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Assam project on forestry and biodiversity conservation

Feasibility report

Final Version

December, 2010

Department of
Environment & Forests
Government of Assam

Assam project on forestry and biodiversity conservation

Feasibility report

This report was financed by Agence France de Développement and prepared from 1st to 12th February 2010 by Cirad, with the contributions of:

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Glossary

Agroforestry: the practice of integrating trees into agriculturally productive landscapes to ensure sustainable delivery of the benefits, products and services, they can provide. Among these are fertilizer trees for land regeneration, soil health and food security; fruit trees for nutrition; fodder trees that improve smallholder livestock production; timber and fuel wood trees for shelter and energy; medicinal trees to combat disease; and trees that produce gums, resins or latex products. Many of these trees are multipurpose, providing a range of benefits.

Forest Area: The area recorded as forest in the Government records.

Forest Cover: All lands, more than one hectare in area, with a tree canopy density of more than 10% irrespective of ownership and legal status. Such lands may not necessarily be recorded forest area. It also includes orchards, bamboo and palm (Forest Survey of India, 2009).

Proposed Reserved Forests (PRF): An area that has been proposed for demarcation and notification as Reserved Forest. The claims for rights of the local communities need to be assessed before the process can be completed. Some PRFs in Assam are still to be notified as Reserved Forests

Protected Area(PA): Means a National Park, asanctuary,a conservation reserve or a community reserve notifiedunder sections 18,35,36C of the Wild Life (Protection) Act,1972

Recorded Forest Area: Same as Forest area, i.e. geographic areas recorded as forests in Government records.

Reserved Forests (RF): An area so constituted under the provisions of the Assam Forest Regulation (1891), having full degree of protection. In Reserved Forests all activities are prohibited unless permitted.

Scheduled Castes (SC): Article 341 of the Indian constitution allows the government to compile a schedule (list) of castes, races, or tribes or parts of groups within castes, races, or tribes that are economically and socially disadvantaged and are therefore entitled to protection and specified benefits under the constitution.

Scheduled Tribes (ST): The Constitution of India does not define Scheduled Tribes as such. According to Article 342 of the Constitution, the Scheduled Tribes are the tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a public notification. The fifth schedule (list) contains the list of tribes or tribal communities that are economically and socially disadvantaged and are entitled to specified benefits. Scheduled Tribes are spread mainly in forest and hilly region.

Trees Outside Forests: Trees growing outside recorded forest areas

Unclassed State Forests: An area recorded as forest but not included in reserved or proposed reserved forest category. Ownership status of such forests varies and may be vested in the State, Autonomous councils or it may even be community owned.

1. Project area description

1.1 Geographical and environmental conditions of project area,

1.1.1 Location and description

Situated between 90° and 96° east longitude and 24° and 28° north latitude, Assam State is bounded by the States of Nagaland, Manipur, Mizoram and Tripura in the south ; Bhutan and the State of Arunachal Pradesh in the north and northeast ; Myanmar in the east ; the States of Meghalaya in the southwest and west Bengal in the west. With 78 438 km^2, Assam is the second largest of the northeastern states of India. Its landscape is dominated by the floodplains of the Brahmaputra valley that covers *72* percent of the state's total area, and the smaller Barak valley in the south. These two valleys are bisected by the hills of Karbi Anglong and North Cachar hills, granite remnants of the old Gondwana shield.

1.1.2 Natural features

Assam is a zone of high seismicity. The 1897 Shillong earthquake and the 1950 Assam earthquake (both above 8,5 on the Richter scale, and counted among the 10 most severe events ever recorded on the planet) have deeply modified the topography and economy of the region. Since the Assam earthquake, the number and extension of floods in the Brahmaputra plain have increased.

The climate is dominated by the subtropical monsoon. The annual rainfall ranges from 1800 mm in the central Kamrup district to 3000 mm in the Barak Valley. Three quarter of the rains fall during the monsoon between June and September. The plains are flooded and the Brahmaputra becomes an inner sea. Autumn and winter are dry seasons and during spring, storms linked to cyclones in the Bengal Gulf occur occasionally.

Assam is part of the Eastern Himalaya biodiversity hotspot, and is home to flagship species such as the Great Indian One Horned Rhinoceros (*Rhinoceros unicornis*) which is the symbol of the State, and the tiger (*Panthera tigris*). The state's forests are among the most biodiversity rich in South Asia.

1.1.3 Landscape and production units

There are two main production systems in Assam. The first one, located in the flood plains is dominated by the Brahmaputra and its vagaries. The principal elements of the landscape mosaic are the bed of the braided Brahmaputra River with its shifting, ephemeral islands called ch*apori*, the irrigated paddy fields, the *beels* (water bodies) devoted to fishing and the household gardens around the habitations. The tea gardens, that produce the famed Assam tea, are located on higher grounds, together with remnants of forest. The second production system is located in the hills, where *jhum* (shifting cultivation) is prevalent. Bamboos, fallows, forest remnants and temporary clearings dot the landscape.

1.2 Description of the livelihoods and socio-economic situation

1.2.1 Population

The total population of Assam is 27 millions of inhabitants (Census of India, 2001). The population density is 340 inhab/km^2, with high variability between the hills (40 inhab/km^2 and 80 inhab/km^2 in the two hill districts) and the plains (600 inhab/km^2). Eighty eight percent (88%) of the population lives in rural areas. The schedules tribes constitute 12% of the total population. It is the only states of the North East where tribals are a minority.

Assam has a large human diversity, with Indo-Aryan, Tibeto-Burmese and Tai language groups being represented. The main group is the « *Assamese* », traditionally hindu and following the caste system. There are nine plain tribes (*Boro, Deori, etc.)* and fourteen hill tribes (*Karbi, Garo, Dimasa* etc.). Other sources mention up to 56 different tribes or sub tribes in the hill districts. Other groups include either Indian or foreign nationals settled in waves since the middle of the 19th century: the tea workers (the so-called tea tribes), brought by the British and coming mainly from the states of Orissa (*Santal, Munda*), Bihar, West Bengal, Madhya Pradesh and Andhra Pradesh; Nepalese; Biharis; Bengalis; Marwaris from Rajasthan. There is also a high diversity of religious practices: Hindus (65% of the total population), Muslims (31%), Christians (4%) are the three major religious groups, but there are also Buddhists and Animists. The literacy rate of Assam is slightly ahead of the national average (Assam: 64%, India: 61%) as is the female literacy rate (Assam: 55%, India: 54 %).

1.2.2 Gender Issues:

The women life expectancy in Assam is 56.6 years, 5.2 years less than their counterparts in the rest of the country. Both men and women in rural Assam can expect to live almost 10 years less than in urban areas. The literacy rates are 25% lower in rural areas than in urban areas. In case of the females, the gaps widens to 30%. The Female Workforce Participation Rate of 20.8 is lower than the national average of 25.7% .Most of them belong to the unskilled labour category. Recently, the Government of Assam has enacted legislation reserving 30% of the government jobs for women.

1.2.3 Economy

The percentage of poor in Assam is the highest among the states of the North East. Around 36% of the population lives below poverty line, against a national average of 26%. Poverty is concentrated in rural areas: four out of ten people in rural Assam are likely to live below poverty line, whereas in the cities, this proportion falls to less than one in ten.

The income and its rate of growth in Assam are both below national standards, and the trend has been increasing over the last thirty years. Assam's per capita income was 27% lower than the Indian average in 1980. It was 46% lower in 1999.

The primary sector is the largest contributor to the Net State Domestic Product (NSDP). But its share has decreased over time, and it now represents around 40% of the NSDP. However, this sector provides employment to 69% of the total workforce. The highest growth has been exhibited by the tertiary sector.

Assam is a major producer of oil and natural gas. Most of the oilfields are located in the Upper Assam region of the Brahmaputra Valley. Assam has four oil refineries with a total capacity of 7 MMTPA (Million Metric Tonnes per annum). Other industries worth mentioning are a chemical fertiliser plant, petrochemical industries, three paper mills, sugar mills and a cement plant. Small scale industries such as saw mills, plywood and veneer mills, jute mill, textile and yarn mills and silk mills can also be found.

Half the male population is engaged in work as per the 2001 Census, whereas less than one fifth of the female population is doing so. Both rates are lower than the Indian average. Unemployment, measured as a percentage of the labour force, is increasing. The rate moved from 2.2% in 1983 to 4.6% in 2000, when the national average stagnated between 2.0% to 2.3%.

1.2.4 Infrastructures, transportation

Assam is landlocked and is linked to the mainland of India by a narrow corridor. There are five civil airports, and one international capable airport (Guwahati), although limited international connection exists as of today (weekly once to Bangkok).The Brahmaputra though suitable for navigation does not have sufficient infrastructure for international trade and is dependent on the diplomatic and trade relationships with Bangladesh. There are two road cum rail bridges, and one road bridge over the Brahmaputra. Construction of two more bridges is in progress.

Assam has a total of 69,000 km of road networks. The National Highway crossing Assam from west to east is being transformed into a four-way. In addition, the opening of Kahao pass (1400m) between Arunachal Pradesh and China, and the construction of roads linking Assam to Yunnan and to Kham, and thus India to South-East Asia should change drastically the situation and have indeed already impacted the economy. It can provide a better access to market to Assam products but may also trigger a flood of foreign goods saturating the local markets.

Mobile telephone services are available throughout the state, and the telecommunication network is growing faster than in other parts of India.

The Assam State Electricity Board (ASEB) has a capacity of 574 MW against a peak demand of 621 MW. Additional projects sponsored by the State are expected to improve the power supply position.

1.2.5 Agricultural systems

The plains are mainly devoted to rice cultivation, with additional revenue from fishing in rivers, *beels* and water tanks, and products from nearby forests. Cattle is used for land tilling and milk production. However small their productivity, the hardy local breeds, with their low upkeep costs, act as safety nets for the households and also play a significant social role, giving their owner status. Livestock population is 14 M heads (Livestock Census 2003), and had decreased by 14% since 1992.

Some groups such as the Nepalese inhabitants are specialized in cattle breeding especially buffaloes for milk production. These breeders used to drive their herds from the *chaporis* (islands on the Brahmaputra) to the hills. Finding grazing grounds has become difficult and they often drive their herds in reserve forests and protected areas.

The lack of irrigation facilities explain that there is generally only one crop of rice, based on the monsoon. Mustard is then generally planted off season. However, motor pumps for irrigation are being introduced, enabling farmers to have multiple crops a year.

Home gardens are frequent and contain a variety of products that supplement the household needs. Plots are devoted to horticulture and arboriculture where different kinds of palms, bananas, mangos, bamboos, etc. are planted. Forest trees are also maintained such as *Simul* (*Bombax ceiba*). Many of these products are sold to the nearby market.

Intensive tea cultivation in “tea gardens” was initiated by the British. The tea gardens now represent one third of the revenues coming from agriculture. There were 49,102 tea gardens in Assam in 2005, employing 6,20,000 workers. They produce 50% of India’s tea and 15% of the world’s total tea production. Guwahati is the largest tea auction market in India. The processing plants in Assam use coal and other energy sources for drying the tea leaves. It takes between 1 and 1.5 kg of coal to produce 1 kg of made tea. The sector is facing difficulties, and tea is becoming less profitable. There is a definite push to diversify the production and reduce costs. Tea workers no more employed in the Tea gardens are among the poorest of the poor in Assam.

The other main crops of Assam, besides rice and tea, are wheat, potato, cotton, maize, jute (one of the biggest producer of India), oilseeds and more recently coffee, rubber and ramie. The state is also an important producer of silk. Around 10 000 villages are involved in sericulture. Handicrafts are produced using local cane and bamboo.

In the hills of Assam, tribal agriculturists engage in *jhum*¸ or shifting cultivation. All their economic and cultural practices have traditionally revolved around this. The rotation cycles have come down from 20 years to 5-10 years on account of the increased population pressure. In the jhum, they plant rainfed rice, with a variety of other crops: mustard, millets, pulses, vegetables, tubers, chillies etc. The plots are neither ploughed nor manured. Cattle are therefore much less important than in other parts of the state.

Energy needs of local communities are mostly met with firewood, in the plains as in the hills. Community surveys suggest that households relied on firewood for about 80 % of their energy needs, primarily for cooking. An estimated 60% percent of rural households obtain their wood from home grown sources or collection in forests and *chaporis*.

1.2.6 Other activities

Besides agriculture, villagers are often involved in cottage industry particularly cane and bamboo crafts, carpentry etc. The products of the cottage industries can be sold in local markets but they don't fetch a good price. Due to low returns from agriculture, acting as hired labour forms an important additional source of income for many farmers. Forest Department, Oil companies and stone quarries are the main sources of employment. The minimum wages has been fixed by the State Government and the rate in May 2010 is Rs.114/day for unskilled labour. Rate of minimum wages payable to labourers is revised periodically. In addition, during February, March and April some men from landless households migrate to nearby urban areas, in order to work as daily wage labourers.

Tourism activities are progressively increasing and communities located in the vicinity of PAs have begun to set up eco-villages or to run lodges and hotels. In Assam, the revenue earned from tourist lodges was 60 lakhs INR (0.1 M€) in 2004-05 and 95 lakhs INR (0.15 M€) in 2007-08. In 2005, Assam received 2.3 M tourists, among which 2.29 M were Indians and 7,300 foreigners. Among them, 12 000 Indians and 500 foreigners went to Kaziranga. Until 2005, Manas National Park was closed for tourists due to insurgency problems. In 2005, 14,000 Indians and 72 foreigners went there.

1.2.7 Political setup:

The State of Assam is witnessing socio-political stability in administration of governance. Till few years back Assam was plagued with the problem of insurgency. But of late, this problem is on decline and the law and order situation has improved to a great extent. Moreover, insurgency has not been a factor in implementation of developmental activities in the State for the reason that developmental activities benefit the common masses. A case in point is the World Bank assisted NaRMIL Project which made a modest beginning in the year 2006 covering only two districts but has now been extended to seven more. In addition, quite a few centrally sponsored schemes are being implemented by the State Forest Department successfully.

For governance in the tribal dominated areas there exits a separate constitutional provision for devolution of executive and legislative powers to the local communities. The sixth schedule of the Constitution of India created special provisions for the administration of the tribal areas in the states of Assam, Maghalaya, Tripura and Mizoram. In the case of Assam, three regions have benefited from this status: Dima Hasao (North Cachar Hills), Karbi Anglong and Bodoland and have autonomous administrative setup- the Karbi Anglong Autonomous Council, the Dima Hasao (NC Hills) Autonomous Council and the Bodoland Territorial Area Districts respectively (see §0). This arrangement has empowered the tribal people in decision making and implementation of developmental schemes.

1.3 Forestry and forest development situation in the Project area

Assam is part of the Eastern Himalaya Biodiversity hotspot and is home to flagship species such as the Great Indian One Horned Rhinoceros (*Rhinoceros unicornis*) and the tiger (*Panthera tigris*). The Kaziranga National Park has recorded highest density of tigers (32/100 sq.km) in the world in a survey conducted recently. Protected areas(PAs) represent 5% and forests cover 35% of the total geographical area of the State, both categories overlapping. The main timber species are *Hollong* (Dipterocarpus macrocarpus), *Hollock* (Terminalia myriocarpa), *Mekai* (Shorea assamica),

Teak (*Tectona grandis*) and Sal (*Shorea robusta*). Another major product of the forest is bamboo ,the poor man's timber, which has now become the raw material for a variety of commercial products. Timber is used by the wood based industries including plywood and bamboos are consumed in large measures by the paper industries.

1.3.1 Recorded Forest Area

The Recorded Forests Area (RFA) of Assam is 26, 748 km² (35% of the total geographical area). It includes Reserved Forests (312 RFs, 13,870 km², 52% of the RFA), Proposed Reserved Forests (145 PRFs, 3,103 km², 12% of the RFA), Protected Areas (3,925 km², 15% of the RFA) and Unclassed State Forests (5,865 km², 33% of the RFA).

1.3.2 Protected Areas

Assam has 5 National Parks and 18 Wildlife sanctuaries. Together they cover 3,925 km² and 5% of the total geographical area of the State. In addition, some of these are also Tiger Reserves e.g. Kaziranga, Manas and Nameri. Manas and Dibru-Saikhowa NPs with an area of 2,837 km²and 765 km^2 respectively are also Biosphere Reserves. Both Kaziranga National Park and Manas National Park are UNESCO World Heritage Sites.

1.3.3 Forest Cover

India uses a forest classification scheme developed by Champion and Seth. According to this scheme, the State has 16 forest sub-types which belong to 5 forest types viz. Tropical Wet Evergreen, Tropical Semi Evergreen, Tropical Moist Deciduous, Tropical Dry Deciduous, and subtropical Pine Forests.

Based on satellite data from 2006-2007, the Forest Survey of India (FSI) has identified the forest cover of the State of Assam. The total forest cover in Assam is 27,645 km² (2.7 M ha). In terms of canopy density, the State has 1, 461 km² of very dense forests (canopy cover above 70%), 11, 558 km² of moderately dense forest (canopy cover between 40% and 70%) and 14, 673 km² of open forests (Canopy cover between 10% and 40%). Between 2004 and 2006, there is a recorded loss of 66 km² of forest cover, half of it concentrated in the open forest component. This loss is attributed by the FSI to encroachment in insurgency affected areas and to shifting cultivation in the hill districts.

Forest cover does not necessarily overlap with the Recorded Forest Areas. Approximately 900 km² of forest cover is not recorded and half of the recorded forest shows a canopy cover below 40%.

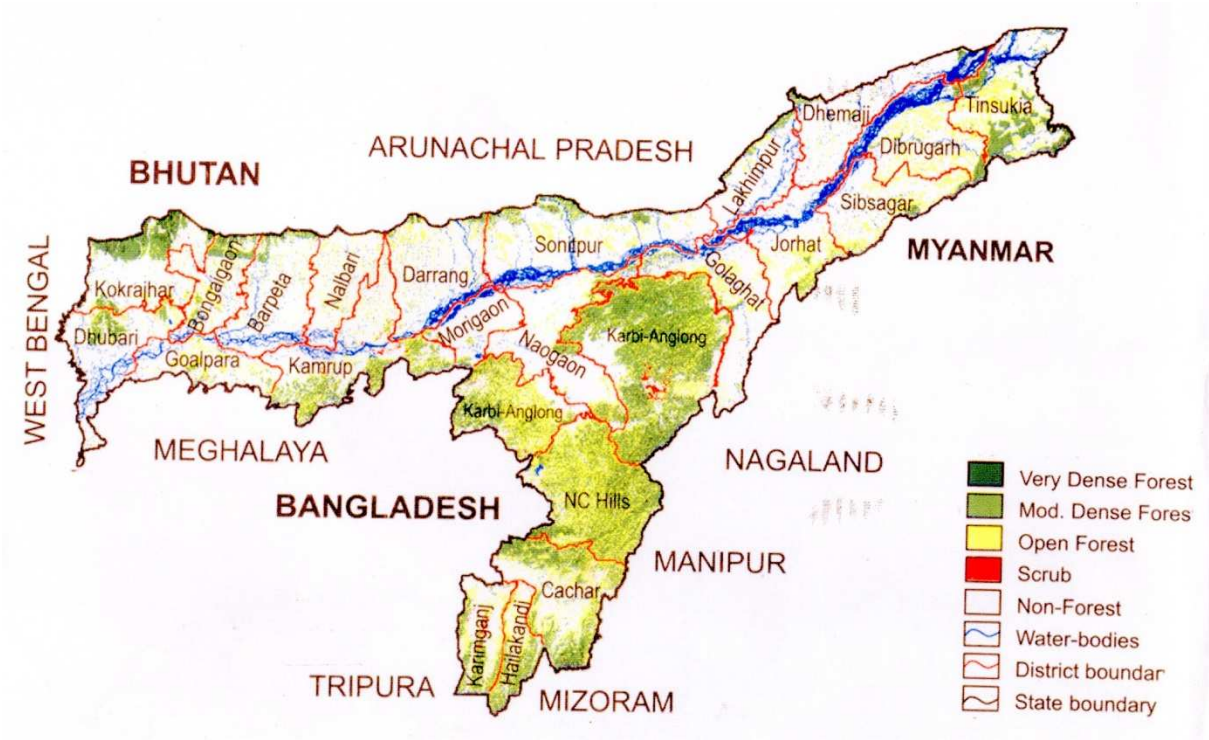

Figure: 1. Forest Cover Map of Assam, 2007.

Source : http://assamforest.in/forestGlance/images/forestDistribution.jpg (accessed on February 2010)

A total of 1,04, 342 ha have been planted under various schemes since 1992 to 2007. The effective rate of forest cover of the recent plantations is not known.

1.3.4 Forest villages and Encroachments

Forest Villages are hamlets established under the provision of the Assam Forest Regulations (VII) of 1891, to meet requirements of labour for various forestry works. The workers and their families were settled inside the area of the Reserve Forest. The inhabitants of the Forest Villages, though formally allotted forest land by the Forest Department for dwelling and cultivation purposes, have no legal land tenure over the allotted land. With the decline in timber harvesting centered forestry operations following the enactment of the Forest Conservation Act (1980) and the Supreme Court's order (1996), these villagers have lost their main source of livelihood. And lack of legal property right over forest land allotted to them was the main impediment in accessing credits and loans from commercial institutions. There are altogether 499 such forest villages recognised by the Forest Department of Assam. Both the national policy and legislation now mandates that such forest villagers be given *patt or title deed* for the forest land in their possession.

In addition, the Forest Department refers to as encroachers all conversions from forest to agricultural land carried out inside the boundaries of the Reserved Forests These can happen piecemeal as a result of individual initiatives by farmers in search of land, or be large scale, involving the resettlement of entire villages. The Forest Department estimates that there are around 3,500 km² of encroachments in Reserved Forests, involving about 70, 000 households (data from 2003).

1.3.5 Forestry Operations and Working Plans

Assam Sate Forest Department is the custodian of the forests in the State. It controls and administers the areas notified as Reserved Forests and Protected Areas. The Unclassed State Forests (USFs) remain under the control of the Revenue Department. The Assam State Forest Department is currently enforcing conservation oriented forest management including Working Plan prescribed timber harvesting.

There are no management prescriptions for the USFs. The Reserve Forests are managed through working plan prescriptions executed by the territorial division concerned. A Working Plan (WP) is a document for medium term (10 years) management of forestry resources at the scale of a forest division. They are prepared as per the working plan code approved by the Government of India (Annex I – MoEF Working Plan Guidelines). The Protected Areas are managed through a Management Plan, under the control of the Wildlife division concerned.

Under the working plan, RF areas are divided into blocks and compartments (lower most management unit) using the natural features, fire lines and roads. These units are administratively under the charge of the foresters and guards (lower most rung of forest administrative staff). The field staff maintains a 'compartment history', which includes activities, fire incidents, encroachments, felling, plantations, diseases, weeds etc. Blocks and compartments are grouped into thematic 'working circles' (fire protection circle, bamboo extraction circle, NWFP collection, felling series, plantation etc.), which prescribe requisite silvicultural treatments and works to be undertaken during the working plan period.

Working plans were prepared using traditional method of field surveys and quantitative assessment of resources. However, the lastest working plans and also those under preparation are based on Remote Sensing data are prepared using limited GIS facility available with the department. Based on this, a stock map (1:15,000 scale) for each compartment is prepared to highlight the resources, status, including age and species. Working plan document gives details about the prescriptions for each circle, interventions, rules, infrastructure and revenue and expenditure projection.

