village	
3. Implementing Agency Details (sub-project level)	
▪ Name of the Department/Agency	
▪ Name of the designated contact person	
▪ Designation	
▪ Contact Number	
▪ E-mail Id	
4. Details about the Social Screening Exercise	
▪ Date	
▪ Name of the Person	
▪ Contact Number	
▪ E-mail Id	

Part B: Land and Social Information

1. Does the sub-project activity require acquisition of private land?			
Yes		No	
Give the following details:	Private Land (sq mts/hac.)		
	Govt. Land (sq mts/hac.)		
	Forest Land (sq mts/hac.)		
2. Does the proposed sub-project activity result in demolition/removal of existing structures?			
Yes		No	
If so, give the following details:			
▪ Number of public structures/buildings			
▪ Number of common property resources (such as religious/cultural/ drinking water/wells/etc)			
▪ Number of private structures (located on private or public land)			
3. Does the proposed Project activity result in loss of crops/trees?			
Yes		No	
4. Does the proposed Project activity result in loss of direct livelihood/ employment?			
Yes		No	
5. Does the proposed activity result in loss of community forest/water bodies/pastures on which near-by residents/local population is dependent for domestic or other needs?			
Yes		No	
If yes, give the details of the extent of area to be lost (in acres/hac.).			
6. Does the proposed Project activity affect schedule tribe communities?			
Yes		No	

Part C : Result/Outcome of Social Screening Exercise

S.No.	Output	Outcome
1.	Answer to all the question is 'No' and only forest land is being acquired.	<input type="checkbox"/> No SIA/RAP required
2.	Answer to any question is 'Yes' and the sub-project does not affect more than 200 people (i.e. either complete or partial loss of assets and/or livelihood)	<input type="checkbox"/> Abbreviated RAP is required

3.	Answer to any question is 'Yes' and the sub-project affects more than 200 people (<i>i.e. either complete or partial loss of assets and/or livelihood</i>)	<input type="checkbox"/> SIA/RAP Required
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Annexure 6.3 : Broad Terms of Reference and Scope for Social Assessment

The Social Assessment (SA) document assists managers and leaders take conscious decisions to avoid social and resettlement impacts. The SA in this context is seen as an impact assessment tool where the concerns to be addressed would go far beyond just social and resettlement issues. The SA so prepared would take into account the policy implications of the central and state governments apart from the resettlement policies and regulation of the World Bank.

Objectives

The main objective of Social Assessment (SA) is to ensure that the project design and implementation are socially acceptable. Further, the objective of SA shall be to provide inputs for selection of sub-projects, preliminary and detailed design of the project. The Resettlement Plans to be developed as part of the SA are to be used during the implementation of the project for executing the resettlement and rehabilitation activities and monitoring measures. In the preparation phase, the SA shall achieve the following objectives:

- a. Establish the Socio-economic conditions in the study area and to identify any significant social issues that may be associated with the proposed project/investment.
- b. Assess impacts of the project, and provide for measures to address the adverse impacts by the provision of the requisite avoidance and/or compensation measures.
- c. Integrate the social and resettlement issues in the project planning and design and
- d. Develop Resettlement Plan for implementing, monitoring and reporting on the social and resettlement compensation measures suggested.

Scope of Work

The Social Assessment shall identify all potential social issues in the project; and shall develop management measures for addressing all these issues. To this end, the SA shall consist of:

- a. Socio-economic baseline established through census surveys
- b. Stakeholder Identification and Consultation
- c. Project and regional level social issues that would need to be considered in the analysis of alternatives, planning and design of the sub-projects and establish their criticality in the context of the proposed project
- d. Resettlement Action Plan to address the project's social issues
- e. Training plan for building adequate capacity in the implementing agency towards implementation of the plans produced.
- f. Monitoring Plan encompassing the monitoring parameters and schedule for monitoring

Key tasks in the assignment include:

- 1) Define likely project impact zone (direct/indirect) based on the project proposal.
- 2) Collect information through desk review and field visits on existing baseline conditions, and include information on land uses, structures and people (e.g., demography, socio-economic status, vulnerability, status of infrastructure and access to people, livelihood programs, market rate of assets, medical support for sexually transmitted diseases, its prevalence, awareness on HIV/AIDS, legal status of land through revenue records) within the project impact zone.
- 3) Identification of key stakeholders involved in various aspects of the project (project implementation and execution agencies and groups from civil society; description of socio-economic organizations of local communities that may affect project outcomes; carry out public consultation with the likely affected groups, district administration, NGOs and other stakeholders and document the issues raised and outcomes; and assessment of local capacities in terms of participation in planning, implementation supervision and evaluation.
- 4) Explore viable alternative project designs to avoid, where feasible, or minimize social impacts such as those related to displacement, impact/s on vulnerable community or cultural properties.
- 5) Identify major and minor social impact issues, including loss of assets, livelihood, poverty, gender and health related issues and estimate the economic and social impacts on people and land.
- 6) Identify and confirm the social safeguard policies triggered and propose mitigation
- 7) A resettlement plan should be prepared based on the outcome of the SIA to minimize, mitigate, and/or compensate for adverse impacts on the affected people/communities. The mitigation or management plans developed should be consistent with the nature of the development and the type of the impact.