The Supreme Court Order dated 12/12/1996 passed on the Public Interest Litigation W.P.(C) No202/95 T. N Godavarman Thirumulpad Vs Union of India MoEF Working Plan Guidelines

Annex II – Supreme Court Ruling 1996Supreme Court Ruling 1996 suspended the felling of trees in all forests except in accordance with the working plans prepared by the State Forest Department and as approved by the Central Government. Such approved Working Plans have therefore a legal value and are the mainstay of forest management.

The WPs are prepared by the Working Plan Division and the existing 4 Divisions are burdened with task of writing/revising Working Plans for 32 Territorial Divisions in Assam. As of today, only 5 working plans are approved and operational for obvious reasons.

1.3.6 Participatory Forest Management

India has adopted Joint Forest Management (JFM) as its primary vehicle for participatory forest management. Joint Forest Management (JFM) is a concept of developing partnerships between forest user groups and the Forest Department (FD) on the basis of mutual trust and jointly defined roles and responsibilities with regard to forest protection and development. In JFM, the user (local communities) and the owner (Government) manage the resource and share the benefits. The rules for sharing the benefits are the key element of the JFM rules and condition to a great extent the success or failure of the process.

The Assam Forest Policy (2004) states that JFM practices would form the basis of forest management in the State. In order to implement this policy, Joint Forest Management Committees (JFMCs) are created at the village level. The guidelines for the creation of the committees follow the guidelines of the National Afforestation Program (NAP, see Annex V – NAP Revised Operational Guidelines 2009). Each constituted JFMC prepares a microplan with the support of a frontline forest department officer (generally a forester acting as the secretary to the JFMC). Cooperation of line departments is taken for inclusion of all such activities in the micro-plan for implementation of which assistance of those departments is called for. This way the JFMCs also implement developmental activities of other line departments. The microplan, based on a Participatory Rural

Appraisal (PRA), lists and prioritises the developmental activities including forest activities that a JFM committee will undertake in the following 5 years, as well as proposed entry-point activities planned to gain the adhesion of the village community to the objectives of forest conservation. The forest related activities contemplated in the microplan essentially deal with plantations, assisted natural regeneration, fuel wood and bamboo and NTFP plantations.

The roles of the members of the JFMC are generally restricted to the implementation of the forestry and other developmental works, and there is limited decision power bestowed to them. The Assam Forest Policy (2004) mentions "*the abundant potential of people living in rural and forest areas [that] would be taped for sound participatory forest management*". A working plan (1999-2011) mentions that the chief aim of the PRA exercise is "*to make [the forest dweller] understand the importance of forestry and allow him to actively/passively participate in forest protection*". In areas where *jhum* cultivation is present, the objective of the PRA is to "*win over the villagers away from jhuming and rehabilitate the forest and carry out capacity building of the forest dweller".*

The Assam Forest Policy (2004) has recognized the increased emphasis put on greater involvement of the communities in forest management. It proposes to gradually shift to a model of Community Forest Management (CFM), without developing further the concept.

The Assam Forest Department has created around 1,300 JFMCs, out of which 550 are involved in the implementation of the National Afforestation Program. These represent a population of over four lakh beneficiaries (http://assamforest.in/forestGlance/assamForest_glance.php; accessed Feb. 2010). A pilot project (Natural Resource Management & Integrated Livelihood Project, NaRMIL) led by the World Bank, currently being implemented in 9 divisions with 10, 000 beneficiaries, has proposed revised guidelines for the JFMC (Annex VI – NaRMIL Guidelines 2009).

1.4 Relevant local governance structures in the proposed area.

There are different governance structures that are involved in the forest and forest resources management, both at local and state level.

The Ministry of Environment and Forests,GOI

The Assam Forest Department

The Assam Revenue Department

The Panchayati Raj Institutions and the Gram Sabha

The Autonomous Councils, the Gaonburah and other traditional institutions

The State and district Forest Development Agencies

The Joint Forest Management Committees and the Eco-Development Committees

1.4.1 Ministry of Environment and Forests

The **Ministry of Environment and Forests** (MoEF) under the Governemnt of India is the lead agency for forestry and wildlife management. It frames rules and issues guidelines that will then be translated by the State Governments. It delivers central and external financial assistance to the states and communities through specific programs like the National Afforestation Programme.

1.4.2 Assam Forest Department and Revenue Department

The **Assam Forest Department** is proposed to act as the implementing agency of this project. It has a Principal Chief Conservator of Forests and Head of Forest Force (PCCF &HFF) at its head who reports to the State Government. The Forest Department is organised in wings each having a distinct task. The major wings are (i) territorial, (ii) wildlife), (iii) social forestry and (iv) research, education and planning, each headed by an officer in the rank of Chief Conservator of Forests (CCF) with the exclusion of the Wildlife wing whose head has the rank of PCCF. Conservators of Forests (CFs) and Divisional Forest Officers (DFOs) are the senior officers operating at the circle

(CF) and division (DFO) levels respectively. All officers from PCCF to CF belong to the Indian Forest Service (IFS), Assam- Meghalaya cadre. The DFOs and Assistant Conservator of Forests (ACFs) are both from IFS and State Forest Service (SFS). Below the DFO, the frontline staff are the Rangers, Foresters and Guards. These are the officers that have a day-today contact with the field and the public. The organisational chart of the Forest Department is provided in Annex III – Organization Chart of the Assam Forest Department.

The **Revenue Department** has authority over the land in the Unclassed State Forests and is responsible for the notification process that leads to the reservation of a forest.

1.4.3 Panchayati Raj Institutions and the Gram Sabah

The **Panchayati Raj Institutions** are the grass-root units of local self-government in India. In Assam, the Assam Panchayat Act 1994 introduces a three-tier system – Gaon Panchayat (village), Anchalik Panchayat (several villages) and Zilla Parishad (district). Elections are held every five years, with reservation of seats for Scheduled Castes, Scheduled Tribes and Women (73rd Amendment of the Constitution, 1992). The Gaon Panchayat prepares the annual development plans for the villages, mobilizes reliefs iduring natural calamities, is responsible for removal of encroachments on public properties, organizes voluntary labour and contribution for community works and maintains village statistics. The Anchalik Panchayat and the Zilla Parishad aggregate the plans of the Gaon Panchayat and ensure the coordinated implementation of such plans.

The **Gram Sabha** means a body consisting of all persons registered in the electoral rolls of a village comprised within the area of a Gaon Panchayat. It is the institution where villagers discuss developmental issues, initiate development programmes, mobilize voluntary labour and contributions in kind and cash for the community welfare programmes and select beneficiaries for the schemes. The Gram Sabha and other village level institutions in areas where they are holders of any forest rights under the Forest Rights Act (2006) have been endowed with responsibility to protect wildlife, forest and biodiversity, prevent destructive practices affecting their cultural and natural heritage and regulate access to community forest resources. The Gram Sabha has also the authority to initiate the process for determining the nature and extent of individual and community forest rights within the local limits of its jurisdiction (see Annex IV – Forest Rights Act 2006).

1.4.4 Autonomous Councils and the Gaonburah

There are three **Autonomous Councils** in Assam, created under the sixth schedule of the Constitution:the Bodoland Territorial Area Districts,the Dima Hasao (North Cachar Hills) Autonomous Council and the Karbi Anglong Autonomous Council. The article (244) of the constitution provides for a separate scheme of administration for the tribal areas designated as “autonomous districts”. The Panchayati Raj Institutions do not extend to these areas. These councils have certain legislative and executive functions vested in them. They are empowered to legislate upon all the subjects transferred which *interalia* included the allotment, occupation and use of land; the management of forests other than reserve forests; the use of canals and watercourses for agriculture, and the regulation of the practice of *jhum* or other forms of shifting cultivation. In the field of forestry, they are in charge of the human resources, financial management, and implementation of the forestry sector development programmes. The revenue from forestry operations accrues to them, and is afterwards reflected in the State budget. They can constitute District Council Reserve Forest (DCRF). The Conservator of Forest (CF) and Divisional Forest Officers (DFO) under the Council’s authority are borrowed from the Assam Forest Department.

The **Gaonburah** (village headman) **and other traditional institutions** reflect the varied customs and traditions of the North East. The tribes of the North East, and more specifically of Assam, are not homogeneous. They differ with respect to the languages they speak, the geographical terrain they inhabit and their livelihoods. Assam has representatives of the Bodo, Kachari, Rabha, Dimasa, Karbi, Mising, Koch, Rajbonshi, Tiwa, Garo, Gangte, Hmar, Hajong and Khasi-

pnars and the list is not exhaustive. Each tribe has its own traditional institutions and land ownership practices (Nongkynrih, 2008).

In their traditions, Karbi villages shift according to the availability of *jhum* sites. Cultivable land is divided among the households by the village council (*Me*) at the first settlement of a village in a new locality. Land is mostly community owned. Most villages were named after the headman. The title of headman conferred honour to the person in social, religious and cultural transactions in the village. The village council settles social disputes by a majority decision.

The Bodos practice private ownership of land on annual or periodic *patta* (title deed) basis. All lands are owned and managed privately, except for the grazing ground, playground, place of worship and school that is owned by the village community.

The Dimasa have a dual system of parallel matrilineal and patrilineal clans, with brothers and sisters sharing common property. The basis of land ownership is the community, controlled by the village council, all of whose members are men. But they are now moving to individual land ownership, partially through the influence of schemes encouraging perennial cash crops (coffee and tea) based on loans and subsidies offered to individual owners.

These examples highlight the diversity of practices and local governance institutions that play a role in the management of the natural resources in an area. However, many of these are gradually getting undermined by the new administrative set up. Decision power on granting individual ownership of land is vested in the Autonomous Councils. Similarly, the Gaonburah does not have much of a role in the new administration (Bathari, 2008).

In practice, the traditional political institutions continue to function as political bodies of the tribes. But they lack access to and control over funding, and no longer have the authority they may have had. There are exceptions though. Villages under customary law have been successful in protecting and preserving the forest areas near their community, outside the recent framework of JFM. One such example is Upparthala in Golpara District. These successful institutions have often been formally recognized to become JFMC under the NAP program.

1.4.5 Joint Forest Management Committees and Eco-Development Committees

The **Joint Forest Management Committees** are the local institutions that channel the current mode of participatory forest management. Their composition and *modus operandi* are defined by the Assam Joint (people's participation) Forestry Management Rules (1998), and the Guidelines of the National Afforestation Program (2009) (Annex VII – Assam Joint (people's participation) Forestry Management Rules (1998); Annex V – NAP Revised Operational Guidelines 2009). The JFMCs are also used to channel funds from centrally sponsored schemes to the villages located in remote areas.

The JFMCs are constituted in villages. All adult villagers are eligible to become members of the General Body (generally membership of a household given to a female and a male). NGOs and Voluntary Associations are associated as facilitators. There is an Executive Body comprising the Gaonburah or a representative of the Panchayat, 10 (including at least 3 women) members elected from the General Body, and one forest personnel in the rank not less than of Forester grade- I, as member secretary of the executive body.

The MoEF guidelines 2000 suggest registering JFMCs under the Societies Registration Act, (1860), giving them legal existence. At present, they are only recognized by a Memorandum of Understanding (MoU) signed with the Forest Department. This MoU is not legally binding, and disputes can only be settled through criminal litigations. There is currently no possibility for a civil arbitration.

The areas that can be targeted by the activities of the JFMC are degraded and peripherial areas of the Reserved Forests, and areas outside the RF. A JFMC is not expected to manage more than 5 ha land per beneficiaries for natural regeneration and 2 ha for intensive planting.

The duties and responsibilities of the JFMCs are to ensure protection of forests and plantations, to ensure execution of forestry works (plantations, thinning, removal of dead trees, fire line maintenance, gully plugging, etc.), to prevent trespass, encroachment, grazing, fire, theft or damage or use of the land for agricultural purpose and to apprehend or assist the forest personnel in apprehension of persons committing any of these offences.

The benefits include collection of NTFP, dead and fallen leaves and wood, use of the usufructs of thinning and felling for their own consumption in accordance with rules in force and guidelines, if any and a share (50% for thinning, 25% for felling) of the sale value of the surplus of thinning and felling minus the direct cost of harvest.

The activities to be undertaken by a JFMCs are detailed in a microplan prepared by the field Forest Officer and the General Body through Participatory Rural Appraisal (Figure 1). It contains detailed information on the socio-economic condition of the village and also contemplates Entry Point Activities such as: construction of community halls, ring well for potable water, improvement of village roads, village infrastructure improvement). Other line departments extend their co-operation in designing the microplan, as the topics covered may not necessarily match the skills and responsibilities of the forester involved in drafting. The microplan is approved by the Chairman of the Forest Development Agency (The Conservator of Forests of the given circle) to which the JFMC belongs. The microplans are supposed to be integrated in the Working Plan of the division where they are located, but this does not seem to always happen, partially because only five of the WPs are operational at present.

In terms of fund flow, JFMCs can maintain several bank accounts, jointly operated by the president and the member secretary. Each account is used to manage the specific funds of a given scheme. Under the World Bank assisted NaRMIL project, an additional, community account was created. This community account is operated jointly by the president and the treasurer, without interference from the Forest Department (see Annex VI – NaRMIL Guidelines 2009).

Figure 1 Noapara JFMC PRA 22 April 2008 (source:Kamrup West Forest Division, Assam)

According to the Assam State Forest Department, there are today 1,300 Joint Forest Management Committees (JFMCs), covering 76, 327 households and managing around 30, 000 ha of forests in Assam. Many of them however are not functional, for lack of funds.

The **Eco-Development Committees** (EDC) are similar in many ways to the JMFCs. The main distinction is that EDCs are created around Protected Areas (National Parks and Wildlife Sanctuaries), where no provision for extracting resources or sharing benefits from forest products is contemplated. The main focus here is on conservation and the entry point and other livelihood activities are considered as an opportunity to generate income outside the forest, to reduce the pressure on the protected area. EDCs generally follow the same guidelines in terms of structure and operation as the JFMCs. They interact essentially with the wildlife wing of the Forest Department.

1.4.6 Forest Development Agencies

The **Forest Development Agency** (FDA) is an association of JFMCs at the Division level. FDAs have been constituted after following issuance of guidelines from the National Afforestation and Eco-Development Board (MoEF, GoI) for the implementation of the National Afforestation Program (NAP) (See Annex V – NAP Revised Operational Guidelines 2009). Their scope was later expanded to encompass other projects. FDAs are registered under the Societies Registration Act (1860). This empowers them to directly receive funds from the Central and State Governments and other government agencies (Foreign funds need to be channeled through the GoI). The Conservator of Forests of the concerned Circle is the Chairperson of the FDA, and the DFO is the CEO and secretary. The Executive Body of the FDA, has besides Forest Officers, representatives from other line departments including that of the Deputy Commissioner together with members of the Zila Parishad. Other members are the presidents and secretaries (Forester) of all the JFMCs within the Division.

The FDA has an annual work program that needs to be approved by its Executive Body which meets once in 6 moths, and if a deviation in the implementation is required, the exec body is required to give its consent. The FDA annual work program is a clubbing of the JFMC's annual work programmes. The FDA receives funds from the projects and transfers them to the JFMCs after CEO's approval. The FDA also monitors the implementation of the projects undertaken by the JFMCs, and can suggest corrections to the JFMC microplan (technical support). The FDAs organise training programs for JFMC members.

State Forest Development Agency is envisaged to be constituted as per the National Afforestation and Eco-development Board's revised Operational Guidelines 2009 under NAP (Annex V – NAP Revised Operational Guidelines 2009). It is the State Level apex confederation of the FDAs, for effectively coordinating implementation of schemes under the NAP and other projects. It has not yet been created in Assam but will be constituted soon.

It will be a registered society and will function as a federation of the FDAs in the State. It will have a Governing Body and an Executive Council. The PCCF &HFF acts as Chairperson and the two bodies will have members including the chairpersons of the FDAs, representatives of the State Revenue, the Tribal,the Rural Development, Panchayati Raj Departments and co-opted members who can be from amongst the JFMCs. Its objective is to support and coordinate implementation of schemes aimed at eco-restoration, sustainable use and management of forest resources in collaboration with forest dependent communities and enhancement of their livelihood support system. SFDA can receive funds from the state and the Central Governments and other Government agencies and disburse it to the FDAs as per work schedule of the constituting JFMCs. The SFDA will accord approval to the Annual Work Programme and may do amendments, reformulation either directly or by issuing directives and monitor and evaluate works being implemented.

JFMCs, FDAs and SFDA constitute a pyramid of institutions to channel funds for participatory forest management to the village level, and coordinate the activities of the JFMCs. However, the representativeness of the local communities is reduced at the higher levels of integration, and the Forest Department's role increases. There are 10 to 12 members of the village communities for 1 forest official in the JFMC. In the FDA, there are 50% + 2 representatives of the Forest Department (the secretaries of the JFMCs plus the Chairman and CEO) against 50%-2 (The presidents of the

JFMC) representatives of the villages. In the SFDA, any direct representation of the villages is only in the form of co-opted members.

1.5 National and local policies that affect the management of forests

1.5.1 Assam Forest Regulation , 1891

The State of Assam has a unique legal framework on forests within which it operates. The Assam Forest Regulation (1891) is the operative law rather the Indian Forest Act (1927). Thus the applicable state forest law is enacted after the 1878 Forest Act rather than the consolidation Act of 1927.

Under the Assam Forest Regulation (1891), forests may exist in at least four categories: Reserved Forests, Village Forests, Unclassed State Forests and those forests and wasteland which are not the property of the government. The term "unsettled tracts" has also been used in the Regulation and the state government has been empowered to reserve trees in such unsettled tracts.

It is the AFR (1891) that describes the process of settlement of rights in the process of reserving forests. It also provides for the establishment and the control of forest villages. It vests the control of all timber and other forest produce in transit in the State and empowers it to make rules to regulate their transit. These include rules prescribing the routes by which timber or other forest produce may be imported, exported or moved in the State, procedure for issuance of passes required for the export, import or movement of forest produce, establishment of revenue stations in the state, penalties imposed for contravening the above-mentioned conditions, etc.

1.5.2 Karbi Anglong (Mikir) Hills District Forest Act, 1957

There are striking similarities between the AFR (1891) and the *Karbi Anglong (Mikir) Hills District Forest Act,* enacted by the District Council, blurring the distinction between state control and community control of forests. Under the *Karbi Anglong* Forest Act, the Executive Committee of the District Council is empowered to constitute any land at the disposal of the District Council into a "Village Forest" for the collective benefit of the village community[1]. It can also enact rules regulating the management of village forests. Further it can prescribe the conditions under which the village community for whose collective benefit the village forest is constituted may be provided with forest produce or with pasture or their duties with respect to the protection and improvement of such forests.

Another statute relevant to the Karbi Anglong District, having implications on forestry, is the *Mikir Hills District (Transfer of Land) Act of 1959*.2 This Act provides for the regulation and control of transfer of land in the Mikir Hills District with a view to promote the interest of the inhabitants. Such protective legislation ensures a continuity of title within the tribal community. The above Act can provide a good policy environment to promote participatory forestry in the lands, which have forests and are owned privately by tribals.

The decision of the GOI to adopt a different approach to local government and resource management in northeastern States such as Assam reflects recognition of the unique historical and cultural context of the region, and awareness that local community resource management systems require special recognition and support. More remote areas with strong tribal controls were generally given greater autonomy, while lowland regions with valuable and accessible timber were generally designated as state controlled reserved and unclassed forest.

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1 Note that this village forest is different from the one that is envisaged under the Assam Forest Regulation (1891) or the Indian Forest Act, 1927.

2 passed under Notification No.TAD/R/84/56dated the 15th June ,1959,in pursuance of Paragraph II of the Sixth Schedule to the Constitution of India.

1.5.3 Assam (Control of Felling and Removal of Trees from Non-Forest Lands) Rules, 2002

These rules prescribe how tree plantations raised in non recorded forest areas by individuals or institutions are to be governed. They specify which plantations need to be registered, which tree species do not require felling permission, what process is to be followed in order to fell trees outside non recorded forest areas, how is the transit of timber originating from non recorded forest areas regulated and how an why timber can be confiscated to the Government. These rules will condition the success of any agro-forestry or energy plantation initiative proposed by the project on private or revenue lands (see Annex VIII – Assam (Control of Felling and Removal of Trees from Non-Forest Lands) Rules, 2002

1.5.4 Jhum (Swidden) Cultivation

The Assam policy like the National Policy regards shifting cultivation as detrimental to the environment but at the same time also recognizes its significance as an "emotional and cultural heritage with the Hill tribes[3]." The state policy therefore advocates "an Integrated Area Development Programme with due respect towards tradition and culture," to tackle the problems related to *jhumming*. The policy envisages rehabilitation of the lands through "innovative community based afforestation/agro-forestry schemes, with the forest department as the nodal agency to ensure primacy of conservation.

While the present Policy statements envision *jhum* in the negative, traditionally there has been recognition to this practice and there has been a constant struggle to balance conservation priorities with livelihood needs even through legal instruments.

1.5.5 Other Law and Policy Concerns on Forestry

There are a number of other laws that has a bearing on forestry development and management. These include the Assam Forest Protection Act (1986), the Assam Panchayat Act (1994) where there may be overlaps in the roles of statutory bodies like the Panchayati Raj Institutions with JFMCs; role of Tribal Autonomous Councils other than the three Autonomous District Councils in the context of forestry management needs to be clarified, and the *Mahal* Rules where the rights under the said rules and the usufructs under the JFM may compete for the same resource.

Then there are judicially influenced Executive Policies such as Removal of Trees from Non-Forest Lands, Royalty on Timber and Forest Produce, Revolving Fund, Movement of timber through railways and Estate for Wood Based Industries. This plethora of laws and how they overlap and whether they are impeding or advancing needs to be thoroughly examined. Legal reforms may be necessary. Thus for example Agarwood (*Aquilaria agallocha*) may be very profitable economically but may attract International law provisions such as CITES. These aspects need a careful examination and review.

1.5.6 Assam Forest Policy, 2004

In 2004 the Assam Forest Policy was drafted, keeping in mind the provisions of the National forest policy and the special needs of the state.

The Assam Forest Policy (2004) was drafted because the State perceived it had been losing its biodiversity and forest cover for a variety of reasons:

- the displacements of thousands of people and their cattle due to the changes in river flow dynamics happening in the aftermath of the 1950 earthquake
- the massive population increase and organized settlements in the reserved forests,

3 S4.3.5

- the grazing and poaching in the protected areas
- the inadequacy in addressing the needs of the people, leading to the development of informal practices threatening the sustainability of the forest resources

The Assam Forest Policy (2004) framework is progressive and detailed, covering various aspects of forestry development, marketing, research and extension. It defines itself as environment and peoples friendly. Its objectives are (i) to maintain environmental stability, (ii) to conserve the natural heritage of the state, (iii) to provide livelihood support and alternatives to forest fringe dwellers, (iv) to increase the tree cover of the State, (v) to meet the livelihood needs of rural poor and tribes in fuel wood and NTFP, (vi) to demarcate all forest lands, irrespective of ownership, (vi) to promote research on forest related topics and (vii) to encourage the conservation of the genetic diversity and the traditional ecological knowledge of Assam. The policy proposes to enroll people's participation to achieve these objectives.

JFM is contemplated all through the policy document as the means to involve local communities. It is presented as the basis of forest management in the State. It also hints towards the need to evolve from Joint Forest Management to Community Forest Management, without defining what is understood as CFM.

The Assam Forest Policy (2004) contemplates many of the elements that have also been discussed while preparing the **Assam Project on Biodiversity and Forest Conservation**. The issues listed in the AFP (2004) have also been listed in the problem assessment phase. The objectives and many of the components of the Assam Project on Forest and Biodiversity Conservation also match those discussed of the Assam Forest Policy. In that respect, it seems that the project is understood as a means for the Assam Forest Department to achieve the policy it framed in 2004.

1.5.7 Forest Rights Act, 2006

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act ,2006 (FRA 2006) recognizes and vests the forest rights including occupation of forest lands in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forest for generations but whose tight could not be recorded. It provides a framework for recording these rights. This text seeks to undo a historic injustice done to the tribal communities and other forest dwellers whose rights were not recorded during the forest reservation processes, during the colonial period and in independent India.

The FRA 2006 defines the possible beneficiaries as the "forest dwelling Scheduled Tribes" primarily residing in and who depend on the forest or forest land for *bona fide* livelihood. It also includes "other traditional forest dwellers", members of non Scheduled Tribes that have been primarily residing in and depending on the forest or forest land for at least three generations prior to 13th December 2005.

The FRA identifies 13 different rights that can be claimed by the beneficiaries, including among others:

- the right to hold and live in the forest land under the individual or common occupation, for habitation or for self-cultivation;
- the right of conversion of any title deed issued on forest lands by local authorities or State governments into titles;
- the right to protect, regenerate or conserve or manage any community forest resource which they have been protecting and conserving for sustainable use
- the right of settlement and conversion of forest villages, whether recorded, notified or not into revenue villages

- and the right of access to biodiversity and community rights to intellectual property and traditional knowledge related to biodiversity and cultural diversity

These rights can be claimed in any "forest land" defined by the Act as land of any description falling within any forest area and including unclassified forests, undemarcated forests, existing or deemed forests, protected forests, reserved forests, Sanctuaries and even National Parks. These rights will be heritable but not alienable or transferable.

The text empowers the holders of the rights, including the Gram Sabah or other village level institutions to protect the wildlife, forest and biodiversity, to ensure their habitat is preserved from destructive practices and regulate and control access to community forest resources.

The Gram Sabha is the authority to initiate the process for determining the rights, be they individual or community based. Once recorded, verified and consolidated, the claims are transferred to a Sub-Divisional Committee where they can be opposed by any person aggrieved by the resolution of the Gram Sabha .A District Level Committee has the final decision on the claim, with a second window for petitions being opened at this level. The different committees involved are composed by officers of the department of Revenue, Forest and Tribal Affaires, as well as members of the Panchayati Raj Institutions (at least two of them being Scheduled Tribes and one a woman).

This text therefore proposes a framework to recognize individual rights over forest land, but also enables the exercise of community forest rights and acknowledges the existence of community forest resources. At present the discussions and claims have focused on the individual rights, but the other components of the act need to be explored. The text will have a major impact on the balance of functions and responsibilities vis-à-vis conservation and sustainable use of forest resources between the local communities and the Forest Department. The role of the Forest Department in Community Forest Areas needs more clarity, especially on the issues of sustainable use, management of forest and conservation of forest resources and biodiversity. The FRA 2006 calls for a stronger collaboration between the Forest Department and the Tribal Affairs Department in the areas where claims will be made. Monitoring mechanisms and support schemes for the newly recognized rights and their implementation will need to be developed (see Annex IV – Forest Rights Act 2006).

Till April,2010 14,397 claims were accepted and rights over 13,880 ha. Of forest land were granted to the claimants.

2 Project analysis and justification

2.1 Problems highlighted and overall justification for the Project

The analysis highlights that the forests of Assam are not being managed sustainably. This is acknowledged in the Assam Forest Policy 2004. Forests in Assam play a crucial role in the livelihood of the local populations. They are a source of timber, fuel wood, bamboo and a wide array of non-timber forest products. They deliver a variety of ecosystem services, fixing river banks, and contributing to soil and water conservation. They can play a vital role in mitigating the impact of climate change, acting as carbon sinks. They also act as safety nets, and contribute substantially to the incomes of the communities living in and around the forest areas, generally tribal households and some of the most vulnerable segments in society. Conservation of Assam's forests is thus extremely important for the State and its people.

Poverty, unemployment, demographic pressure etc. are exerting considerable adverse impact on the forests and its biodiversity, endangering the sustainability of the system. The management itself is facing challenges, both internally to the Assam Forest Department and in its relationship with other stakeholders and more specifically the communities.

1. **Inadequate Institutional Capacities:** Internal to the Forest Department, identified knowledge gaps such as erosion of compartment history, control form and plantation journal, insufficient awareness of social, legal and economical drivers; inadequate capacity in terms of infrastructure and skills, specifically regarding GIS and remote sensing; use of old methods and practices of survey and assessment while preparing working plans; less effective interaction and coordination between wings in management of RFs and PAs and other activities of the Department spawning exclusiveness; lack of effective bridges with the research sector and the fact that most information available is disjointed or missing (example of missing georeferenced boundaries), prevent the Department from adequately facing the challenges of sustainable forest management.
2. **Absence of Strategic Planning:** The Assam Forest Department harbours long term vision as evidenced in the forest Policy document but inadequate knowledge base on which to ground decisions is currently impeding the decision making process. Thus, decisions being taken may appear to be taken in isolation excluding other stakeholders and also may not seem to be transparent. The documents of reference, when they exist, (Working plans, Management Plans, Microplans) are disjointed and make no reference to one another, translating in a lack of coordination between the different operational expanses and an operational divide apparently exists.
3. **Unsustainable Forest and Tree Management:** The productivity of the forests, in terms of timber production is very low. Valuable timber plantations are aging for lack of proper forestry operations. These plantations have entailed a high biodiversity cost, but are not producing revenue, a loose-loose scenario for the environment and society. A mushrooming informal sector with possible criminal links has emerged with the ban on productive forestry operations. The working plans that could redress this by proposing sustainable forest operations are not up to the mark. The forest degradation also diminishes the capacity of the forest to capture carbon. It is also a source of conflicts between humans and wildlife, as habitats increasingly overlap.

    a. A network of acts and laws; sometimes overlapping, make communication difficult between State Departments and conflicting community interests with respect to forest land and forest resources translate into road blocks in the negotiation processes for framing and implementation of schemes. The existing mechanism of Joint Forest Management (JFM) is the first step taken to achieve effective and equal partnership with communities in conservation and sustainable use of forest resources. The legal provisions made in the FRA, 2006 will take some time to be fully understood by the holders of forest rights and the alternative partnership it proposes needs to be fully and sufficiently explored by the Forest Department officials. Agro-forestry alternatives and packages that could reduce the negative environmental impacts of conversion of forests into agricultural land and create ecological buffer zones around critical forest ecosystems need to be developed. The management of trees out of forests constraints the opportunities of private actors to engage in forest conservation and management and calls for serious facilitating efforts.

    b. The World Bank estimates that there is a need for 1Mha of energy plantation to supply for the domestic energy needs of the local communities across the state. There is however no state level firewood policy, and the activities dedicated to meeting this need are not coordinated. Forest Department in Assam has embarked on scheme to introduce biogas and

solar panels in the forest and forest fringe villages. At the same time, firewood is expected to remain the major source of energy. There is thus enough scope for evolving an integrated energy supply and management protocol involving diverse energy sources and resources to meet the ever increasing domestic energy needs locally and sustainably

c. There is no multi-stakeholder forum to address the conflicting issues (over land, over rights, over loss of life and property caused by wildlife) with transparency, leaving the Forest Department alone to deal with the possible negative outcomes of decisions, and generates additional mistrust between the Department and the communities.

4. **Lack of economic incentives to reduce pressure on forest:** Poverty, demographic pressure, unemployment and lack of livelihood oppertunities are exerting considerable pressure on the forests and its biodiversity, endangering the sustainability of the system. Populations residing in forest fringe villages and forest villages have few alternatives to turn to, the supply chains of most of the timber and non timber forest products are rigid and inefficient and most of the value is not captured in the locality or even in the state. Regarding services, the carbon sink potential of the forests is not currently rewarded. Likewise, tourism that adds economic value to the aesthetics of the ecosystems of Assam presents an untapped potential as well as a potential menace should its growth be unchecked.

2.2 Selection of the target areas and target groups

The scope of the project is the entire State of Assam. But the target areas and groups will change between the components and activities of the project. Some will encompass the totality of the State, especially those dealing with institutional strengthening of the Forest Department and plantations. Other activities will be implemented in phased manner target specific areas in the first three years, with the scope to expand to the entire state in the final two years.

A set of activities will specifically target villages. The project proposes to target 228 forest fringe villages (located within one kilometer of the Reserve Forest) and forest villages (settlements established inside the notified forests by the forest department for forestry operations in accordance with the provisions made in the AFR,1891). Many of such villages have already been covered by earlier projects, and have already constituted Joint Forest Management Committees (JFMC) following the guidelines of the Government of India and the rules of the State of Assam. The villages targeted under this project are those that have not been touched by earlier projects. Some will have JFMC already constituted but inactive for lack of funds, others will need to constitute the JFMC as their first activity. A complete list and preparation of map of the proposed 200 villages will constitute one of the first activities of the project management component during the first 6 months of implementation.

With this target of 228 villages, the project will benefit a population of 22, 800 households, equivalent to 1,36 ,800 individuals. These villages are located in remote areas, with difficult access to infrastructure and most, if not all, of the target beneficiaries are currently below poverty line. The inhabitants are primarily engaged in agriculture and allied activities and heavily depend upon nearby forests for meeting sustenance and health needs, livelihood support and generating income. The communities to which the inhabitants belong vary from region to region. In the hill districts, most of them belong to the Scheduled Tribes whereas in the plains there will be representatives of either Scheduled Tribes, Schedules Castes and Other Backward Castes, following the official denomination.

The second target group of the project is the staff of the Forest Department itself, which is at current 8000 – 10 000 strong. Through the provision of better working conditions, better human resources management, initial and in-house training and awareness creation activities, the project

aims to enable the forest department officials to better engage with communities in sustainable forest management. This should in turn benefit the entire state of Assam.

2.3 Project approach and principles

Based on the assessment presented above and drawing from past experiences in Assam and elsewhere in India, the Assam Forest Department has developed the present project. It is based on the principles of adaptive management, with embedded feedback loops between monitoring and decision to enable learning, iterative decision making process where results will be evaluated and actions adjusted accordingly and accepts the need to take robust decisions in the face of uncertainty. The project will seek to strengthen the capacity of the Department to face the challenges of sustainable forest management, to restore degraded forests and to manage biodiversity through participation, and to empower communities and offer them alternative livelihoods, designing effective and flexible institutions, improving access to more efficient market systems for forest products and giving them stronger rights and responsibilities.

The project through its stated components and proposed activities aims to incrementally empower the communities to ensure their involvement in management and decision making, to build their capacity to absorb and manage changes and take initiative to start new activities and use their traditional knowledge base. In addition, building institutions for grass root participation and conflict resolution and providing community and individual skill based alternative livelihood activities would ultimately achieve social, economic in the targeted population as well as their direct involvement in the conservation and management of the forests and other critical ecosystems of Assam.

The objectives and components of the Project are in synergy with the broad objectives of supporting livelihood of the forest fringe villages and maintain and conserving the forest resources and biodiversity.

The project proposes to serve as mediation between policy and implementation. The length of the project, 5 years, enables policies to be assessed, tested and implemented, with feedbacks embedded in the project outcomes to ensure adaptability of the policy framework.

2.4 Principles and interactions with existing policy framework

The Assam Forest Policy, 2004 envisages a “massive need based and time bound programme of afforestation and tree planting…” and also envisages a role for the Forest Development Agencies in the enrichment of open forests and the protection of natural forests. Thus the policy directly addresses the involvement of peoples’ institutions, in the form of Joint Forest Management committees and Eco development committees, in forest protection and development. *There is however, no policy space given to any existing community based institutions that may have traditionally engaged in forest protection and conservation. The participatory processes* contemplated in the project *therefore must provide for a space for traditional institutions to be encouraged and formally recognized for their role in forestry management.*

The State policy mandates that the trade and market related aspects of forestry for motivating ‘private’ involvement must be facilitated. Therefore in addition to the modification of the land laws, the policy advocates modifications and standardization of the pricing structure of forest produce, and laws related to harvesting from private lands. The project proposes to address these aspects on pilot basis.

The Assam policy address forest management issues not only in the context of State forests but also the district council or autonomous council, community and private forests. While these policies advocate restrictions in ecologically fragile and unstable areas they mandate that these forests should be cautiously and sustainably managed. *The Project* will gives space to traditional management regimes and practice and such efforts must be incorporated as a policy mandate.

According to the Assam policy, the ultimate aim of participation is 'Sustainable Forest Management'. It envisages 'upgradation' of the JFM cell to a SFM cell that uses established 'Criteria and Indicators' of sustainability. The policy advocates the same management principles in the case of the forests under the Autonomous Councils, as well as forests that are owned by community and private individuals, but cautions that there should be no "infringement of any rights or legal status vested….by the Constitution.". The Project shall produce as one of its early outcomes such set of Criteria and Indicators of sustainability, based on a review of the relevant state of art current literature and on local conditions.

The Assam Forest Policy, 2004 also recognizes that the life of tribal and other poor living within and near forests revolves around the forests and that the rights and concessions enjoyed by them should be fully protected. At the same time however, these policies mandate that the rights and concessions must always be in relation to the carrying capacity of the forests and that wherever the resource capacity falls short of the requirement, the demand should be met through social forestry on lands "outside the reserved forests". Rights and concessions if not adhered to entail different legal consequences and the Project shall ensure the distinction is well understood all through the implementation of its activities.

With regard to NTFP specifically, the Assam Forest Policy, 2004 mandates that the "ownership rights of NTFP are to be endowed on the local communities as per the provision of the Panchayat Raj (Section 4 of the Panchayat Raj -Extension to Scheduled Areas Act 1996). PESA is an enactment specifically for Schedule V Areas and not Schedule VI Areas. Incorporating PESA in the Local governance framework in Schedule vi areas would be inappropriate, technically. However provisions of PESA, in principle, may be incorporated wherever and whenever the Project activities interact with ownership rights of NTFP.

The Assam Forest Policy, 2004 brings out the critical issues of Intellectual Property (IPR), Traditional Ecological Knowledge (TEK) and Traditional Knowledge (TK) and mandates legal and administrative measures. The Project will support these considerations.

The Assam Forest Policy, 2004 pays considerable attention to the issue of forest based industries and deals in detail with concerns of raw material supply, forest produce trade, marketing, certification and development of ecotourism as an industry. The project will operationalise these mechanisms on pilot basis, with special regard to the Supreme Court Directives.

The Assam Bamboo and Cane policy mandates the establishment of a separate Bamboo and Cane Development Wing in the State Forest Department. The Assam Forest Policy, however, makes no mention in this regard. Further, while the Bamboo and Cane Policy presents a strategy on production, supply, marketing and trade of Bamboo and Canes, and also develops an institutional structure to facilitate the implementation of the same, it does not envisage a role for the community based institutions and the Forest Development Agencies. However, the State Bamboo Mission created under the aegis of the National Bamboo Mission is undertaking bamboo plantations and is involving FDAs and JFMCs. It is also looking after value addition and marketing of bamboo products. *The concept of Producer Company as envisaged in the Company's Act through its 2002 amendments could also be a* strategy explored by the Project *to give an entrepreneurial focus* to bamboo based activities.

In order to tap the international market, particularly in the case of handicrafts and medicinal plants, the Assam policy establishes the need to install systems of trade certification. This would also entail a detailed forestry certification mechanism both at the state and the national level. No legally recognized institution exists within the country as of date. The Project proposes to explore both *Trade and Forest Certifications at the state level with internationally acceptible standards*, as part of its strategy for adding value to goods and services generated by the Sustainable Management of Assam's forests.

2.5 Synergies and overlapping with other external projects

The World Bank NaRMIL (Natural Resource Management and Integrated Livelihood) project is at present the only externally funded project in the implementation phase. In addition, a project by JICA on capacity building has been approved by GOI. It will target 10 states, including Assam. Finally, KfW is negotiating with the MDONER (Ministry of Development of North East Region) a project on climate change adaptation for select North East states including Assam.

The components of the present project have been designed in a way to be in synergy with these initiatives and to avoid overlapping. For example, this project addresses climate change mitigation through the restoration of degraded forests, while KfW addresses adaptation. Likewise, in terms of capacity building, the JICA project covers front line staff training related infrastructures. The capacity training activities contemplated in this project will supplement those contemplated by the JICA project. Finally, through careful site selection, the Project will ensure there will be no overlapping of the JFMC or forest areas covered under this project with the NaRMIL World Bank project, and will focus instead on how to add value to the ongoing initiative. There has been already a great deal of information exchange between the implementing units of the NaRMIL project and the team of experts participating in the design of the present document. Such synergies will continue during the implementation of the proposed Project, ensuring mutual learning.

All other components of the project, such as FD institutional strengthening, strategic planning, forest restoration, biodiversity conservation or conflict mitigation are unique features of the Project.

This project will target its investments at local level in forest areas and villages that have not yet benefited from other projects. Activities by other projects will be incorporated into the strategic planning process for sustainable forestry in Assam that the Project will implement.

In fixing the targets the project will factor inflation and exchange rate variation to arrive at the final achievable target.

3 Project Concept

3.1 Detailed specific objectives and expected results

Project vision: To enable **sustainable forest management** in Assam through multi-scale integrative planning involving participation of local population.

Project specific objective: In collaboration with the forest dependent communities, to restore forest ecosystems to enhance the forest dependent communities' livelihoods and ensure conservation and sustainable use of biodiversity.

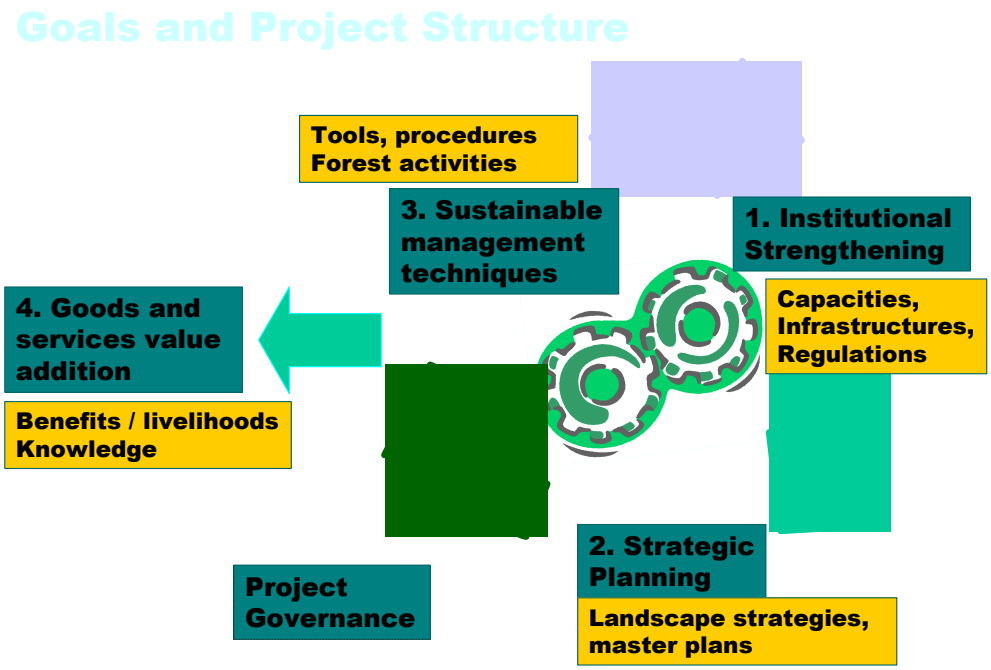

Figure 2 Project Components

3.2 Activities by component

3.2.1 Forest Department Institutional Strengthening

This component aims at enabling the Assam Forest Department (ForDep) to enhance its capacity to deal with the new challenges it faces. It encompasses streamlining of the working procedures between the different wings of the ForDep, training of the staff of the ForDep, the improvement of the existing equipment but also the enhancement of interactions with other Departments of the Assam State.

3.2.1.1 Streamlining working procedures between Forest Department Wings

This activity will be mostly undertaken by the project management unit, and involves team work, networking and facilitation among the different wings and hierarchical levels of the Department. This activity should not require specific funds, and will be developed during the five years span of the project.

Share experiences and staff between wings

Adopt similar approaches for common procedures related to JFM and ED

Harmonise Forest units management plans/working plans procedures (at least some chapters are in common) for PA and RF.

3.2.1.2 Capacity building of staff.

Management of human resources is a key issue for the Assam Forest Department. Indeed, since 1980, the reforms in the forest legal framework have introduced deep changes in the missions of the Forest Department. Besides, as the recruitment process for frontline staff was stopped for more than 15 years, the field staff vacancy rate is 10 % and the average age of field staffer is about 50 years old. This means that most of them didn't have access to training in modern techniques (information technologies, community-driven development...). Improvement of capacities is constrained today by the fact that refresher courses are not available for frontline staff.

At the same time, refresher courses for State Forest Service (SFS) staff are only annually available for about 10 % of them. Since 2009, recruitments of frontline staff have restarted in Assam but the capacities of the two training centers (Jalukbari and Makum) are not in adequacy with the needs (see the following section). If the question of initial training of the frontline staff and the development of training infrastructures will be tackled by the JICA project, the present project will deal with the refreshing of their skills.

Therefore, the overall goal of this capacity building sub-component will be focussed on refresher courses for SFS and frontline staff and a wider and easier access to technical information for the whole staff.

This sub-component will be implemented through external technical expertise through the following activities:

1. **Building of a "Human Resource management Information System(HARMIS)"**

The major objectives of this system are to optimize the efficiency of the staff, to increase their motivation, to share the skills and to be adaptive to evolutions. The following actions will be done:

- Introduction of the concept of "**Human Resource management Information System(HARMIS)"** at the level of Assam Forest Department headquarters;
- Implementation of "**Human Resource management Information System**" through an identification of the jobs and the skills needed, the formulation and designing of job ID, a mapping of the existing skills at the Assam Forest Department;
- Implementation of "**Human Resource management Information System**" through Annual Individual Assessment (AIA). The objectives of AIA are the evaluation of the performance of individual Officers, but also the identification of his training needs to assume correctly the responsibilities of his position and charting his career evolutions in close relationship with the existing ranking of the job positions;
- Designing of computerized tools in order to manage and valorise the information generated by the abovementioned actions at the level of the Human Resource Development & Vigilance wing of the Assam Forest Department.

2. **Designing and implementation of refresher courses program.** Based on a preliminary assessment of the training needs, specific one to two week modules will be developed with the support of outside resource persons specifically for instance on eco-restoration techniques, agro-forestry, forest and biodiversity survey and monitoring, legal knowledge, GIS and soft support infrastructure management, CDM/REDD. As a rule, special attention will be given to topics that can be covered to prepare for the future. In a second phase, the results from the "**Human Resource management Information System**" will be used to develop a refresher course program.

- Identify gap in curricula of staff on duty and assess training needs; prepare mid term recruitment and retirement schedule if required,
- Forest and biodiversity survey and monitoring
- Socio-economic development
- Information technology
- Forest planning

3. **Building of knowledge bases.** In order to add value to the common expertise of the staff, knowledge bases will be constituted, fed by existing data and by the information collected with the support of the project, especially along the "strategic planning

process". Technical expertise will be called in to present the methods for this. Once constituted, the knowledge bases can then be made accessible through the intranet of the Assam Forest Department, to ensure optimal resonance to the accumulated empirical knowledge. Such topics can cover aspects such as silvicultural practices, species ecological traits and responses to management, development of quality plant material, etc. The same methods can be used to document the ecological knowledge of the local communities. The knowledge bases can then be linked to the ones generated from the expertise of the Assam Forest Department staff, merging knowledge from different sources. Such hybrid knowledge can then be called in to provide insight on management practices and for problem solving.