Annexure 6.4 : Format for Resettlement Action Plan

(A) Abbreviated Resettlement Action Plan *(if population affected is < 200)*

An abbreviated plan covers the following minimum elements:

- a. A census survey of displaced persons and valuation of assets
- b. Description of compensation and other resettlement assistance to be provided
- c. Consultations with displaced people about acceptable alternatives
- d. Institutional responsibility for implementation and procedures for grievance redressal.
- e. Arrangements for monitoring and implementation and
- f. A timetable and budget.

(B) (Complete/Full) Resettlement Action Plan *(if population affected is > 200)*

1. The scope and level of detail in the resettlement plan will vary with the magnitude of land acquisition and complexity of resettlement. The plan is based on up-to-date and reliable information about (a) the proposed compensation payment and resettlement of adversely affected groups, and (b) the legal issues involved in resettlement. The resettlement plan covers the elements below, as relevant. When any element is not relevant to project circumstances, it should be stated clearly in the resettlement plan.
2. **Description of the Project.** General description of the project and identification of the project area.
3. **Potential impacts.** Identification of: (a) the project component or activities that give rise to land acquisition and resettlement; (b) the alternatives considered avoiding or minimizing land acquisition and resettlement; and (c) the mechanisms established to minimize resettlement, to the extent possible, during project implementation.
4. **Objectives.** The main objectives of the resettlement program.
5. **Results of census socio-economic surveys.** The findings of surveys to be conducted in the early stages of project preparation and with the involvement of potentially affected people, including: (a) the results of a census survey; (b) current occupants of the affected area to establish a basis for the design of the compensation payment and resettlement program and to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance; (c) standard demographic and socio-economic characteristics of the affected households; (d) the magnitude of the expected loss - total or partial - of assets and the extent of impact, physical and/or economic; (e) public infrastructure and social services that will be affected; and (f) social and cultural characteristics of affected communities, including a description of formal and informal institutions (community organizations, NGOs, ritual groups, that may be relevant to the consultation strategy and to designing and implementing the resettlement activities.

6. **Eligibility.** Definition of affected persons and criteria for determining their eligibility for compensation and other resettlement assistance, including relevant cut-off dates.
7. **Valuation of and compensation for losses.** The methodology to be used in valuing losses to determine their replacement cost and a description of the proposed types/levels of compensation under local law and such supplementary measures, as are necessary to achieve replacement cost for lost assets.
8. **Resettlement measures.** A description of the package/s of compensation and other resettlement measures that will assist each category of eligible affected persons to achieve the objectives of the policy. In addition to being technically and economically feasible, the resettlement packages should be compatible with the cultural preferences of the displaced persons, and must be prepared in consultation with them. Should include any measures necessary to prevent land speculation or influx of ineligible persons at the selected sites. The provisions of housing, infrastructure (e.g., water supply, feeder roads), and social services (e.g., schools, health services); plans to ensure comparable services to host population. Additional measures to ensure that such vulnerable groups as indigenous people, ethnic minorities, the landless, and women are adequately represented.
9. **Income Restoration Measures.** Wherever the livelihoods are affected, appropriate measures for improvement or restoring of livelihoods, including assistance during the transition period, will be proposed which should be compatible with the cultural preference and skill of the affected people.
10. **Community participation, Consultation and Disclosure.** Involvement of affected people for consultation with and participation in the preparation and implementation; (b) a summary of the views expressed and how these views were taken into account in preparing the resettlement plan; (c) a review of the alternatives presented and the choices made by affected persons, wherever options are available to them, including choices related to forms of compensation and resettlement assistance; (d) Project policy on R&R and RAP should be disclosed to the public through various means – print/web sites/documents available at the concerned department offices.
11. **Integration with host population.** Measures to mitigate the impact of resettlement on any host communities, including: (a) consultations with host communities and local governments; (b) arrangements for prompt tendering of any payment due the hosts for land or other assets provided to re-settlers; (c) arrangements for addressing any conflict that may arise between re-settlers and host communities; and (d) any measures necessary to augment services (e.g., education, water, health, and production services) in host communities to make them at least comparable to services available to re-settlers.
12. **Implementation Arrangements:** The description of agencies responsible for implementation of compensation payment and resettlement activities should be outlined and an assessment of the institutional capacity of such agencies and NGOs should be made, including identification of any steps that would be required to enhance the institutional capacity of agencies responsible for resettlement implementation.

13. **Grievance procedures.** Affordable and accessible procedures for redressal of disputes arising from resettlement - such grievance mechanisms should also take into account the availability of judicial recourse.
14. **Implementation schedule.** Implementation schedule covering all payments of compensation and other applicable resettlement activities from preparation through implementation, including target dates for the achievement of expected benefits to re-settlers and hosts and terminating the various forms of assistance. The schedule should indicate how the resettlement activities are linked to the implementation of the over-all project.
15. **Costs and budget.** Tables showing itemized cost estimates for all compensation payments and associated resettlement activities other contingencies; time-tables for expenditure; sources of funds; and arrangements for timely flow of funds and funding arrangements for land acquisition and resettlement should be described.
16. **Monitoring and evaluation.** Arrangements for monitoring of compensation payments and resettlement activities by the implementing agency, supplemented by independent monitors, as considered appropriate by the Bank, to ensure complete and objective information; performance monitoring indicators to measure inputs, outputs, and outcomes for resettlement activities; evaluation of the impact of resettlement for a reasonable period after all resettlement and related development activities have been completed; using the results of resettlement monitoring to guide subsequent implementation.