3.2.1.3 Rehabilitate and enhance existing equipment

This activity is threefold. It involves the improvement of surface communication, a global scheme to enhance office and residential infrastructure for the ForDep, and the purchase of equipment and vehicles to enhance the ability of ForDep staff to work at field level.

The project will provide a provision of the equivalent of 40 kilometers of rehabilitation of access roads to villages and forest camps, mostly earthen roads, in each division. Critical priority access sites will be supported during year 1 for 4 pilot divisions, in the framework of the implementation of the initial JFMC/EDC. The other divisions will receive support in two waves during years 2 and 3, here again as accompanying measures to JFMC and EDC.

The project will finance the construction and renovation of a range of offices and residential ForDep infrastructure in Assam State. Each Circle and Division has already intimated its needs, and a global assessment at Assam level will identify the priorities at site level.

The global infrastructure schedule is planned through an annual programme along years 1 to 4.

The table below lists and provides numbers for forest field offices, residential quarters and heritage buildings.

Table 1 Number of infrastructures to be rehabilitated or built by the project

Items	Numbers
Forest field offices	
New infrastructure	20
Restoration/Improvement	20
Residential Buildings at headquarter	
Residential quarters	
New infrastructure	
Senior Officers	20
Middle Level Officers	30
Lower staff	50
Restoration/Improvement	80
Restoration Heritage buildings	30

In terms of vehicles the project has identified a provision for head office and field levels.

Table 2 Vehicles to be purchased by the project

Vehicles	Numbers
Head office	20
Field office	50
Beat/2 wheeler	300

Cycles	600
Patrolling Boats	50

The project will provide a range of equipment to support both office and field activities. The project will provide an opportunity to modernize the computing capacities of the ForDep, which the enhancement of a global network reaching field level, to improve information sharing, reporting, access to databases, e-learning, better internal and external communication, etc.

Provision for more specialized and technical equipment is also listed, such as specific rugged field devices, as well as specific forester's equipment (Gps, compass, dendrometres, etc.). Such equipment also includes the specific computers, printer, scanners, software, and satellite imagery required to implement a GIS network at State and field levels.

Special attention is paid to the security needs of field level staff, with the provision of strongbox/safes to lock valuables or seized equipment, including secured areas for larger items (cars, etc.).

Table 3 Equipment to be purchased by the project

Items	Numbers
Strong Room with Strongbox/safes/Chest	140
Computers (standard allocation for central level and per circle, division, forest, range, beat ?) networking + specialised equipement : field, GIS, databases, monitoring	
Standard office computer with maintenance	600
Additional computing equipment (scanner, printer, network, wifi..)	300
Specialised computing equipment (GIS, rugged, servers…)	50
Forestry equipment (Total Station, GPS, compass, tapes…)	
Small equipment/devices	300
Hightech/large equipment	100

3.2.1.4 Enhanced interaction with other departments

The project will facilitate interactions between the ForDep and partner institutions in Assam, which all have in common to develop projects which impact on village people's livelihoods, with a focus on territories located nearby forests. Such institutions include departments of Assam in charge of tourism, agriculture, rural development, cattle breeding, fish farming, water resources, roads and communication, education, energy (including alternatives), etc. Universities, research bodies will also be involved Interaction will be support at all strategic levels from decision makers at central offices to field staff.

- A special attention is required at field level, as in many villages in remote forested areas, the forester is often the only public officer visiting village dwellers, facing multi-sector demands (such as roads, electricity, schools, etc.) by villagers exceeding the typical forestry mandate.
- At District level the Forest Development Agency is a coordinating body headed by Forest officers, whose responsibilities and scope should be strengthened.

Many activities will focus on the organization of workshops and on the provision of incentives for partner officers and field to join these meetings.

The facilitation will be undertaken by the project PMU, with the mobilization of the project Governing Body in charge of the mobilization of various Department decision makers.

3.2.1.5 Legal reforms, assessments, updates and dissemination

The ForDep will be supported with the provision of legal advice, in order to:

- Identify sectors with opportunities for regulation enhancement/updating or design
- Identify process to design/enhance regulations (through workshops and analysis of lessons learnt)
- Pilot the implementation of updated regulation
- Facilitate the dissemination of information, within the ForDep, but also to partner institutions as well as to village populations in the Districts.

A sub-contract with an environment/forestry jurist body or institution will facilitate the access, understanding, dissemination of legal and regulatory knowledge at all levels from central to front line staff, but also to the population level through adapted information channels. For that purpose, specific communication material will be edited and disseminated up the village level, in accessible formats for each target group.

3.2.1.6 Research and Development

This Project attempts to bring a new and innovative approach to forestry in the State of Assam. Forestry in the State faces a number of technical challenges as well challenges associated with implementing policies that conform to new legislation. It is clear that additional financial resources are required to do this, but financial resources alone are unlikely to ensure that the Project meets its goals. There is a great need for new knowledge to ensure the successful implementation of this Project. The Project will set aside significant funding to support the development of new knowledge. This funding will play a catalytic role in JFMCs, Reserve Forests, forests managed by Autonomous Councils, Wildlife and Tiger Reserves and in communities living adjacent to these areas to speed up the implementation of the land-use or IEM plans.

In the first year of the Project, the team will undertake a priority setting exercise in consultation with local stakeholders and NGOs to identify key knowledge gaps that the Project will address through a funding mechanism. At the same time, the Project steering committee will engage in an exercise to identify emerging issues that require new knowledge for the Forest Department and other development agencies to address the needs of the people of Assam. There are several key areas that will be considered in this exercise.

- *Agroforestry/forestry best management practices*. The Forest Department is very competent at implementing traditional forestry plantation management and at managing natural stands. However, as the Department shifts focus to provide support to helping communities meet their needs, there is a need for new types of knowledge related to new types of plantation management. There is a need to conduct species screening trials, agro-forestry and community forestry plantation trials for different objectives (soil and moisture conservation and river bank erosion prevention, income generation, production of medicines, etc.). Bio-fuels like Pongomia and Jatropha, particularly need specific studies both for improvement of germplasm and for improvement of production systems. Emphasis would also be placed on development of second generation and algae based bio-fuels

  There is need also to generate knowledge about the multi-functional role that trees can play in improving livelihoods (fodder production, enhancing financial resilience by buffering against production and market risks, etc.). Finally there is a need to evaluate the environmental services that trees on farms and on community land can play like water quality through protection of riparian areas, carbon sequestration and biodiversity.
- *Increased livelihood vulnerability to climate change*. Assam has many areas that are either drought or flood prone, and this causes great problems for the population. Whereas climate variability is likely to increase and as the monsoons are likely to weaken, agriculture, which is the basis for livelihoods of the greater part of Assam's

population may be threatened. Thus, the Project will sponsor research into recent climate change and likely impacts of climate futures on agriculture and forestry.

- *Synergies between economic development and carbon finance*. Carbon finance may be part of the sustainability strategy of the Project to ensure that benefits continue to accrue after the Project withdraws. Research is needed in several areas to ensure proper implementation in Assam. Carbon accounting will require research support. The 2006 IPCC Guidelines for National Greenhouse Gas Inventories is the basis for accounting, but adequate data to implement these guidelines is not available. Research will be needed to fill key gaps to ensure proper implementation of an accounting system. For several of the carbon sequestration activities that will be implemented in communities (agro-forestry, community forestry) research is needed to support community-based measurement and monitoring of carbon stocks. Research is also needed to understand carbon sequestration – agricultural productivity tradeoffs and how these tradeoffs can be balances to ensure maximum poverty reduction benefits.
- *Emerging issues in timber certification*. Timber certification requires a system for tracking logs, ensuring that they are produced sustainably and that production systems meet well defined criteria. Research is required to develop silvicultural systems that meet the criteria, on the economics of these systems and to support the development of statewide monitoring systems to ensure that production meets the certification criteria.
- *Improving implementation of new policies and using them to ensure improved livelihoods*. While there are progressive laws on the books and policies to implement these laws have been developed by different line ministries, implementation does not always fully achieve the objectives of the laws and policies. Research can contribute to identifying constraints to implementation, identifying and validating different stakeholders' viewpoints, and developing strategies for overcoming these constraints.
- *Linking forestry and agro-forestry to other livelihood systems within forests, at the forest edge and outside forests*. Whereas this Project seeks an innovative approach to integrate forestry and agro-forestry into the economic activities of forest dwelling communities, communities on the forest margins and communities in the lowlands, there is a need to better understand how these new management systems can be integrated into the economic fabric of these communities. The first step is to analyze the economics and financial aspects of novel systems for returns to labour, returns to land for the production systems that will be promoted. The second phases will involve participatory research with farmers in the communities to refine these systems so that they conform to the realities and aspirations of the populations.
- *Economic pressures on forest resources and vice versa*. It is obvious to external observers and to the Forest Department that economic concerns are at the root of forest loss in the state and that the concerns associated with forest management place economic constraints on rural populations. Additionally, expansion of the pulp industry in the State will create more demand for land to produce bamboo. The Project will commission research on the economic drivers of deforestation and develop at least one spatially explicit econometric model of land-use change. This model will allow planners to conduct scenario analyses to project the impacts of future policy decisions and implementation rules on deforestation and forest degradation and on the livelihoods of communities. This tool will help in analyzing tradeoffs between economic development and forest conservation and should

contribute to the planning process of the Forest Department both within this Project and beyond.

- *Animal-human conflict, both inside and outside forest*. Animal – human conflicts are increasing as swelling human populations and their economic activities intrude into and expand further inside important habitats. Assam has a rich biodiversity heritage that is threatened by this expansion. At the same time the people of Assam are facing real economic constraints and they need real solutions to these conflicts. The Project will commission scientific studies in key conflict areas to develop technical and social solutions to the problem. In some areas of Africa and India, for example, communities have developed techniques to reduce contact between people and wildlife (plantation of chilly fences, for example).
- *Integrated management of invasive species*. The Forest Department identified the spread of invasive species as an important problem and it considers this to be particularly problematic in and around Wildlife Reserves. The Project will commission several research projects to develop appropriate control measures that they can integrate into Reserve management plans over the life of this Project and beyond.

The Project will encourage and actively develop links with a number of key institutions inside of Assam and across India, including:

- Forestry Research Institute in Dehradun
- Agro forestry Research Institute in Jhansi
- Rain Forest Research Institute, Jorhat
- KFRI (Kerala)
- French Institute of Pondicherry
- ICAR Northeast Center in Meghalaya
- Assam Agricultural University
- Other Universities in Assam
- Central Agricultural University (Arunachal Pradesh)
- State Remote Sensing Agency

The Project will also work to establish strategic, issue based links with research institutions outside India, including among others: CIFOR, ICRAF, IRD, and CIRAD. These organizations will backstop the local research institutions in implementing the research agenda of the Project. Research organizations also need training in the latest methods and practices for sustainable land management. The Project will leverage the capacity building efforts of the JICA project, but additional training will also be required. The Project will develop collaboration with advanced research institutions for training (e.g. CIRAD, ICRAF, CIFOR) and organize targeted international field visits for Forest department officials to develop knowledge of how similar problems are being addressed elsewhere in the world.

The absence of a dedicated forest research institute in Assam creates knowledge gaps that if filled could open new avenues for streamlining biodiversity conservation and community participation. As a result, the project proposes to tailor specific calls for proposals on topics identified jointly by the Assam Forest Department and a scientific advisory committee. Due to its innovative aspects, this component is currently proposed as part of the project.

To this end, the project proposes the following activities:

- Constituting a multidisciplinary scientific advisory committee, with a specific budget for its logistics
- The Scientific advisory committee would meet at least 4 times per year, advising and channeling the PMU and project Governing Body, identifying research topics required by the forestry sector.
- Providing quarterly advice on planned and on-going studies and research supported by the project.
- Establish a competitive fund for small grants for scientific studies designed to support broad requests from the forestry sector. (PhD, applied research)
- Preparing the call for proposal on the topics identified.
- Assessing the proposals and overseeing the research projects
- Disseminating the results within the forest department to ensure ownership.

The participation of the forest department staff to the research will ensure appropriate institutionalization of the research results. The outcomes will be integrated in the project management as they become available.

3.2.2 Multi-level Strategic Planning

3.2.2.1 Activities

The overall objective of this activity is to develop landscape level integrated management strategies and identify priority areas of intervention, through the design of an Assam State level forest strategic plan, itself supported by a landscape level multisectoral assessment. The Assam State forest strategic plan will provide for general long term guidance and vision at Assam level, as well as the framework for site management and planning, at circle and division levels, introducing the concept of integrated/master plans involving Reserved Forest, Protected Areas and villages in zones of influence of PA, for larger mixed forest/village/agriculture complex.

The State of Assam has in place a document Vision 2025, strategies developed by NBSAP and global strategies and policies prepared by the forest department. However, critical and cross cutting analysis of these documents is required for following:

- achieved objectives
- aspects of biodiversity and sustainable development covered
- coordination and communication
- participatory process
- achieved outputs
- integration of cross cutting issues
- linkages with past and ongoing processes
- adequacy of existing information
- anticipated and unanticipated impacts
- adequacy of resources
- timeframe

The specific objective of this component is to develop strategic landscape level planning through integrated approaches and to develop information systems for that can be used for

education, research and training of the staff of the forest department. For this, the project proposes to develop a comprehensive spatial database that would form the future strategic planning. This data base will be used to identify landscape units to rationalize management plans and make them site specific. Through the analysis of spatial characteristics, ecological structures of vegetation and fauna, the project will identify high conservation value areas and migratory corridors. This data will be overlaid on top of layers built to assess social and economic information, particularly dependency on forest resources for farming and livelihood systems, and its impact on forest biodiversity and economic returns. Keeping on par with the participatory approach adopted by the project, the project will institutionalize the interests of the stakeholder in conservation and management planning, scaling up microplans from JFMC and ensuring larger scale management strategies do not contradict decision taken at the village level.

Based on these analysis and information generated through the project a comprehensive, fine tuned, site specific, achievable and time bound strategic plans for biodiversity conservation and livelihood issues need to be prepared.

A global strategic study will be undertaken with the support of external expertise, and will include a global ecological and socio-economic survey at Assam level, and the identification of major forest issues at landscape level: The rationale is the homogeneity of ecosystems and situations of actors and of constraints. Landscapes would include different forests categories (Protected Ares, and/or R.F), other areas of ecological interest, other woody lands outside of Forestry Department control and other land uses (agriculture, mines, urban areas, etc.) with an influence on forest management and conservation.

Expected results involve a strategic plan (including base line studies - environment, biodiversity, social and economic issues), a system of databases and GIS design, and trained staff.

The main activities are as follows :

- Design a strategic plan with the support of a sub-contracted operator, during years 1 and 2
- A provision for the purchase of satellite images (including SPOT) is made available.
- Implement an information programme both internal to ForDep and towards external stakeholders, with the participatory design and communication of the plan, through participatory workshops at Assam, Circle and Division levels, and an information and dissemination programme.
- Build and update knowledge bases, under the formal of "central repository of knowledge" of the forest sector
- Implement a permanent data collection based on the strategic plan objectives, with the support of external technical assistance at national level, in connection with the forest monitoring system (field surveys on forestry, social, economical issues)
- Disseminate information from the databases at central and local levels, through the establishment of database networks (State-Circles-Divisions-Ranges), including the provision of specific software and training.
- Establish public forest information and interpretation centers at division level (Equipment, exhibition material, design, implementation) with the design of site specific packages at each circle/division level supported by sub-contractor.
- Establish a central public forest information center at Assam level

3.2.2.2 Strategic Planning rationale

The complexity of physical features and variations in macro and microclimatic conditions has rendered a high degree of species and habitat diversity to the North-East Indian region in general and the Assam in particular. However, increasing demographic pressure and changing land use have inflicted qualitative and quantitative reduction of the forest cover, driving the survivorship of a large number of species towards a critical status. The present system of forest management has evolved over a longer period of time through progressive changes in the policies and strategies. Until recently the thrust was on the revenue generation with lesser importance given to the conservation of biodiversity and protection of environment with people's participation. A radical shift in the policy was effected (inspired by international agreements like the Convention of Biological Diversity and the Johannesburg Summit) in the past two decades with participatory management as the key characteristic. The Hallmark of these changes was the adoption of an integrated approach to biodiversity conservation with the emergence of new institutional arrangements with due incentives for the local people for a joint management of forests. However, some of the existing regulations (e.g. Wildlife Protection Act, 1972) have proved to be impeding the effective implementation of participatory forest management. In order to rectify these shortfalls and to address the challenges posed by the heterogeneity in land use and the dynamics fuelled by natural and anthropogenic factors on ecosystem processes, an inclusive and a comprehensive strategic forest management is sought.

A document on National Biodiversity and Action Plans (NBSAP) was prepared by the Ministry of Environment and Forests (MoEF), Government of India at National and State levels to address the ecological and livelihood security of the country. Cutting across different sectors (forests, agriculture, governance, legal issues and policies), the document prescribes the strategies and action plans for biodiversity conservation, sustainable use and equity. It is now onus on the state forest and line departments to implement these strategies. Assam like some other states is ill prepared to execute the plans due to lack of cohesive and meaning full information system as well as paucity in the knowledge to prioritise the targeted areas.

Keeping in view of the present management scenario, policies and gaps in information, one of the aims of the project is to facilitate forest department to execute the existing plans as well as to develop site specific plans to promote conservation of biodiversity and sustainable use of natural resources by communities and other stakeholders through long, medium and short term targeted actions. Furthermore, to enhance the capacity of forest managers, the scientific underpinnings of landscape level management and the consequences of spatial heterogeneity to land-management decisions needs to be elucidated.

3.2.2.3 Information system

Information on physical, biological and anthropogenic factors is prerequisite for developing and implementing comprehensive strategic planning. Although there are major lacunae, still there are sporadic information on biodiversity are available through different studies conducted by Forest Department, Botanical Survey of India, Zoological Survey of India, Wildlife Institute of India, Universities, NGOs etc. Most of these studies are either in the form of enumerations or site/species specific studies. Often the information lacks ecological attributes, distribution range, causative factors for their degradation and major threats. Forest maps are also available by the studies conducted by Forest Survey of India and Indian Institute of Remote Sensing. However, these maps are either at coarse level or inadequate to provide a lucid picture of the current status and ongoing losses/gains. More importantly, there is a big gap in developing comprehensive database on socioeconomic situations and traditional knowledge of forest dwelling communities who are distinctly present in every landscape of Assam.

Most of the institutions are often conducting research based on their own priorities. At present in the state there is a paucity of system for collecting, collating and disseminating

information on biodiversity. In the absence of such mechanism there is often wastage of funds and efforts to recreating data. Furthermore, the strategic planning focuses explicitly on spatial pattern, thus, the advanced technology in remote sensing, powerful GIS and spatial statistics need to be used to produce geo-referenced thematic layers. For this, forest department need to be equipped and personnel have to be trained.

Keeping in view of the above constraints, project need to support following activities to identify the gaps in existing data, baseline survey, and creation of spatial databases and training to create and handle the data:

Comprehensive spatial database on biophysical factors to assess the biomes and their status

Abiotic factors which include geology, soil, relief, drainage and bio-climate need to be mapped using different sources of information. These maps can be used as templates to understand the diversity of vegetation and land use pattern. These basic layers would also allow developing thematic maps indicating the zones of vulnerable soils to erosion and watershed areas.

Adequate data on species diversity, populations, location and extent of habitat, major threats to different species, etc., and changes (including historical) in these aspects over time are essential to design a proper strategy for conservation. Given the extensive diversity of biomes in Assam, ecological surveys and taxonomic investigations for both flora and fauna need to be intensified. High resolution land cover and land use maps highlighting different vegetation types and its status need to be prepared using extensive ground truthing and satellite data. Across these different vegetation types, sampling plots and transects have to be laid to assess the richness and diversity of plants as well as richness, abundance and distribution of selected Rare, Endangered and Threatened (RET) fauna. The data thus obtained need to be analyzed with an emphasis on the critical status of habitats and species particularly of keystone species, large mammals, migratory species, endemics, unique ecosystems etc.

3.2.2.4 Administrative and tenurial boundary layers

Geo-referenced administrative unit (revenue boundaries such as hamlet, village, block, district; and forest administrative boundaries (beat, section, range, division, national parks and wildlife sanctuaries) and tenurial regimes (reserved forests, un-classed state forests, autonomous district council forests, community reserves) boundary layers need to be prepared.

3.2.2.5 Human ecological appraisal for dependency on forest resources particularly for farming and livelihood systems:

The human ecological component should include two distinct themes: (1) human ecological appraisal of the spatial pattern of subsistence and (2) appraisal of the present mode of resource utilization and its impact on forest biodiversity and economic returns. To carry out the appraisal, the data on dependency on resources, socioeconomics and traditional knowledge of different stake holders need be collected through PRA or MLA technique in various forest landscapes. Data on socioeconomic variables, cultural history should be analyzed to derive typology of socioeconomic situations, which reflects their assets and portfolio choices that have strong implication over their dependency on forests and sustainability of resource use.

3.2.2.6 Spatial tools for decision making

As the strategic planning focuses explicitly on spatial pattern, the advanced technology in remote sensing, powerful GIS and spatial statistics need to be used to produce above mentioned geo-referenced thematic layers and data analysis. For this, forest department need to be equipped and personnel have to be trained.

3.2.2.7 Database creation

Assam Forest Biodiversity Information System needs to be created. The information (ecological and socioeconomic parameters) collected through network of research institutions, research reports, published information, working and management plans, workshops etc. need to be compiled and disseminated through either web portal or other appropriate media. Foresters and scientific officers of the department, need to be trained, to design and maintaining the system.

3.2.2.8 Participatory approach

The data collection, planning and implementation exercises should ensure the effective participation of all stake holders. The various stakeholders could include all sectors of the Forest Department such as territorial, social forestry, wildlife and planning wings, other governmental ministries and departments such as irrigation, power, industrial development, rural development, tribal development with local communities and civil society at large including research institutions, private bodies and NGOs.

3.2.2.9 Multiple levels of strategic planning

The management of the forest now not only involves multiple objectives, incorporating multiple stake holders with diverse interests, but also a greater recognition of the environmental services forests provide, and an increasing recognition of wider range of products. The need is now for higher level planning, to encompass, different levels, to provide direction and give geographic priorities and targets to guide management at lower level. This will provide a frame work to enable bottom-up planning and accommodation of wider range of stakeholder interests.

3.2.2.10 Strategies for landscape level management

Forest department is traditionally managing and protecting the forest and it resources through working and management plans. Often these plans are prepared in isolation without considering adjacent Reserves and cut across same landscape unit or ecosystem and, will have different implementation plans. Particularly in working plans, working circles often overlaps. Especially, when the conservation circles overlaps with other resource utilization circles then the plan becomes contradictory. Thus, in order to provide a landscape perspective to the working plans, management plans and also to the microplans, a comprehensive strategic plan at landscape level is required.

The strategic planning at landscape level should be designed based on the principle of landscape ecology where a landscape is considered as a heterogeneous area composed of a cluster of interacting ecosystems. The structure (type, pattern and spatial arrangements) of ecosystem elements is primarily determined by physical factors (bio-climate, soil, topography, drainage) and modified by human activities. As a result, a complex environment, constrained by socio-economic and cultural factors among others develop in a landscape. Thus, the landscapes are complex systems in which an entire series of ecological phenomenon occur, each having its own spatio-temporal scale.

Identification of landscape units

As the natural environmental complexities determines the land use and socio–economic mosaics, the state need to be divided into different landscape units at appropriate scale, by taking into account geography, topographic features, soil, bio-climate, potential forest types or ecosystems, socio-economic situations, cultural diversity etc. The landscape units not only just cover the forest element but also include other anthropogenic elements which are constantly interacting with the forest and resources. Understanding the spatio-temporal dynamics of these elements, which are generally influenced by their characteristics, behavior and interaction are crucial for developing site specific management strategies and action plans. During the project period, on the pilot basis, few representative

landscape units thus derived can be selected for detailed studies and these selected units could become the model for integrative management plan.

Strategic plans to manage the management units/zones within the landscape units:

Management units are the basic targeted zones for the local level strategic management. They have to be derived from the detailed studies conducted on biophysical features as well as human ecology within the landscape. As these units are spatially derived using GIS, extent and size can be easily quantified and monitored for changes over a period of time. These management units may include high conservation zones for protection, resource zones for human subsistence and industrial consumption, critical soil and water conservation zones that render their services to proximal and distant stakeholders, fire prone zones to tackle effect of fire on ecosystems and fauna, degraded zones for restoration or rehabilitation (especially abandoned *jhums*).

Managing the constraints/threats

The success of conservation of biological diversity and sustainable development of local communities in a landscape, depend on the way the constraints are being managed. There are many direct and indirect causes (or constraints) that lead to the loss of biological wealth due to degradation and fragmentation of habitats. The direct constraints are human induced actions that destroy the forests and their components; whereas, the indirect ones originate from the basic social, economic, political, cultural and historical features of the society impacting on biodiversity in various ways.

To address these overarching constraints in the strategic management plan, focus group discussions need to be conducted with the frontline staff of forest department as well as local communities. Based on their field experience, potential and existing threats to conservation and livelihood of people in the landscape need to be listed and prioritised by considering the frequency and extent of threats in each landscape unit.

Strategies, action plans and institutional mechanism to manage landscapes:

Once the management units and threats/constraints are identified, management strategies and action plans need to be prepared and executed through participatory approach.

Implementation of the strategies requires refashioning of the institutional priorities and practices. Institutions are instruments for coordinating individual expectations. Here, the sustainable management of the landscape is the collective expectation. Drawing on the insights from the human ecological appraisal and the stakeholder analysis, an institutional structure is recommended for the landscape. An institutional structure means a network of institutions coordinated by a key nodal institution; in this case the coordinating nodal agency is the forest department. The PFM institutions such as Joint Forest Management Committees (JFMC) and Eco-Development Committees (EDC) are given priority while channeling the benefit-streams of conservation as an incentive to their participation.

3.2.2.11 Strategy to rationalize the existing protected area network

As the magnitude of the human imprint on natural ecosystems increases globally, protecting and managing the remaining diversity of genes, species and ecosystems requires action to set aside some areas as nature reserves. India with long history of forest management is having strong commitment of protection of wilderness. The establishment of National Parks and Wildlife Sanctuaries in 1970s gained impetus with the adoption of National Policy for Wildlife Conservation in 1970 and the enactment of the Wildlife (Protection) Act in1972. Since then India has xxx protected areas (PAs).

Protected areas are supposed to be the repositories of biological richness and diversity. In this context the selection of PA and its role is critically important. The selection PAs and design of network should be based on three basic principles: *representativity* (to ensure the representation of all biomes, unique habitats and critical species), *ecological integrity* (sufficiently large enough to ensure the ecological functions and range) and *contiguity* (to ensure the connectivity through corridors for migration of species and gene flow).

In conformity with the national policy and act, the Assam state till now has created five national parks and eighteen wildlife sanctuaries covering an area of about 4000 km^2 and constituting 4.98% of the geographical area. Except nine PAs (111 to 500 km^2), rest are less than 97 km^2 each; many of them were created to protect high profile species like rhino, tigers and birds, and; most of the PAs are in isolation without much contiguity between them.

As Assam being a most important bio-geographic area and part of the biodiversity *hotspot*, it is important to review the existing PA network for any gaps in conservation and management. If necessary, studies can be taken up to identify the priority areas (using the parameters like endemism, RET species, unique and critical ecosystems etc.) as well as to rationalize the existing of PA network. Furthermore, studies also can be conducted to identify the conservation reserves and community reserves, which are having provisions in the wildlife (Protection) act.

3.2.2.12 The Integrated/Master plan concept

Two categories of planning documents are implemented in Assam forests, the Working Plans for over all management of forest in a Division and the micro-plans limited to the village land under the scope of a management committee. These documents show low formal connections. Working plans only mention the existence of JFMC and EDC related to the various forests in the concerned Division. Harmonization is very limited between the planned activities between several levels: Assam state level, Circle level, Division level, Forest level (Reserved forest, protected areas) and village level. Two typical situations can be seen in Assam (and probably elsewhere in India), which can demonstrate the constraints caused by such lack of harmonization:

- All forests in Assam are surrounded by village settlements on agriculture and grazing lands, with sometimes human residence inside the forest, legal or illegal. All these people have frequent, daily interactions with the same forest bordering their fields. A limited number of these villages receive the support of a JFMC or EDC scheme. The forester in charge of the conservation or the sustainable management of a given forest has no specific tools provided by his administration to involve all such neighbouring villages into a collective scheme, in search of synergies between villages and better efficiency for his efforts to organise local stakeholders and develop local activities.
- Situations are frequent in Assam where Reserved Forest are located very close to protected areas. In some case, they belong to the same local ecological unit, and it can happen that a same group of villages may interact with several neighbouring forests. Planning tools are lacking to involve such forests, when they are clearly part of the same ecological or socio-economical situation, within a single and comprehensive document.

An answer to the lack of integration of forest units, which share the same groups of villages and the same ecological constraints, would be to launch a new category of management plan, less detailed than a working plan or a micro-plan, focusing on the planning strategy and vision of the overall mosaic involving forests, rural land and villages.

The project will design the concept, and the implementation procedures, of such integrated/master plan approach with narrow involvement of ForDep staff, at all levels from State to field. The project will launch a specific study including workshops, and technical inputs of specialised technical assistance from national and international levels to:

- Design and disseminate an Integrated/master plan approach to field levels. The design will promote participatory planning and implementation procedures.
- Organise workshops at State, Circle, Division-FDA levels, with all stakeholders involved and edit documents (hard and soft versions, web)
- Harmonise the approaches between various plans (Assam strategic plan, Working plan, micro-plan/JFMC/EDC)

Once the protocols are designed, they will be implemented on a pilot basis in selected landscapes in Assam state, with a specific contribution from DFOs.

3.2.3 Sustainable Forest management

3.2.3.1 Forest Management in Core Areas

3.2.3.1.1 Update existing working and management plans procedures

The Working Plan is mandatory and rules all activities in Reserves forests for a ten years long period. This is both an explicit and implicit document. The WP is explicit when it describes what has to be implemented, agreed or forbidden during this decade, but it is also implicit as all activities not mentioned into the plan are considered as not allowed. In addition, many Reserved forest bear "tolerated" activities by village people, which are not documented (i.e. picking dead wood: how many people, zones of extraction and volumes extracted, etc.).

The on-going generation of working plans in Assam has suffered from various weaknesses, with a result that out of the 32 Divisions, only 5 have operational Working Plans at present. The system has deteriorated and the method of preparation is struggling to reflect the many challenges and constraints forests have to face. The main issues are:

- possible overlap between forestry wings (social, wildlife territorial)
- inadequate financial resources for the preparation as well as the implementation phases
- long process of approval
- obsolete methods of survey and assessment (preparation requires extensive surveys, and the estimations of growing stock are made through simple instruments. Much of the flora remains unaccounted for and biodiversity is inadequately assessed. The manual stock-map preparation and calculations for yields are outdated)
- demotivated working plan staff and insufficient presence in field
- mismatch between prescription, activities and State planning
- lack of experience for the staff in computers, GIS and remote sensing
- lack of georeferenced boundaries
- poor connection with JFMC activities

The challenge is to enhance the existing procedure, while providing a document which has to pass through several formal agreements including the central level in Delhi. Existing guidelines have been designed at national level, and the present project may have limited capacity to change such centralised documents. It is believed that additional enhancements, rather than modifications of the standardised layout, may achieve easier approval.

- Develop software with GIS interfaces for monitoring changes in landscape units.
- Implement a user friendly web portal for regular updating from ground level.
- Produce extensive botanical surveys & documentation.

Activities will rely on ongoing experience in the ForDep, from working plan officers, DFOs, with the support of external expertise. The main focus will be placed on the integration of Working Plans within the global Assam and landscape strategic planning, in line with the harmonizing approach developed along the integrated/master planning process to be developed by the project.

3.2.3.1.2 Launch a pilot program for sustainable management of production forests in Assam.

The project will assess opportunities and conditionalities to organize scientific silvicultural operations in Working Plans. Attention is drawn to the fact that "scientific" silviculture needs to take local knowledge into account, rather than supplant it. A pilot program for sustainable management of production forests in line with Forest (Conservation) Act and Supreme Court Orders will be studied, designed and submitted for formal approval.

Specific procedures will be designed for:

- Forest survey (biodiversity, forest resources, socio-economic context) and assessment of potentialities and identification of forests suitable for future sustainable logging
- Silvicultural practices (rotation, minimum age/diameter, zoning, thinning regime, low impact logging, etc.)
- Biodiversity friendly silvicultural practices, with stakeholder involvement (including conservation NGO)
- Monitoring of sustainability

A specific additional study will work on the development of a tracking system for forest products, from the standing stem to the final consumer. Ecological studies on forest dynamics and wood balance will also be supported by the project, with the support of external expertise.

3.2.3.1.3 Forest Rehabilitation (Plantation and Assisted Natural Regeneration)

A large proportion of the Assam forests have been degraded due to human and biotic pressure. Currently degraded and open forests cover 14,784 km^2, as per the assessment of the Forest Survey of India, which represents nearly 60% of the total forest cover of the State. The project proposes to undertake silvicultural and ecological engineering activities to ensure the recovery of these degraded ecosystems. The eco-restoration activities will be based on the knowledge accumulated by the staff of the forest department and the local communities and from experiences developed elsewhere, for example in West Bengal. Most afforestation and rehabilitation activities will be channeled through participative forestry, with JFMC and EDC as principal vehicles.

Empirical observations and trials conducted by the Forest Department indicate that the bioclimatic conditions of Assam ensure that forest succession is dynamic provided the areas under regeneration are protected from further biotic pressure, specifically cattle grazing. It is possible therefore to envisage ecological transitions with minimal efforts and inputs. Re-introducing species that are lacking (based on past documentation as available in the working plans) can suffice to hasten natural succession and reconstruct degraded ecosystems to the level they mimic native forests. Specific attention will be paid to controlling invasive species like *Mimosa sp.* in Kaziranga National Park, *Ipomoea sp.* in Pobitora Wildlife Sanctuary and *Michenia spp.,Eupatorium spp.* in evergreen forests. These species are threatening the physical integrity of the ecosystems and seriously hampering growth of natural vegetation.

The species composition of the enrichment activities will be decided on a per case basis, to match the local conditions to the species ecological traits. This decision will be taken jointly between the forest department officials and the JFMC committees, to ensure that both the communities' needs and the biodiversity conservation objectives are met.

Silvicultural systems are well tested and identified and it is felt that no need for further refinement of the eco-restoration protocols is needed. The selection system, shelterwood system,

coppice with standards /reserves, tunnel planting system and periodic block / floating periodic block system are practices in vogue in managing and maintaining the ecological integrity, sustainable use of forest resources and regenerating forest ecosystems in the state.

The project will identify specific pockets as preservation plots that represent the optimums of biodiversity to be left aside from production activities. These will be labelled as biodiversity heritage sites. Delineation of these pockets will be done through negotiations between the Field Implementation Units and the JFMC of the concerned areas.

All eco-restoration activities will be undertaken through active participation of the local communities. This wage-paid labour at times represents the only alternative for forest villages without access to other forms of remunerative activities, and will directly benefit local livelihoods.

Care needs to be taken that the definition of barren or degraded land as per the forest department criteria does not conflict with possible uses currently in force in the local communities. The decision to restore any given area falling under JFMC will therefore be subject to approval in the microplan of the said JFMC.

Likewise, eco-restoration will not be restricted to raising commercially important timber and NTFP species and the objectives of creating near natural formations, biodiversity conservation will be taken on board collectively by the Forest Department and the JFMCs in complete understanding and harmony.

The prospects for eco-restoration in the forests of Assam seem to offer good opportunities for REDD / REDD+ mechanisms where the efforts of restoration can directly exhibit a net gain in carbon stocks as compared to the base line scenario. The eco-restoration component of the project can play a role in the mitigation of the impact of climate change in addition to help in recovering biodiversity and sustaining local livelihoods by increasing the resource base. External expertise can therefore be mobilized to ensure these activities are in tune with existing international discussions and national policies, commitments and actions on REDD.

A final set of activities will specifically target the *Jhum* cultivation areas in North Cachar Hills and Karbi Anglong. In these areas, the combination of human pressure, short rotation of *juhm* cycle, slope erosion and gregarious flowering of the Mulli Bamboo (*M. baccifera*) have also left heavily degraded areas with low productivity. Yet the prevalence of *Jhum* cultivation prevents traditional eco-restoration approaches. Therefore alternatives need to be proposed to the local communities to lengthen the *jhumming* cycle and increase the productivity of the production system through the introduction of other crops like pineapple, ginger, medicinal and aromatic herbs and shrubs and silvo-pastoral activities to support cattle, poultry and silk worm rearing.

The project also recognizes that the drivers and constraints of the *jhum* cultivators need to be better understood if any alternative is to be successfully proposed. Methods such as Companion Modeling (ComMod) successfully tried in Bhutan, can be deployed to create discussion arenas between the forest department and the local communities. Here also, external expertise can be mobilized.

The table below shows the number of hectares involved in the overall plantation programme of the project. Emphasis has been placed on fuel wood and fodder trees of indigenous origin as livelihoods of population in rural areas are strongly depending on these resources.

Table 4 Number of hectares involved in afforestation and rehabilitation

Afforestation/Rehabilitation	Hectares
Assisted natural regeneration	4, 050
Afforestation/Economic	5, 000
Afforestation mixed NFTP/medicinal	5, 000
Afforestation Bamboo	2, 500

Afforestation/Fuelwood and fodder trees	20, 000

3.2.3.1.4 Eco-restoration

The eco-restoration component of the Project will support the reduction of net emissions of greenhouse gases and increased storage of carbon in terrestrial ecosystems, the conservation and sustainable use of watersheds, protection of an important international water body (the Brahmaputra River), and the conservation and sustainable use of biological diversity through an Integrated Ecosystem Management (IEM) framework in sync with the State Biodiversity Rules. This framework takes a landscape approach to eco-restoration and devises objectives and management options for each ecosystem in the landscape taking into account the spatial relationship between these ecosystems with respect to providing environmental goods and services. The Project will support interventions that specifically address the following constraints that impede the adoption of IEM approaches in Assam:

- Absence of necessary data and information required by resource managers, planners and decision-makers to mainstream an IEM-based approach into production activities;
- Weak policy framework and enabling environment supporting the adoption of IEM approaches;
- Weak institutions at regional and local levels with poor capacity to adopt and implement policies formulated in support of IEM objectives;
- Insufficient technical assistance and financial resources to reduce the perceived risks faced by resource managers in the decisions leading to the adoption of non-traditional land management strategies in support of IEM objectives;
- Difficulty in integrating activities related to sustainable ecosystem management that transcends municipal and provincial boundaries because of lack of coordinated planning across these boundaries.

The overall implementation strategy of this component is geared to help development and adoption of an (IEM) approach to the problems of rural poverty, environmental degradation, and the increased risks and uncertainties that derive from changes in the biophysical and socio-economic environment (see figure below). Society relies on ecosystems not only for the continued production of “goods” or commodities, but also for the maintenance of critical “services” that ecosystems provide. Where goals for production of ecosystem goods and services often conflict with one another, IEM is a means of achieving the goals of poverty alleviation, increased food security and environmental protection. The overall goal for this approach is to improve agro-ecosystem performance in terms of biological productivity, integrity, maintenance and perpetuation (doing so over the relevant spatial and temporal scales) while at the same time ensuring that these improvements can be adopted by farmers and decision-makers at various levels and that they actually result in poverty alleviation and farmers empowerment.

A multi-scale, multi-objective, systems approach is needed to fulfill such an objective. This approach also needs to embrace the competing interests of the various stakeholders, and key interconnections and thresholds for ecosystem services. At its core lies a search for a balance between productivity of agriculture, forestry and fisheries and resilience of these systems (or growth and adaptability), between increases in the adaptive capacity of agro-ecosystems (including that of their managers at different levels) and increases in the productivity of these systems. The outputs of such an approach are ranges of flexible and adaptive options, for farmers and other resource users, as well as for policy-makers at various levels. The IEM framework is based on the premise that there are social, economic, and biophysical interactions between the goals for production of environmental goods and services that are desired by different stakeholders. Reconciling conflicting

goals and uses of land is a critical challenge for land management. Understanding how land-use decisions and management practices affect the production of different ecosystem goods and services is necessary for sustainable management of the agricultural landscape.

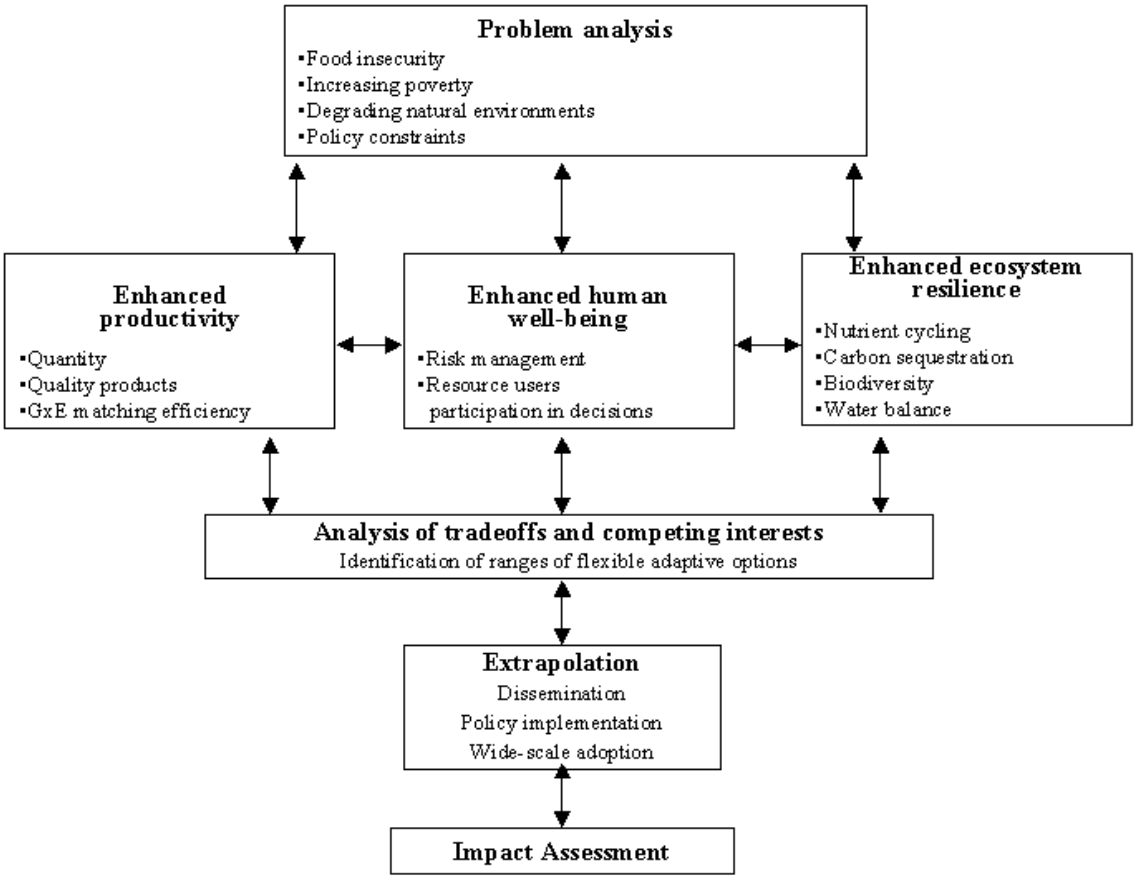

Figure 3 ***Integrated Natural Resources Management Framework***

This framework includes both biophysical, socio-economic and policy analyses and interventions in a comprehensive approach to solving problems of rural poverty and providing goods and services to different stakeholders. Problem analysis involves understanding both biophysical and socio-economic components of poverty and land degradation as well as the temporal processes and the cause-effect chains that result in the current situation. Options for enhanced biological productivity, enhanced human well-being, and enhanced ecosystem integrity and resilience are developed in parallel and tradeoffs are analyzed. The information on causes and effects, potential options for addressing problems at the farm and landscape scale and tradeoffs between different options and production levels are then brought to negotiations between different stakeholders and used to inform the negotiation process. Developing this framework and making it operational will empower the communities and resource managers in the Project area to take on the long-term responsibility for managing resources.

3.2.3.1.5 Specific activities

1. *Problem Analysis.* In each area chosen for eco-restoration, the Project will conduct a problem identification and analysis exercise. This will include biophysical and socioeconomic surveys, stakeholder consultation, technical consultation with other

ministries and departments that intervene on the ground, as appropriate. The outcome of this analysis will be a prioritization of problems to be tackled across each landscape.

2. *Establishing baselines*. Once key problems have been prioritized, the Project will develop key indicators for progress on each priority problem. For example, if a priority problem is agricultural productivity, indicators of productivity will be developed (e.g. yield). If the problem is food security the indicator may be the number of months that households have to purchase staple food in a year or how many months they are self sufficient for staples. Baselines will be both biophysical and socioeconomic and designed to help the Project measure progress.
3. *Planning interventions.* In consultation with appropriate stakeholders, the Project will identify best practices for improving productivity, human well-being and ecosystem resilience, taking into account the most important sources of stress that are creating the identified problems (climate variability, population growth, illegal logging, policy failures, etc.). This planning will be forward looking
4. *Trade-off analysis.* Land management decisions often involve tradeoffs between multiple objectives and between different stakeholders. These trade-offs are sometimes explicit, but often they are implicit until a formal analysis has been conducted. The Project will engage external consultants in each case where tradeoffs are felt to be important. These consultants will work to document the viewpoints of all concerned stakeholders and facilitate a negotiation over the implementation of activities by the Project.
5. *Extrapolation*. Based upon the results of the trade-off analysis, the Project will begin activities on the ground and scale up rapidly to full implementation in each eco-restoration area.
6. *Impact assessment*. The Project will conduct formal impact assessment exercises in each eco-restoration area to provide feedback to Project managers and activity implementers in relevant time frames to allow for adjustment to implementation plans. Impact assessment is the first step in adaptive management of the Project. The output of the impact assessment exercises will feed back into problem identification and the cycle will begin over again (i.e. at step 1).

This Component will build on the experience and lessons learnt by and from the other projects that have been or are currently operating in the region, particularly the World Bank and JICA projects. It will be able to use the networks and communication channels that have been created to reach farmers and communities, and there will cooperation with them to develop and advance the IEM approach.

3.2.3.1.6 Analyse and restore forest product supply chains

The logging restriction in Assam State has placed a drastic stress on the forestry economy, both public and private. As the project plans to study the conditions to potentially open selected forests to logging, these new conditions may open room for the renovation of the forest product supply chains in the State as well as a redistribution of the income to be expected from forest products.

Downstream forest industry seems to operate outdated machinery, with large opportunity to increase lumber yield and mill productivity. A state policy to secure qualified employment and wood supply will be necessary.

A second major issue is to identify innovative financial mechanisms to allocate the revenue from logging to secure long term sustainability, in a transparent way with special interest to forest communities and to ecosystem services (biodiversity, soil and water resources, cultural values, etc.).

During the previous decades, benefits from commercial logging in Reserved Forest were returned to the state coffer, with no designated return to Assam forests. A suggestion, but which might require decision at higher level, would be to channel a proportion on this income to stay in Forest Department, to the benefit of sustainable forestry. It is considered that sustainable forestry, with its complex survey and monitoring process, would generate additional running costs, which could be covered by the forest production itself. Ultimately, the main beneficiaries would be the downstream population and private sector, in charge of the logging and wood processing added value activities.

3.2.3.1.7 Improved management plans of protected areas

Protected areas in Assam show contrasted situations, regarding the progress in the development of their management plans. Flagship areas, such as Kaziranga National Park, have attracted a lot of interest from Government and also foreign institutions, but sometimes with unequal distribution of funds among sites. In addition, Assam's protected areas are home of some of the most emblematic wildlife species of India, which benefit from the direct support from central level initiatives. Practically the largest funding initiatives in protected areas come from projects like "Project Tiger".

In this context, this project will focus its activities at two levels:

At State level, the project will review ongoing management plans, in a way to facilitate the integration of the protected areas: (i) within their socio-economic context, (i) with other forests in their neighbourhood, through a integrated/master plan approach, and with the harmonisation between local management plans and national conservation schemes/initiatives.

At site level, a selection of protected areas will receive support to rehabilitate its most critically degraded habitats.

The project will also introduce the concept of "adaptive management", for ecological and socio-economical issues, to be implemented through the management plans. Adaptive management applied to ecology would for instance analyse the opportunity and efficiency for desiltation of ponds: sedimentation is a natural process and desiltation can thus become a never ending process, with the risk to transform them gradually into artificial waterholes and hamper the natural context of the protected area. Opportunities to increase the geographical coverage of Protected Areas will also be explored through community reserves.

Mixed international and national consultancy will be hired to support the project in two sectors: protected areas planning, including methods for adaptive management, and multisector assessment to promote participatory management and conservation.

Identification and rehabilitation of degraded critical habitats will involve desiltation of ponds crucial for wildlife during drier season, introduction of artificial waterholes on critical sites, grassland management to maintain habitats, and wetland management, according to the table below.

Table 5 Rehabilitation of degraded critical habitats

	Numbers
Desiltation	30
Artificial waterholes	30
Grassland management	1 000 ha
Wetland management	25

3.2.3.2 Participatory forest management

3.2.3.2.1 Strengthening existing participatory schemes: JFMCs and EDCs

Assam forests face increasing pressure from a growing rural population whose livelihoods are dependent on forests. Forests indeed constitute the main sources of firewood, timber for

construction works, non timber forest produce, medicinal and aromatic plants for indigenous communities.

The "guards and guns" type protection methods have not been enough to prevent the degradation of resource base, with the ensuing detrimental consequences on local livelihoods. The involvement of local populations in forest management appears as central to a better management of forests. Recognizing this, the Government of India drafted guidelines for the implementation of Joint Forest Management Committees (JFMC). Through such committees, local communities have been encouraged to participate in management and share the benefits derived from forest products. JFMCs have proven effective in reducing the destruction of forests and biodiversity (such as illegal felling of trees, illegal grazing, and wild animal poaching) and in increasing local populations' incomes.

Joint Forest Management Committees, as well as Eco Development Committees, are the pillars supporting the participatory policy of the ForDep in Assam, based on national procedures and guidelines, with State specificities.

Joint Forest Management is recent in Assam. As such, local communities are currently lacking the experience and the capacity to sustainably manage the natural resources on their own. But the Forest Department believes that conservation of natural resources can only happen through the implication of local communities.

The involvement of the local communities in the decision making process needs therefore to be cautiously phased in. The first and immediate actions involve ensuring proper representation of women in the Joint Forest Management Committees executing bodies. Current practice is a 70/30 ratio; the project proposes to instead opt for an equal representation. Likewise, to ensure women are properly engaged, dispositions will be taken targeting them to build their confidence and attract them in the committees. These will include specific training and awareness raising activities aimed at them and also specific dispositions regarding benefits sharing ensuring their share within the household is not arrested. The microplans need to be prepared in local language, to ensure ease of involvement of the communities.

The second set of activities will deal with awareness raising activities at the community level to ensure they gain proper exposure / experience / understanding of the role and value of biodiversity conservation. The communities need also to be aware of the long term benefits they will get through conservation.

As the project develops, and the awareness is slowly created, it will be possible, through the adoption of adaptive management, to increase their share in the decision making process, including their representation in the higher decision bodies of the project, as contemplated in the Project Management section.

The NaRMIL/World Bank has supported the formation of Committees in pilot villages and the field experience acquired at range and division levels will be very valuable for the present project. It is expected to draw from NaRMIL lessons to enhance the on-going practices for the launching and the follow-up of the village Committees. The additional revision and potential updating of field processes would take a year. Objectives includes better empowerment of populations, as well as the better integration of the Committees and their micro-plans within the general planning process involving Working Plans and the newly defined Integrated/Master plans. The legalisation of the process would also be enhanced. At the same time, it is clearly understood that the project is requested to channel activities and funds as urgently as possible to populations. Therefore, the project has scheduled to involve a total of 200 JFMC and 28 EDC, in three successive steps.

First step (Year 1): Project rooting through early JFM and ED people empowerment: this step focuses on 4 pilot areas, with 10 JMFCs and 1 EDCs per area for a total of 40 JFMCs

and 4 EDCs. The approach will be directly inspired by the know-how from NaRMIL project, and the choice of villages will be established in Divisions at FDA level according to existing priorities. At the same time, a multi-disciplinary team will assess extensively the successes and shortcomings in existing JFMCs and EDCs, in order to revise the on-going practices, especially at field level.

Second step (Years 2 and 3): The second step is designed to test at village level, following an adaptive management approach, the revised practices initiated during the first step with a specific consideration on the x10 up scaling in the number of JFMC to be developed, compared to the previous NaRMIL exercise. Each year, the project will provide an allocation for 40 JFMCs and 4 EDCs as test at field level.

Third step (Years 4 and 5): this is a step of consolidation of the revised approach, as defined by the previous steps, with an increased number of villages involved, reaching a total of 200 JFMCs and 28 EDC sby the end of the project, to be supported and monitored by the ForDep. In addition the new 80 JFMCs and 16 EDCs, the existing Committees will also update their management documents and practices, according to the revised approach.

This component would include the following activities, with the aim to gradually empower forest dependent communities to become partners in the management and conservation of forest resources and biodiversity, through training and institutional design:

- Integrate existing formal participatory tools, such as JFM and ED procedures into specific chapters of the forest management plans/working plans (i.e. microplan)
- Assess existing JFM and EDC procedures and impacts (environmental and socio-economic impacts), and propose updated procedures
- Implement updated procedures on a pilot basis
- Prepare and implement micro-plans and develop entry point activities
- Address participatory forest management while taking account of the different situation of the villages neighbouring forests: Forest Villages, fringe villages or encroaching villages, potential of forest land reclamation by Tribes or long time village dwellers.
- Harmonise approaches in villages belonging to the same zone of influence for a specific forest or group of forests, through the integrated/master plan mechanism
- Strengthen capacities of JFM and EC committees
- Participatory forestry in Unclassed State Forests and Proposed Reserved Forests
- Develop opportunities for better communication through information sharing sessions, and test public hearings approach.

3.2.3.2.2 Exploring the opportunities offered by the FRA 2006

The Forest Right Act has opened opportunities to transfer forest rights to different stakeholders along with transferring, if not strengthening, the necessity for forest conservation to the new dwellers. The project proposes to study and assess the modalities to better link the Community Forest Resources and Community Forest Rights(CoFR) under the Forest Rights Act to Forest Department conservation strategies. The project would support Assam ForDep with legal and socio-economic expertise, which would work on the design of policy guidelines to clarify the relationships between ForDep and communities, in CoFR areas. if the need arises preliminary modalities and participatory vehicles can be tested on pilot sites.

3.2.3.2.3 Agro-forestry and trees out of Forests

The main objective of this activity is to develop specific packages to promote agro-forestry outside recorded forest lands to supplement the needs of local communities, improve the overall productivity of the production system and provide ecosystem services while reducing the pressure on the forests.

Opportunities for agro-forestry and other tree management outside forests will be assessed during Year 1 with the support of expertise, taking account of the specific land tenure systems in Assam, in Bramaputra flood plain or in hills areas.

Lessons will be taken from national and international experiences, through the organisation of overseas visits, as well as visits to agro-forestry successful areas in India.

Preliminary packages will be identified from the large experience developed in similar ecological and socio-economical situations. Initial options agro-forestry will be tested on pilot sites representative of Assam landscapes (hill areas/Jhumming, flood plain, etc.). Field activities will be developed in the project pilot areas with provisional budget for 30 sites during year two.

As a second step, building on experience from the initial tests, larger scale agro-forestry would be promoted during years 3 and 4, with a total provision of 90 additional sites, to be identified and implemented in participative mode.

A specific focus shall be explored on land recognised under the Forest Right Act, to enhance productivity through agro-forestry approach and to promote trees outside of recorded forest areas.

3.2.3.3 Conflict Management

The general purpose of this component is to explore strategies to reduce the causes and impacts of conflicts between the populations living in interaction with or in zones of influence near to forests, and the forest administration. In general, conflicts relate to land tenure, to access rights or to competition on land and resources. In many cases, it seems that a better common sharing and understanding of the laws and regulations between the forest administration and the village dwellers would contribute to mitigate many conflicts. Despite of their often large experience, forest officers lack adapted skills and tools to manage the diversity and the number of conflicts they face. The population lacks access to and understanding of relevant data and information related to forestry, such as legal documents and management plans.

Conflicts between population and wildlife require a special attention, because they act as fixation points in the quality of the dialogue between foresters and population. Overlapping natural habitats and productive activities create increased opportunities for interactions between wildlife and local communities. These interactions have potential detrimental effects for both humans and animal, and lead to conflicts. In Assam this translates into elephants and other large mammal raiding crops, cattle being lifted by large carnivores (Tigers, Panthers), and communities retaliating (poisoning). Other source of friction is the abundance of cattle grazing inside forests, competing for the resources and enabling two-way transmission of diseases.

Existing mitigation strategies such as compensation schemes or fencing have shown limitations, and have not curbed the extent of conflicts in the State. This component will develop strategies for the local communities to cope up with the wildlife in conflict prone areas and propose schemes to raise tolerance level of neighbouring communities. The actions will be decided upon based on lessons drawn from other areas presenting similar problems, both in India and outside, and are split into immediate action and long term.

3.2.3.3.1 Immediate response

- The current **compensation scheme** will be assessed to identify bottlenecks and shortcomings. Procedures will be streamlined to reduce time lags between damage and compensation and realistic financial estimations of the total costs will be produced.

- **Capture and relocation** of problem animals has the added benefit of building trusts within the communities that feel the problem is being dealt with. Infrastructures (such as cages, tranquilizer darts and the skills needed to correctly use them) will be provided to specific cells in charge of these activities.
- **Power fencing** has proved effective when targeted at specific locations. It has also its detrimental effects such as reducing gene flows. Species specific barriers will be developed in well identified areas to minimize the negative impacts yet still reducing the levels of conflicts.
- Through the JFMC, **local protection committees** will be constituted, and given training and capacity to deal with conflicts and implement coping strategies.

3.2.3.3.2 Long term management

- **Habitat restoration activities** will be undertaken in selected localities to raise the carrying capacity of the ecosystems and temporally lift the pressure on surrounding landscapes. These activities will include enriching palatable species inside forests, taking care not to disrupt local ecological dynamics; manage invasive species that may otherwise reduce the availability of key resources; identify and restore biological corridors; implement small scale check dams or elevated corridors to prevent either water scarcity or refuges during floods. These activities will target areas outside PAs, where there is less scope to mitigate the conflict with the existing Departmental activities.
- **Promoting more productive cattle breed**ing to bring down the cattle population and reduce pressure on forest and regeneration. This will require identifying social and cultural drivers that promote current patterns of cattle breeding and rearing, and offering training, including para-veterinary skills, and subsidized food until production starts. This will need to be accompanied by measures to remove present incentives for stray cattle. This pilot activity will be developed around Pobitora Wildlife Sanctuary that provides critical habitat for the endangered Rhino population.
- **Raising tolerance**. If benefits are received by individuals and the communities from the presence of wildlife, there is a potential for the problem to be less perceived as such. Market labels, development of ecotourism and training of local guides, support to entry point activities directly linked to the presence of wildlife are tools that will be explored around target protected areas.
- **Identifying coping strategies**. Changes in cropping pattern and the creation of buffer zones have the potential to reduce negative interactions. Other strategies will be identified through the analysis of experiences outside the area and from communities and field staff internal empirical experiences.
- **Improving communication** dissemination, through the development of forest information centers, with documents available to the public about forest law and regulations, as well as the various planning documents in force in the area. Mechanisms to enhance information sharing and taking account of population advice, such as public hearings, will be promoted by the project.

Human wildlife conflicts typically pose wicked problems, and require adaptive management approaches to be dealt with any measure of success. Therefore, monitoring and evaluation activities, as currently contemplated in the project, which inform strategies and decision making, will be critical for the delivery of the outcomes contemplated in this component.

3.2.3.4 Develop sustainable fuel wood production and promotion of alternatives

Fuel wood is the major forest product used by rural populations in Assam. Exact figures on fuel wood production and consumption are not available, although such resource constitutes a significant component of village livelihoods. The reason comes from the fact that fuel wood chain of custody remains mostly informal, relying on tolerated dead wood picking in forests by neighbouring population. Impact of fuel wood use on forest degradation is an important concern, although still needs toe better understood.

As an early step the project will assess on-going fuel wood consumption, practices, markets and perspectives at global Assam level. The assessment will require a State level survey, in order to better quantify the most sensitive areas with the largest gaps between fuel wood offer and demand, as well as to identify areas of interest critically at risk. The assessment will be followed by a prospective study on rural domestic energy, and by the design of a fuel wood strategy and policy for Assam. Assessment and strategic studies will be entrusted to external expertise.

The project will put a special focus on fuel wood plantations, with the following expected direct and indirect benefits:

- Facilitate the access by populations to a scarce and only tolerated resource
- Provide a resource that would release the pressure on neighbouring natural forest resources
- Facilitate the dialogue between foresters and village population,as fuel wood plantation are significant components of microplan activities.

The project will provide for the establishment of a total of 20,000 hectares of fuel wood plantation through participatory approach. As a component of the micro-planning design, the project will support the assessment of opportunities for fuel production for domestic household use with villagers: land availability, species, sylviculture, manpower (plantation, protection, maintenance, logging).

In parallel, the project will also support the identification of opportunities through inter-department (agriculture, energy, infrastructure, industry, etc.) approach for fuel wood alternatives. The development of such alternatives will be promoted through eco-development or entry point activities.

One alternative to fuel wood with promising results elsewhere in India could be biogas production. The example of Karnataka, with SKG Sangha NGO, shows that biogas production can be successful at family/household levels. SKG Sangha, also involved in North East India in Megalaya, has an experience above 60,000 units installed. Experience shows that the recycling of the organic wastes of two cows is enough, as an average, to provide two hours of biogas per day for cooking. Such energy is a direct substitute to fuel wood, which therefore contributes to reduce the pressure on wood resources. In addition, biogas can reduce the daily burden for women to pick and carry the wood, freeing 3 hours out of 4 per day, or reducing the daily cost to purchase the wood. Reduce the dependency on fuel wood also releases the pressure to risk illegality for villagers.

On going successful financial scheme to disseminate household biogas units (500€ each) relies on a contribution by families limited to 25% of the total cost, mostly in-kind (work, or material, sand, briks), the remaining 75% is subsidised by SKG either through an external grant, or through a more innovative CDM –Clean Development Mechanism, selling in advance carbon credits on the voluntary market, based on the amount of fuel wood saved by the biogas.

3.2.4 Adding value and opening markets/opportunities for forests and biodiversity goods and services

Most of the forest produce, except a few small scale non-wood items, such as honey, in Assam is sold in its raw form, resulting in low proceeds from such a sale. This is common not only for

the produce that originates in the forests but also for the produce that is of forest nature but produced out side the forests. The real irony is that although there is a significant level of processing and value addition done to the forest produce, it is usually not done by the primary producers. Also in this dilemma, the producers are at the mercy of the market, which is usually controlled by the buyers, who are the processors and value adding companies. Such companies thereby pay a price, which is favourable to them and have larger margin of returns than the producers. This scenario can be reversed and the income of the producers enhanced several fold by taking up activities which are related to value addition and marketing of the forests and bio diversity goods.

Similar is the situation with the forest and biodiversity services, such as the eco- tourism, safaris, etc. and such services in several instances are contracted out (sourced out) for management purposes. Herein again, the contracting parties generate more revenue than the original source of such services.

Introducing alternative protocols for value addition and marketing of forest and biodiversity goods and services is expected to result in enhanced livelihoods and income of the communities and contribute to the general goal of this project. Therefore, it strongly relates to the livelihoods alternatives and income generating activities (IGA) for the communities of this project.

3.2.4.1 Promoting forest goods

There are a number of forest and biodiversity goods produced in Assam. They include timber, pulp wood, medicinal and aromatic plants, natural dyes, essential oils, spices and condiments, high value fruits, mushrooms, tubers, rhizomes, silk, fibre, fodder, etc. A number of these are unique to Assam, e.g. Assam teak, 'Leteku, Thekera, Poniyal' fruits, Agar oil and Chalmogra oil, Mogra and Mijankuri silk and Ria fibre and organic honey and fetch higher market price than the same produce if originating elsewhere in the country. Therefore, special attention will be paid to promote such unique goods to Assam, including their production, processing, branding and marketing aspects. The improved marketing strategies will also be applied to other forest and biodiversity goods in general.

The promotion of unique goods to Assam may involve locating their natural habitat, analysing the constraints in their large scale production, bottlenecks in the value addition and supply chain and restrictions in their marketing, including the critical volume aspects, monopolies, tariffs, etc. After the constraint analysis, efforts will be made to overcome the impeding problems for their production, value addition, or processing and marketing through the technical back up, capacity building and community organization. This may involve drawing / developing and promotion of the production technology and marketing strategies, training of the producers and the forest department staff on production, sustainable collection, processing, and marketing and developing the entrepreneurial skills of the community in the form of self-help groups and societies.

This scheme may involve inventory of important goods by agro-ecology, by community, or by any other manner feasible in the state and prioritizing them to a few using selected technical, social and economic parameters, such as the community familiarity and knowledge in handling them (production, processing, etc.), market demand, price structure, and available market, etc. The next step will involve organizing and preparing the community for producing, processing and marketing them, by organizing the community in self help, or producers groups, or societies and training them on different aspects, including the group purchase of inputs and sale of the produce / product. Establishing the extent of their production on area, or volume basis, delineating the area for it and arranging for the needed inputs will be an essential part of this. Likewise, providing the market feed back or market intelligence to the producers and / or using it in developing commodity based local plans and linking the producers to various markets on a regular basis will be another important input to this component of the project.

These options may include the models of e-chaupal, e-kiosks, Producer Company, etc.

3.2.4.2 Adding value to local production

One very important aspect in this area is the value addition through post harvest and processing techniques, from as simple as grading of the produce to the product development through processing, (e.g. jelly, jams and pickle making), attractive and easy to handle packaging and branding of the produce, or the products. Adequate attention will be paid on this aspect and to the products are produced by the tribal communities, through organic means and without involving child labour because these commodities normally fetch better prices and thereby offer higher returns. This activity will be taken up at the pilot level initially and be expanded to a larger coverage later on.

3.2.4.3 Developing livelihood alternatives

JFMCs, through the combination of paid wages for forest related work and the share of benefits from present community managed forest resources, cannot alone uphold the livelihoods and the development of the forest dependent communities. As a result, forests still face pressure from growing local communities, because they often constitute the main, if not the only, source of income of such communities. The links between forestry and poverty are complex. But reducing the dependency on forests of rural populations by providing them with alternative sources of income would significantly help reduce the pressure on the forests.

Livelihood alternatives would be explored and promoted in relation to the forest, non-forest (non-forest) and allied sectors. Forest sector alternatives would focus on those activities such as the production and sale of high quality planting material, seed supply of forest species, and those related activities, which could provide livelihoods from the forests, e.g. sustainable collection of non-wood forest produce, such as the natural dyes, medicinal plants, resin and gum, etc. to the communities. Non- forest alternatives would include on-farm and house hold activities, which maybe related to agriculture, including agro-forestry, livestock (goat, pig, poultry), and fish farming, sericulture, fruit processing and preservation. The allied sector activities may include yarn and weaving, garment making, handicrafts making, and manufacturing and repairs of farm tools and implements, etc.

Alternative livelihoods products and activities can originate from resources from both inside and outside the forests. Forest resources can be carefully exploited to be turned into products which can be commercialized, thereby providing an additional source of income for local populations. The project will identify such products that have potential for up-scaling. *

This will include **Bamboos** that can be used to build furniture; carefully collected seeds and medicinal and aromatic plants that can be cultivated to be sold outside the village's boundaries.

Ecotourism, just nascent in Assam, can be expanded in specific areas of the State, adding an additional avenue for local communities to commercialize their products and run eco-resorts. The project will train member of local communities to act as eco-guides. Members of local communities will need support and training to gain the set of specific skills that are needed to develop such products and activities.

Since most of the IGAs are site specific, their identification will be done through **the assessment of needs and capacity expressed by the communities.** Quantitative tools will be applied for such an assessment. In here, a number of trainings, especially on sustainable collection of forest produce and on specific items / commodity production will be very relevant and provisions made to offer them through this project support. Likewise, some form of arrangement for providing crucial inputs on livelihood items will also be necessary to be provided through the project support.

Biogas. Biogas units are being installed by the Forest Department Under Village Energy Security Programme (VESP) of the Government of India and 8800 such units have already been installed and further 5000 units are planned to be installed in the current financial year. There is very

positive response from the villagers and Forest Department is willing to meet the challenge in the targe villages through financial assistance from the Central Government. In addition 14 gassifiers have also been installed but they have not caught the favour of villagers.

Micro enterprise development will be another essential activity in this area, and may include supplying some inputs to the forest department, such as the planting material, compost, etc. and the value addition and marketing of the forest and non-forest produce in a "community collective" manner. Linking this area with the value addition part, would require preparing the entrepreneur type of individuals in the community to organize an "entity / body" that would be able to provide the forward linkages to the markets for the produce and the backward linkages to the producers for the market demand. However, this venture would involve expenditure on the training of communities on aspects of community organization, their negotiation capacity, composition of a forward and backward linkage providing entity, e.g. a producer company, and the upscale marketing of the produce, or the products.

3.2.4.4 Capacity building and training

Similarly, local communities would become less dependent on forest products if they could benefit from vocational training to specialize in non-forest based activities. The project will develop training modules, for instance handloom weaving, driving, mechanics and electronics repairing, tailoring, to name but a few. Adding value on site through small and medium scale ventures would also help avoiding products based on Assamese raw materials such as the hand brooms (made from wild grass) and agrabatti (incense sticks made of bamboo) to be manufactured outside the state Assam, as is too often happening. For this also, training will be needed to build the entrepreneurial skill of identified leaders.

3.2.4.5 Marketing and labelling products

If the new professions and products developed are to be successfully commercialized, they would need to be made fit for the demand and adequately marketed. The forest department officials and rural communities will therefore need support in undertaking market analysis studies, preparing viable business plans, as well as branding and labeling their products. The project will also establish showrooms to showcase the products of the communities, therefore increasing their profile and raising the demand.

3.2.4.6 Carbon Finance

This Project will explore the opportunities offered by carbon finance as one of its strategies of sustainability. Carbon finance offer several options for generating long-term revenue streams. One option is through the new REDD+ mechanism that is emerging from the negotiations around the UN Framework Convention on Climate Change. Under this mechanism, activities that reduce emissions from deforestation and from forest degradation are eligible for financing. While deforestation and forest degradation emissions are not a large part of India's emissions, they are proportionately a larger part of emissions from Assam state, which has a low level of industrialization. The REDD+ mechanism may also allow opportunities associated with rehabilitation of degraded forests, although a final decision on this is pending. The REDD+ mechanism is likely to be launched in 2012. The Project should monitor the international negotiations and evaluate opportunities to engage with this mechanism. It will be essential for the Project to be in frequent contact with the UNFCCC Focal Point in the Ministry of environment and Forests.

The second option is through afforestation and reforestation activities in either the Clean Development Mechanism (CD) or in voluntary markets. The CDM offers carbon certified emissions reduction (CER) credits as offsets to companies in developed countries when they cannot meet emissions reductions themselves. Voluntary markets offer so called voluntary emissions reductions (VERs) to companies that wish to reduce their carbon footprints as part of a sense of corporate social responsibility.

The CDM offers two approaches to carbon crediting based on the length of time for which credits are valid. Long-term CERs (lCER) offer long-term guarantees that carbon will be sequestered, but carries liabilities for project proponents to ensure that carbon remains sequestered for long periods up to 60 years. The liabilities of lCERs are generally seen as unacceptable to project developers and they are seen as too risky by buyers. As a result no projects have yet been based on the lCER option. The second option offers temporary CERs (tCER) that must be renewed every 5 years. These types of credits offer flexibility to project proponents and are more suited to community-based projects as they offer flexibility to land owners. The Project should explore the opportunities that tCERs offer.

Prices in the CDM market are generally significantly higher than in voluntary markets, but transaction costs are also considerably higher. The Project should explore both market opportunities and assess the appropriateness of each one for different components of the Project. The Project may decide that CDM is appropriate for one subset of activities and the voluntary market is appropriate for another subset.

In anticipation of seeking carbon finance from the different options offered, the Project will undertake the following activities:

3.2.4.6.1 Determination of baselines and reference emission levels:

Baselines are generally determined for afforestation and reforestation projects. They consist in estimating carbon stocks on the landscape in the absence of project activities. Reference emissions levels are the corollary in REDD projects and consist of estimating future emissions in the absence of the project.

Significant data on forest area and forest quality exist at the CCF office. There is additional data with the Forest Survey of India office in Dehradun. The Project will determine current land use, expected future land use and land-use change in the absence of the Project and expected future land-use as a result of the Project. Land use and land-use change should be made in a spatially explicit manner.

The Project will determine the different drivers of deforestation in each sub-region of the state and will determine the economics behind deforestation.

A modeling or projection exercise will be required to estimate future likely deforestation rates in a spatially explicit manner. Determining a baseline or reference emission is not an exact science because one is attempting to prove the counter factual – land-use change and associated emissions that did not take place. The best approach at the moment is to develop several future scenarios based on reasonable assumptions about likely economic futures. Deforestation rates estimated for each scenario should be converted emissions numbers. External expertise may be required to implement this.

3.2.4.6.2 Establishment of a State-wide system for carbon stock monitoring:

The FSI already conducts national forest inventories and there is a lot of appropriate data available on forest stocks. These stocks will need to be converted into carbon numbers. It will be important for the Project to establish a link with the forestry department at the Agricultural University in Guwahati to help develop appropriate conversion factors. Outside assistance may also be needed to do this.

There is a need for the Project to provide training in the IPCC approach to carbon accounting. The 2003 Good Practice Guidance provides methods for project-level accounting. These methods were extended in the 2006 National Greenhouse Gas Inventory Guidelines. If the Project is going to consider using carbon finance as part of its sustainability strategy, there is a need to create a small cadre of staff who understand these methods and who can ensure that they are

implemented properly. This could be supported either locally or internationally. There is expertise at the University of Bangalore and the World Bank is supporting development of a carbon monitoring system for agro-forestry systems through the Carbon Poverty Reduction Project led by ICRAF.

Community based monitoring will be an important component of the measurement and monitoring system to facilitate community participation in the carbon finance components of the Project, to help ensure transparency in reporting and to increase community buy-in.

Education of community leaders: Ensuring the sustainability of carbon benefits will require community participation and cooperation. It is essential that communities understand and provide informed consent to participating in any carbon finance scheme.

Negotiate benefits sharing agreements with participating communities: Whereas communities will be altering their current land management practices, and may undertake activities with longer-term payoffs but significant up-front costs and lost production, they need to share in the benefits of carbon finance schemes. Comprehensive benefits sharing agreements are going to have to be worked out on a community by community basis for this Project.

Explore the possibilities of CCBA certification. The Climate, Community and Biodiversity Alliance (CCBA) has created an internationally recognized set of standards for carbon finance projects that ensures projects deliver multiple benefits in a sustainable manner. All activities undertaken in this Project should use these standards as design guidelines. Furthermore, the Project should work with CCBA to develop appropriate documentation to meet the requirements of certification and the Project should seek such certification.

Accessing carbon finance: Several opportunities to access carbon finance are available to the Project. The Project should begin conversations with UN-REDD, the Forest Carbon Partnership Facility, the BioCarbon Fund and private brokers to explore bringing projects to market. The Project should engage the services of consultants to advice on developing appropriate documentation.

Assess social impact of carbon sequestration projects: Carbon sequestration projects could have both negative and positive impacts on communities, and this is likely to vary between different types of communities (forest villages, villages in revenue lands, etc.). The Project needs to assess positive and negative impacts ad develop a mitigation plan for all negative impacts identified.

Conduct an environmental impact assessment. Most C-finance buyers require an environmental impact assessment (it is likely that the GoI will require such an assessment for this Project independent of whether C- finance is involved). One likely negative effect is water availability and the impact of increase tree cover on water availability must be assessed. Communities that we visited during this mission already listed water availability as a major problem.

3.2.5 Project management

3.2.5.1 Project running costs (Project management)

The project will cover the running costs of its Governing Body and its Project Management Unit. As no specific staff should be hired at the Field Unit level, the running costs at this level will be taken into consideration through the various project activities, in addition to existing ForDep budget.

A specific budget for the Governing Body will facilitate the organisation of its regular meetings. The PMU will benefit from the allocation of a specific budget for office space, stationary, office facilities (electricity, telephone, internet). At present the Forest Department of Assam lacks the necessary office space in Guwahati to accommodate the full team of the PMU. A provision to rent sufficient office space will be made available, leaving to the government of Assam the opportunity to provide relevant additional working space, through the construction of new buildings.

Transportation facilities will be provided to the PMU, with a provision of 10 cars and the relevant running costs for the project duration. A budget for national and international air tickets is also available.

The PMU will involve staff from mixed origin, with three categories (i) hired/outsourced staff (ii) forest officers detached from the Forest Department (iii) officers detached from other departments (i.e. agriculture, tribal affairs, etc.). Detached forest officers will maintain their salary from the Department, and will receive specific project incentives, as per rules in force in the matter. Detached officers from other Departments will be fully compensated by the provision of their salaries etc. by the project.

The project will launch a large number of procurements related to infrastructure, equipment and studies. Procurement process requires specific budgets, such as publicity, control, finalisation of contracts, etc. The project will hire external auditors on a regular basis to provide transparency for each procurement and regulatory procedure.

3.2.5.2 Phasing Workshops

Three key project phases will receive the support of large scale workshops, involving representatives of stakeholders at local and State levels (NGOs, villages, tribal representatives, forest committees, etc.), local and State authorities, line Department officers, partner projects and donors. A selection of attendees from other Indian States, form Central level, as well as from foreign countries will be invited on the basis of their relevant experience.

These workshops will provide the opportunity to the PMU and to the Forest Department to exchange views on the project strategy and outcomes and to draw lessons from existing experiences. Workshops will also focus on possible evolutions or more in-depth reforms in management of forest, biodiversity and livelihood issues in Assam, and technical workgroups will assess different options to help decision making by authorities.

The three main workshops will be:

- **Inception Workshop**, to be organised within the first six months of the project. This inception phase will launch a range of studies and pilot activities, and will also provide guidance for an initial round of confidence-building activities in pilot project areas.
- **Pilot Phase Workshop**, will draw lessons from the many studies and pilot activities launched by the project during its three first years. This mid-term workshop will be decisive to potentially re-orient the project, depending on the success of its achievements. This workshop will also validate among the pilot activities those with an operational potential to be developed at large scale level in Assam. Finally, the mid-term workshop will set the grounds of potentially new regulations and norms to be implemented in Assam forestry and partner sectors. The main strategic orientation of the technical approaches, as well as the regulation to be adopted, is their long term sustainability, in term of human, material and financial resources.
- **Final Implementation Workshop** will be organised during the second half of the project's last year. The main focus would be placed on an extensive assessment of the project's outcome, of lessons learnt and on the most appropriate options to provide steady maintenance of the various equipment and infrastructure established by the project.

3.2.5.3 Communication, documentation

The project will develop a general communication policy including the production of various material based on multimedia, internet, exhibitions, edition of brochures and booklets. A proactive approach will maintain narrow connections with local Assam media, newspapers. A specific

communication strategy will be designed during the project inception phase at PMU level, with several targets:

- as a transparency objective, inform the general public and forest stakeholders about the project activities,
- enhance the access to forestry data, with an attention on public data
- increase awareness and information of the stakeholders in Assam about major forest related issues, such as fuel wood crisis, land ownership, deforestation, forest laws and regulations, forest committees and other participatory tools, conflict prevention and mitigation, etc.

3.2.5.4 Monitoring & Evaluation

The monitoring and evaluation of the project will be carried out on the basis of the log frame and list of indicators that will have been established by the French Development Agency, the Assam Forest Department in the Project Description Document, and key stakeholders of the project. The implementation of the project will be monitored both internally by the PMU, and externally by an independent organization.

The project will adopt a participatory monitoring and evaluation system, by which all stakeholders of the project will be involved in the M&E. Prior to the implementation of the project, the French Development Agency, the Assam Forest Department, and when possible local communities and NGOs, will agree on a list of monitoring and evaluation dispositions, as well as on financial and physical targets that will be either be based on existing targets or be specifically designed for each innovative component.

To bypass possible administrative bottlenecks, a direct link between village level units and the executive committee will be established. The exact form this letterbox will work will be decided on the basis of the existing technology available at the village level. A simple system with a mail box receiving SMS from mobile phones can be envisaged, and could be designed so as to protect anonymity of the sources if needed.

The project embraces adaptive management or “learning by doing” as an essential component of its strategy. The project plans to create the conditions for adaptive management to emerge, though the adoption of a multi-layered scheme of monitoring and evaluation, drawing lessons from past experiences to improve the flow of information at all level of the project structure.

Adaptive management is a structured, iterative decision making process in the face of uncertainty with the aim to reduce said uncertainty over time via monitoring. It deals with testing assumptions, using site-specific knowledge to select the strategy of action and then evaluating the impact of this strategy. If the assumptions are proven wrong, it involves being able to change the steering direction, adopting new assumptions and strategies of action on the basis of the information gained through monitoring and empirical observation. It finally implies documenting the planning and implementation processes, and the outcomes, both positive and negative. This is crucial to enable internal learning and also share the experiences obtained with the outside community. In addition, monitoring that financial and physical targets are met on time and evaluating the impacts produced by the project activities to assess the success of its activities and eventually redirect its course are key components to achieve adaptive management.

There are however common pitfalls that need to be avoided:

- The monitoring is never completed.
- The monitoring data are not analyzed.
- The analyzed results are not conclusive.

- The analyzed results are interesting but never reach decision makers.
- The decision makers do not use the results because of internal or external factors.

The first part of developing the monitoring plan involves specifying the audience and their information needs. Who will use the data, how and for what? Different targets can be identified, from the donor agency to the village committee, and each will require a specific set of information. The indicators will then be identified, based on the target audience and its needs. The list will need to be refined in due course as required.

Some possible indicators are:

Forestry: (i) Change in vegetation cover and growing stock, (ii) Incidence of grazing and illegal felling in JFM allotted area, (iii) Degraded forest land brought back to regeneration process, (iv) Incidence of poaching, (v) Impact on aquatic habitats & water resources, (vi) Collection of Fire-wood by head load and Bicycles & (vii) Bio-diversity Conservation.

Livelihood: (i) Wage employment for JFM Committee members, (ii) Increase in NTFP production, processing, marketing and additional income to villagers, (iii) Infrastructure development in the villages, (iv) Impact on water harvesting and ground water recharge, (v) Income generation from alternative livelihood activities.

Empowerment: (i) Participation in micro-plan preparation and management of physical and financial assets by the villagers, (ii) participation of women and other weaker sections in planning and decision making, (iii) Coordination with the Forest and other line Departments & (iv) Formation of Self Help Groups.

This internal adaptive and participatory monitoring does not replaces the need for an external evaluation led by an independent institution, as required by the Government of India and the donor agency.

The monitoring activities will be organised as follows:

- Design and test sets of indicators
- Implement a baseline study
- Collect and analyze monitoring data for decision making

Evaluation activities will include half year financial audits and two major technical audits at mid-term and at the end of the project, in time with the main project phases.

3.3 Logical framework

3.3.1 Project log frame

Table 6 Project log frame

Level		Indicators	Indicator source	Assumptions
General Objective		**General Objective Contribution Indicators**		
	Sustainable Forest Management in Assam	Deforestation and Forest Degradation rates are reduced; Forest products supply chain is active.	State of the Forest Reports Assam 2010 - 2015	GoI maintain steady stream of funds for forestry development/forest plantations
	Improved Livelihood of Forest Dependent Communities	Communities are empowered to participate in forest management decision making, Dependency on forest for livelihood is reduced. Access to community forest resources is secured.	Mid-term and Final Review (stakeholder interviews): MoEF Annual reports	Insurgency remains at low levels in project target areas
Specific Objective		**Outcome indicators:**		
1	To enhance the capacity of the Assam Forest Department	Equipments and infrastructures are adequate in target areas from headquarters to forester and guard level;	Assam Forest Department Activity Reports; Mid Term Review	Funding from State government is stable or increases
2	To establish a multi level strategic plan for the management of Assam Forests	Existing and future Working/Management Plans explicitly refer to the State Levels Strategic Plan; use the multidisciplinary GIS database and integrate microplans	Assam Forest Department Working/ Management Plans 2010-2015	
3	To carry out forest management activities in a transparent and sustainable way	Forests in target areas are restored ; JFMC and EDC in target areas have legal recognition and are active; Conflict levels (on land and on wildlife) are reduced	Mid -Term and Final Review (Land Use Cover Changes Assessment; Stakeholders interviews)	Supreme Court validates options selected for the Working Plans
4	To add value to goods and services generated through sustainable forest management	Target villages successfully engaged in IGA; CDM/ REDD + projects are accepted	Line Department activity reports (Horticulture, Fisheries, Animal Husbandry, Tourism); Mid Term and Final review	Road network connection with China does not disrupt forest products supply chains.
Outputs		**Output indicators:**		
1	**Component 1 : FD Institutional strengthening and legal refoms**			
1.1	Streamlining procedures within ForDep		Assam Forest Department Activity Reports	
1.2	Capacity building of staff.	N persons trained, by category of training	Training reports / extension	
1.3	Rehabilitate and enhance existing infrastructure and equipment	N improved facilities, Existence of a intranet/internet (number of active users; number of connections)	Assam Forest Department Activity Reports	
1.4	Enhance interaction with other departments and partners			Other Departments participate in the project

1.5	Legal reforms, Assess and update, disseminate regulation	N workshops held, Reports and dissemination material is available and accessible; propositions are submitted to the State Government	External consultant report; Project monitoring	
1.6	Research and Development	Scientific papers and reports on topics identified by the Assam Forest Department; Results quoted and used in Strategic Plan and Working/Management Plans and available through the Forest Department intranet	Scientific committee activity report; Strategic Forest Management Plan for Assam; Working/Management Plans	
2	**Component 2 : Multi-level strategic planning**			
2.1	Assam State level forest strategic planning -policy	Existence of a multidisciplinary GIS database on Assam Forests; State Action Plan is up to date	Mid Term Review, Final Review	
2.2	Design integrated/master plan approach	Guidelines for integrated master plan are accessible and followed by working plan officers.	Working Plans, Mid Term Review, Final Review	
3	**Component 3 : Sustainable forest management**			
3.1	Sustainable Forest Management by the Forest Department	N hectares restored/planted; Each division has an accepted working plan; Forestry operations are undertaken in pilot sites; Management Plans of selected Protected Areas explicitly adopt Adaptive management procedures; N companies participate in timber traceability schemes; N of m3 of wood processed before and after the project.	Assam Forest Department Activity Reports; Working plans; Management Plans; Wood Balance Study 2010 and 2015	Transparency and control of the timber supply chain, including inter state border exchanges is enforced
3.2	Participatory forestry management	N number of JFMC and EDC have legal existence and are active; Revised guidelines on JFMC are proposed; N of hectare under agro-forestry initiated; Guidelines for agro-forestry packages exist and are integrated in the Strategic Plan	JFMC/EDC MoA or Registry under Societies Act; Microplans; JFMC/ECD Activity reports; Mid-term review.	JFMC activities do not undermine the implementation of the FRA; Implementation of FRA is not stalled
3.3	Biodiversity Conservation and Management	People Biodiversity Register in place; Dissemination workshops are held.	Assam Forest Department Activity Reports; MoEF Annual Report; Project Monitoring	
3.4	Implement sustainable fuel wood production strategy and promotion of alternatives	Assam State Fuel wood policy is drafted and available; N of hectares of fuel wood plantation established. Project on alternate energy sources is submitted to a donor agency	Assam Forest Department Activity Reports; Project Monitoring	Availability of land for plantations
3.5	Mitigation of conflicts including wildlife/human and land use	Workshops are held, N of persons trained in conflict management; Toolkits are available and in use.	Project Monitoring: Mid Term and Final review	There are no large scale border disputes with other States and levels of insurgency remain low

3.6	Explore opportunities and support pilot schemes to develop a private forest sector	Report on policy recommendations is produced; N hectares of private forestry under trial, by category	Project Monitoring: Mid Term and Final review	There are no issues raised by the National Biodiversity Authority on planting protected species (under CITES).
4	**Component 4 : Adding value and opening markets/opportunities**			
4.1	Support forest product/goods promotion and marketing	N persons trained, by category; Area by activity, with/without improved standard	Project village / enterprise monitoring ; JFMC Activity reports	Access to local and remote markets. Road network connection with China does not disrupt forest products supply chains.
4.2	Support IGA outside forests	N persons trained, by category; N of household with new activity packages implemented, with/without improved standard	Project village / enterprise monitoring ; JFMC Activity reports	Road network connection with China does not disrupt agricultural products supply chains.
4.3	Estimate potential value of ecosystem services (including carbon and biodiversity)	There is an official Baseline used in framing State CDM/REDD+ policy; N and Area under carbon sink project	Reports on carbon sink impact assessment in each eco-rehabilitation area.	Unpredictable evaluation of carbon market value. National Indian carbon policies.
Inputs		**Input Indicators**		
5.1	Financial Resources	AFD loan	Financial Monitoring	INR exchange rate remains stable; Transparence and Accountability Standards are respected.
5.2	Human Resources	Competitive selection of Project Staff; Project Staff turn over rate	Project Monitoring: Mid Term and Final review	Project staff and Forest Officials turn over is limited (normal tenure for ForDep Staff is 3 ears).
5.3	Technical assistance			

3.3.2 Project expected outputs

Table 7 Project expected outputs

	Component 1 : FD Institutional strengthening and legal reforms	
1.1	**Streamlining procedures within the Forestry Department**	
1.2	**Capacity building of staff.**	
1.2.1	Building of a Projection for Management Staff, Job and Skills" system	1 intranet based Human Resources System operational with trained HR officers
1.2.2	Designing in service training program	1 comprehensive and multidisciplinary service training program
1.2.3	Refresher training course program - Phase 1	180 Trainees
1.2.4	New skills/tools training course program - Phase 2	130 Trainees
1.2.5	Impact assessment of training courses	1 study on the impact of training course
1.3	**Rehabilitate and enhance existing infrastructure and equipment**	
1.3.1	Infrastructure/ surface communication	1280 km of improved access roads (earthen roads) distributed across the 32 divisions
1.3.2	Infrastructure/New buildings and renovation	40 Forest field offices created or restored, 210 residential quarters new or improved
1.3.3	Equipment	140 vehicles, 90 bikes, 600 cycles, 140 strongholds, standard computer equipment at the level of range office, forestry equipment issued at the level of forester
1.4	**Enhance interaction with other departments and partners**	
1.4.1	Incentives	Inter-department workshops held regularly across the project timeline
1.4.2	Workshops	
1.5	**Legal reforms, Assess and update, disseminate regulation**	
1.5.1	Supporting project decision with jurist advice	1 contract with a legal advisory firm, specific dissemination spreadsheets on legal aspects
1.6	**Research and Development**	
1.6.1	Constitute a multidisciplinary scientific advisory committee and identify research topics	1 scientific committee constituted
1.6.2	Manage calls for proposal on the topics identified	1 Call for Proposal launched, X research projects completed
1.6.3	Disseminate the results among Assam stakeholders to ensure ownership	Workshops to disseminate research results organised
	Component 2 : Multi-level strategic planning	
2.1	**Assam State level forest strategic planning -policy**	
2.1.1	Design strategic plan	1 Assam Forest Participatory Strategic Plan
2.1.2	Satellite images and maps	1 centralised GIS on Assam Forests, with public access through web mapping
2.1.3	Implement information programme (participatory design and communication of the plan)	Communication leaflets and brochures on the Assam Forest Strategic Plan

2.1.4	Build and update knowledge bases "central repository of knowledge" of forest sector	Assam Forest Department Intra and Extra Net
2.2	**Design integrated/master plan approach**	
2.2.1	Elaborate integrated/master plan approach with ForDep staff	1 report on guidelines for Integrated Plan at the local level, 4 Integrated Plans (1 for each priority area)
2.2.2	Disseminate Integrated/master plan approach to field levels	Communication documents are accessible to the general public
	Component 3 : Sustainable forest management	
3.1	**Sustainable Forest Management by the Forest Department**	
3.1.1	SFM in Reserved Forests (- minus JFMC areas)	32 approved working plans, 1 report on sustainability of forest operations in Assam, 1 report on wood balance for the state of Assam, 1 report designing a traceability system for forest products, 16550 Ha rehabilitated, 1 report on forest products market chains and opportunities.
3.1.2	Improved management plans of protected areas	External support brought to the design of PA management plans, Degraded critical habitats inside PA are restored, 1 report on opportunities for community reserves, Guidelines for adaptive management
3.2	**Participatory forestry management**	
3.2.1	Participatory forestry management : JFM/EDC support and strengthening	200 JFMC are constituted, active and have legal existence, 1 report on JFMC/EDC policy and links with FRA
3.2.2	Participatory forest management : community forest rights and resources (FRA)	1 report on community forest rights and links with the implementation of the FRA; Guidelines on interaction between ForDep and communities; 4 pilot sites on to test modalities of interactions.
3.2.3	Participatory forest management : agro forestry and trees outside of forests	1 report on opportunities for agro-forestry development in Assam; Exchanges organised in India and abroad; Agro-forestry packaged tested on field sites, and implemented at larger scale; Agro -forestry packages developed and proposed in lands claimed under FRA.
3.3	**Biodiversity Conservation and Management**	
3.3.1	Supporting Assam ForDep to assess and implement Assam Biodiversity strategy	Assam Biodiversity Strategy implemented with support from the project, including establishment of People's Biodiversity Registers in Project Sites.
3.4	**Implement sustainable fuel wood production strategy and promotion of alternatives**	
3.4.1	Design Assam state fuel wood strategy and policy	1 report on fuel wood needs for Assam State; 1 fuel wood policy document,
3.4.2	Support fuel wood plantations according to various schemes	20000 Ha fuel wood plantations
3.4.4	Identify and support opportunities for fuel wood alternatives	1 report on alternatives for fuel wood consumption. 1 project on alternatives proposed.
3.5	**Mitigation of conflicts including wildlife/human and land use**	
3.5.1	Analyse main causes and consequences of conflicts	1 report on conflict issues in Assam regarding forest and forest management

3.5.2	Enhance capacities for conflict management/mitigation	1 contract with a external expertise, on conflict management.
3.5.3	Improve monitoring of conflicts	Conflict monitoring system in place and functional
3.5.4	Develop procedures/tool kits for conflict prevention and mitigation	Tool kits and guidelines developed for conflict prevention/mitigation
3.5.5	Implement specific programmes targeted at conflict prevention/mitigation	Specific activities implement in selected conflict prone areas
3.5.6	Implement public information programme addressing conflicting issues	Communication documents (leaflets, webpage, etc.) available to the general public, workshops organised.
3.6	**Explore opportunities and support pilot schemes to develop a private forest sector**	
3.6.1	Exchange with other states, identifies species and products…	1 pilot scheme for private forest sector development
	Component 4 : Adding value and opening markets/opportunities	
4.1	**Support forest product/goods promotion and marketing**	
4.1.1	Identification of site specific Income Generating Activities IGA on forest products	Reports on market analysis for forest products
4.1.2	Organise producers and build entrepreneurial and technical capacities	Workshops and capacity training undertaken in selected villages
4.1.3	Value addition through improved production and product processing	Improved product processing and marketing of forest products in target areas
4.1.4	Support identification of and facilitate access to markets	External marketing support facilitates market access for forest products
4.1.5	Assess and streamline existing marketing channels for forest products	1 policy draft for improved forest products custody chain
4.2	**Support IGA outside forests**	
4.2.1	Identification of site specific Income Generating Activities IGA outside forests	Reports on market analysis for IGA outside forests
4.2.2	Organise producers and build entrepreneurial and technical capacities	Workshops and capacity training undertaken in selected villages
4.2.3	Value addition through improved production and product processing	Improved products and services
4.2.4	Support identification of and facilitate access to markets	External marketing support facilitates market access for products and services
4.3	**Estimate potential value of ecosystem services (including carbon and biodiversity)**	
4.3.1	Establish baselines with focus on small scale forestry	1 report on baseline scenario for carbon stocks in Assam
4.3.2	Design carbon sink participatory programme through eco restoration	Guidelines for carbon sink participatory programme.
4.3.4	Support CDM/REDD carbon sink programme design and implementation	Carbon sink program piloted tested and implemented
4.3.5	Assess specific impacts of eco-rehabilitation through carbon schemes	Reports on carbon sink impact assessment in each eco-rehabilitation area.

3.4 Technical assistance through consultant services funded either from limited grant or project budget

A team of consultant will be hired through a global tender by the PMU to support the project management within the first 6 months of the project, through an international tender launched by the PMU. In addition to five hired PMU staff, a team of two international advisors will be recruited during the first three years of the project to provide additional support to all projects bodies (esp. for reporting, financial accounting, and building capacity over the first years),

The Project will put emphasis on using local expertise to find solution to problems (cost effective). However, the project proposes to invite external, and particularly French, technical assistance for need based specific innovative activities.

The main objectives of the team are to:

- Contribute to identify and to prepare the relevant terms of reference for the various supporting studies and applied research
- Facilitate the launching and the monitoring of these studies, and the dissemination of their outcomes among the various stakeholders
- Facilitate the launching and monitoring of tenders for the public works and the equipment purchases
- Design and support implementation of project procedures
- Monitor the flow of funds
- Organise the necessary meetings, at any necessary level, to facilitate the implementation of the project
- Support the organisation of phasing workshops, including the inception workshop, and the capitalisation workshop before the end of phase 1.
- Provide guidance, on a day to day basis, to forestry department staff and its partners

A provision of short term expertise will also be available, on profiles to be determined by the project, with 35 months of international expertise and 40 months of national expertise.

The topics for the short and long term technical assistance can cover:

- Development of a computer based tools, such as GIS, databases, taxonomic tools;
- Adoption of new methodologies for strategic planning, policy design and landscape assessment (working plans and management plans) based on remote sensing and GIS;
- Preparation of REDD, REDD+ and CDM projects concerning the eco-restoration activities;
- Implementation at operational level of tools for participatory forestry, such as Companion Modeling (ComMod) in the jhum areas to identify drivers and constraints preventing the adoption of new practices.
- Development of adaptive management approach
- Assessment of existing laws, regulations and norms, and preparation of revised texts.
- Monitoring and evaluation, indicators
- Procurement procedures
- Training
- Plantation

4 Project implementation arrangements

4.1 Additionality and institutionalization

Managing the project will result in a considerable extra workload for all concerned officers of the Forest Department. As a result, to ensure timely delivery of the project specific outputs, it is considered essential to hire, on short and long term contracts as and when needed external support a range of staff. On the other hand, all field related activities will be in charge of the staff of the Forest Department, so as to ensure proper institutionalization and ownership of the outcomes.

4.2 Project governance structure

4.2.1 Governing body

The Governing Body will be the highest Project related decision making body and fully empowered to achieve inter-departmental coordination and to ensure non-duplication of management interventions. The secretariat of the Governing Body will be undertaken by he head of the PMU, also in charge of the organisation of each session: preparation of the ordre du jour, logistics, reporting.

The **Governing Body** will be headed by the Chief Secretary of the Government of Assam (chairman) and will be composed of:

- Planning & Development Principal Secretary/ Commissioner
- Environment & Forests Department Principal Secretary/ Commissioner
- Finance Department Principal Secretary/ Commissioner
- Panchayat & Rural Development Principal Secretary/ Commissioner
- W.P.T. & B.C. Principal Secretary / Commissioner
- Agriculture Principal Secretary/ Commissioner
- One representative of MoEF, GOI
- One reputed NGO
- Principal Chief Conservator of Forests & HFF
- Chief Wildlife Warden
- Project Director, Assam Project on Forest and Biodiversity Conservation (Member Secretary)
- Representatives from two FIUs nominated by the PCCF &HFF
- One representative of the French Development Agency as observer

The Governing Body will meet every 6 months, at least during the first two years. Each meeting will lead to a statement of the progress of the project based on technical and financial reports. Overall guidance on the project will be formulated by the Governing Body after each meeting.

4.2.2 Project Management Unit

At Assam State level, the project will be implemented by a project management unit (PMU). It is essential that the PMU will involve staff with a full time assignment dedicated to the project. The PMU will be in permanent contact with the Forestry Department, under the authority of the PCCF. The PMU will have the capacity to establish direct working contacts with all staff belonging to the

Forestry Department. In addition, the PMU will be vested the capacity to call for meetings with selected officers from partner Departments in Assam, as well as other partners, such a NGOs, public and private institutions, at Assam, national and international levels.

- The project management unit (PMU) will be headed by a Project Director, who will be assisted by four component area leaders. This unit will also be staffed by full time supporting / service providing sections, such as the finance, including the procurement, disbursements, audit, human resources and communication. The Project Director will be a senior Forest Officer from Assam Forest Department in the rank of Addl. P.C.C.F./C.C.F deputed by the Government of Assam. Each component leader position will be filled by Officers in the rank of or equivalent to the Chief Conservators of Forests/ Conservator of Forests. The head of the PMU will also lead the **Component 2** / Strategic planning, and of the general management of the project schedule and budget, including the efficient and effective implementation of all project components, concurrent monitoring and internal/ external evaluation of the Project activities

The project management unit will include three categories of staff:

- Staff from the Forest Department, deputed to the PMU on full time basis
- Staff deputed from partner Departments in Assam, equally fully detached from their parent Department for full time assignment in the PMU.
- Staff recruited through an international tender by the project, involving national and international short and long term technical assistance, as support to the PMU.

The following staff will be detached from the Assam Forest Department:

- one officer in charge of landscape design and integrated plans
- one officer in charge of the coordination of the **Component 1**, leader of a team of 2 staff
    - one officer in charge of capacity building, responsible for capacity building of all the stakeholders, training, research documentation and publicity
    - one officer in charge of infrastructure and equipment
- one officer in charge of the coordination of the **Component 3**, leader of a team of 3 persons
    - one officer in charge of Sustainable Forest Management sector
    - one officer in charge of protected areas and biodiversity management
    - one officer in charge of participatory forestry
- one project financial officer, leader of a team including one accountant, one purchase and operations. The officer will be responsible for drawing up the Annual Plan of Action, budgeting and allotment of funds to Field Management Units (FMUs) in accordance with the Micro Plans of the JFMCs and Management Plan/ Working Plan of the Department, maintenance and superintendence of claims as per schedule to the State Finance Department.

The following staff will be detached from other departments in Assam State

- one forest officer with agriculture background, or from Agriculture Department, in charge of **Component 4**

- one officer in charge of agronomy (DepAgr or DepFor)
- one officer in charge of product marketing (DepAgr or DepFor)
- one officer from Tribal Affairs for need assessment and community support

PMU staff will be selected through a transparent procedure, with prior communication of CVs and validation by the Governing Body and submitted to AFD/Non objection

Detached/ deputed officers will receive incentives as per existing rules, and will be committed to stay on duty for a minimum of 3 years for the same assignment.

4.2.3 Hired staff

International staff

- One deputy PMU director, senior forest officer
- One senior TA , deputy of officer in charge of component 1, with specific experience in administration, procurement and capacity building

National staff

- One communication officer (all media)
- One procurement officer, supporting component 1
- One expert in participatory forestry, supporting component 3
- One "Innovations" officer, in charge of new developments, marketing and product development, supporting component 4
- One auditor(s)/ auditing firm (financial and regulatory) (ref Monitoring and evaluation)

4.2.4 Supporting staff

A secretariat with 3 permanent staff (one Superintendent and two other senior assistants with computer skills)5 drivers, one for each component and one for the head of PMU

4.2.5 Field Implementation Units

Field Implementation Units (FIU) will host pilot project activities: one FIU will be nominated for each pilot project area. Each FIU will be placed under the charge of respective Conservator (coordination and supervision)/Divisional Forest Officer (implementation and supervision). FIU coordinators will be supported by other sub-ordinate Forest staff in the Division, and assisted by technical staff hired or seconded over for specific purpose.

The Deputy Conservator of Forest will head the field implementation unit. Where more than one division is involved in the project, the Circle Conservators of Forest will coordinate the divisions. Normally all communication involve and are channeled through the Circle Conservators. However, the DFOs will be able to directly submit the proposals to the project management unit.

NGO and community representatives will be nominated by the PMU, and agreed by the GB to each FIU to work at the interface of Forest Department and communities in survey and

management planning, implementation and participatory monitoring and evaluation. Proposals by DFOs will be channeled to PMU directly. Circle Conservators will coordinate Divisions included into the same pilot project areas.

At the FIU level, the DFO is concerned with all assistance and support at his disposal. He will be responsible for the implementation of the approved Work Plan, including expenditure, submission of accounts, submitting Progress report and claim for reimbursement. Funds from the proposed project will be channeled to the FIU through proposals. Proposals by DFO will be channeled to PMU directly

Village Level Joint Forest Management Committee

At implementation level, the projected activities will be planned with active participation of JFMCs commensurate with project objectives and executed through the JFMCs which will function in accordance with the JFMC Rules in force in the State of Assam. As indicated in the target population, it is proposed to cover 200 JFMCs either created or existing but not assigned any work under any schemes at present.

Representation of JFMCs in the Governing Body is not envisaged in the initial stages as past attempts to form confederation of JFMCs had not succeeded due to internal conflicts. However, since the project envisages “Adaptive Management” approach course correction and changes based on past experiences will be incorporated in the Project Management.

4.3 Project duration and phases

The total duration of the project will be 5 years, with 2 main phases.

-**The first phase, or Pilot Phase** is scheduled for 3 years and will focus on initial assessments, launched through an inception workshop (year 1) and studies leading to pilot field activities (years 2 and 3). As a visible support to communities, the project will need to show its presence at field level as soon as possible and therefore will not wait until the end of the phase 1 to start its operations. Initial pilot sites (such as villages, communities, forests) will be selected, on which project activities will be focused during the three first years.

This first phase will concentrate most of the studies and assessment, with the support of external expertise. A global synthesis of the knowledge acquired will be undertaken during the preparation of the mid-term workshop, which will also act as a milestone to elaborate optimized and revised regulations and norms for Assam forestry.

-**The second phase, or Implementation Phase**, for 2 years, will be designed as a period dedicated to the implementation at larger scale of the various tools, approaches and regulation designed by the pilot phase, through a participatory approach. The implementation phase will end with a final project workshop capitalizing on the lessons learnt and the technologies transferred, in order to sustain the most promising project developments. The project will anticipate the phasing out of the budget and transfer to Forestry Department staff most to its activities

4.4 Project institutional arrangement

The Project will be managed and implemented through a special purpose vehicle which will be a society registered under the Societies Registration Act, 1960. This Society will involve one guidance providing and approving body- the Governing Body, a Project Management Unit (PMU) and Field Implementation Units (FIU) in pilot project areas.

The PMU will report to the Governing body and also to the PCCF and HFF. The PMU will organize the process for each procurement in a transparent way, under the supervision of external auditors, according to India laws. Technical progress reports, as well as financial reports will be submitted by the head of the PMU for validation to each Governing Body half yearly meeting. TheGoverning Body meetings will also validate the project planning for the coming year. The PMU

will also coordinate and merge the field reports submitted by the Field Implementation Unit coordinators, and similarly the PMU will coordinate the half-year and yearly plans of each FIU.

A manual of procedures will be prepared during the first three months of the project, detailing control and monitor processes along the project activities.

Project documents, such as progress report and various technical reports, will be gathered and made available to partner stakeholders.

In its early stages, the project will work with village committees through an approach relying mostly on the lessons learnt from the NaRMIL project, in term of village organisation, committee design, participatory approach and bank account opening. The project relying on the JFMC/EDC procedure to a larger scale will need to standardise the reporting and monitoring procedures to follow-up progresses at State level. The project will therefore update the existing procedures in a more systematic way, in the view to transfer the approach uniformly to all forest Divisions.

Bottom-up processes such as micro-planning requires an accurate level of accountability, with a planning and an approval system based on transparent approach.

4.5 Project fund flows

The Government of Assam allocates annually INR 2000 lakhs (2.9 M€) to the Assam Forest Department as per its state sector plan. In addition to this, the Assam FD manages a portfolio of projects, state, central and externally funded, worth INR 7872 lakhs (11.1 M€) annually (details in Table I). The total annual cash flow managed by the Assam FD is therefore equivalent to INR 100 crores (14 M€). Should the project be accepted by the donor agency, it would represent an annual average of INR 63 crores (10 M€), an increase of roughly 71% of the annual cash flow.

Table 8 Annual funds managed by the Assam Forest Department.

	Name of the fund source	Annual Amount	
		INR (lakhs)	EUR (M€)
PROJECTS	National Medicinal Plant Board (2010)	778	1,1
	National Afforestation Programme (2009)	978	1,4
	National Bamboo Mission (2009)	906	1,3
	Forest Village Development Fund (2009)	1344	1,9
	NARMIL (World Bank)	1600	2,2
	Development Parks	166	0,2
	CSS Wildlife schemes	1000*	1,4
	Integrated Forest protection	400*	0,6
	CAMPA (Compensatory Afforestation Fund)	600*	0,9
	Social Forestry	100*	0,1
STATE PLAN	Annual allocation	2000*	2,9

* Estimated values

The Assam Forest Department considers itself as fully geared up and capable of observing and implementing the schemes of similar fund allotted. In addition to the existing capacity, new recruitments of field level staff to fill the vacancies, and the creation of new positions at all levels is being currently undertaken to increase the capacity of the department to absorb additional funds.

As a consequence of the increased level of activities, the PMU will strengthen the Assam FD capacities with a team of staff dedicated to accounting, procurement, organisation and control.

Project funds will be channeled according to the scheme below, with the loan being transferred as a grant to Asssam Forestry Department, and finally delivered to the Project Society Bank Account.

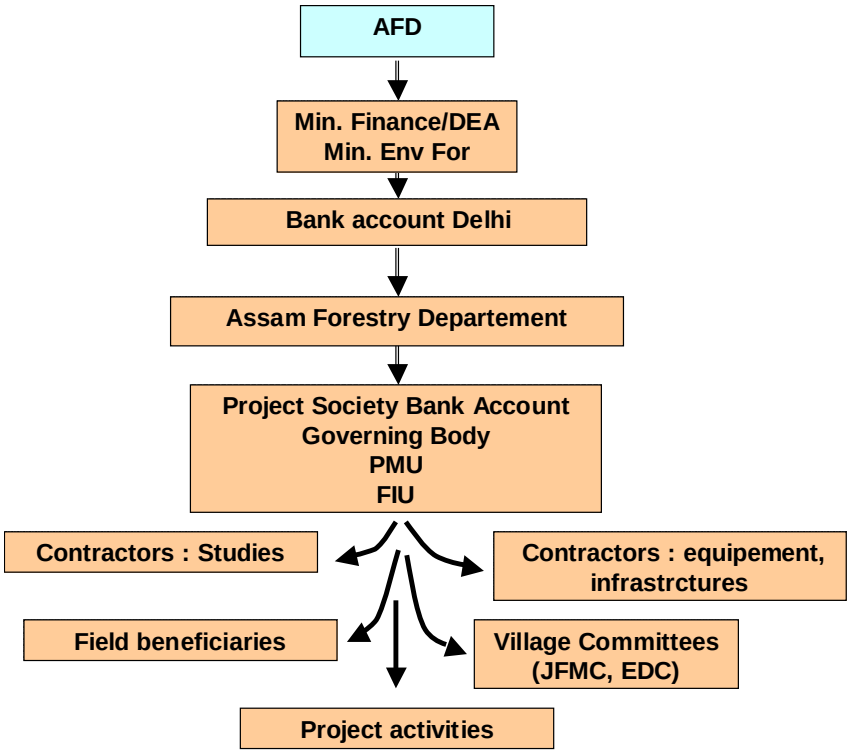

Figure 4 Fund flows from central level to field activities

5 Institutional roles and responsibilities

Roles and responsibilities assigned to different organisations concerned with Project implementation and delivery including Assam Forest Department, other Department and Government Institutions, local Government Bodies (district administration, Village Committees, NGOs, etc.).

6 Project costs and financing plan

The breakdown of the overall project budget by years and by project components is shown in the table below. Near to half of the budget is dedicated to sustainable forest management activities.

Table 9 Budget

		Year 1 Cost	Year 2 Cost	Year 3 Cost	Year 4 Cost	Year 5 Cost	Total Euros	%	Total Lacks Rs
	Component 1 : FD Institutional strengthening and legal refoms	**2 426 558**	**3 308 684**	**2 922 797**	**1 976 971**	**327 657**	**10 962 668**	**19%**	**6248,721**
1.1	Streamlining procedures within ForDep	0	0	0	0	0 p.m.			0
1.2	Capacity building of staff.	235 200	314 950	201 474	251 238	299 640	1 302 501		742,4257724
1.3	Rehabilitate and enhance existing infrastructure and equipment	2 166 358	2 968 034	2 694 888	1 698 527	0	9 527 808		5430,850416
1.4	Enhance interaction with other departments and partners	2 000	2 050	2 103	2 158	2 216	10 526		0
1.5	Legals reforms, Assess and update, disseminate regulation	11 000	11 050	11 103	11 158	11 216	55 526		0
1.6	Research and Development	12 000	12 600	13 230	13 892	14 586	66 308		0
	Component 2 : Multi-level strategic planning	**670 000**	**652 000**	**98 820**	**10 000**	**10 000**	**1 440 820**	**2%**	**821,2674**
2.1	Assam State level forest strategic planning -policy	562 000	652 000	90 000	10 000	10 000	1 324 000		0
2.2	Design integrated/master plan approach	108 000	0	8 820	0	0	116 820		0
	Component 3 : Sustainable forest management	**5 460 351**	**7 875 584**	**6 457 019**	**5 926 365**	**3 363 668**	**29 082 987**	**50%**	**16577,3**
3.1	Sustainable Forest Management by the Forest Department	1 902 035	3 494 926	2 512 600	1 867 802	813 501	10 590 864		0
3.2	Participatory forestry management	2 053 246	1 753 421	1 891 158	2 325 250	1 588 026	9 611 100		5478,327125
3.3	Biodiversity Conservation and Management	60 000	60 000	60 000	60 000	60 000	300 000		0
3.4	Implement sustainable fuelwood production strategy and promotion of alternatives	1 353 070	2 519 737	1 934 211	1 624 737	852 987	8 284 741		4722,3025
3.5	Mitigation of conflicts including wildlife/human and land use	62 000	47 500	48 025	48 576	49 155	255 256		0
3.6	Explore opportunities and support pilot schemes to develop a private forest sector	30 000	0	11 025	0	0	41 025		0
	Component 4 : Adding value and opening markets/opportunities	**1 979 474**	**2 076 947**	**1 752 395**	**3 156 051**	**0**	**8 964 867**	**15%**	**5109,974**
4.1	Support forest product/goods promotion and marketing	647 544	679 421	680 842	1 299 789	0	3 307 596		0
4.2	Support IGA outside forests	791 930	830 526	851 053	1 624 737	0	4 098 246		0
4.3	Estimate potential value of ecosystem services (including carbon and biodiversity)	540 000	567 000	220 500	231 525	0	1 559 025		0
	Project management	**1 202 800**	**1 252 440**	**769 659**	**734 697**	**440 617**	**4 971 089**	**8%**	**2833,521**
5.1	Project running costs (Project managment)	187 000	196 350	206 168	215 153	227 300	1 031 970		645
5.2	Phasing Workshops	10 000	0	16 538	0	18 233	44 770		0
5.3	Communication, documentation	53 000	55 650	56 175	56 726	57 305	278 856		0
5.4	Monitoring & Evaluation	243 000	255 150	124 970	78 719	137 779	734 493		418,6609673
5.5	Technical assistance	676 000	709 800	745 290	365 809	384 099	2 881 000		0
	Total	**11 739 183**	**15 165 656**	**12 000 690**	**11 804 084**	**4 141 942**	**55 422 431**		**31590,79**
	Miscelaneous, contingencies (6%)						**3 325 346**	**6%**	**1895,447**
	TOTAL GENERAL						**58 747 777**		**33486,23**

7 Long term sustainability of the project

The project is designed to improve the on-going working procedures that stakeholders in the forestry sector in Assam are implementing at present, including the Forest Department, NGOs, Village organisations and local/Small scale or individual entrepreneurs. The project aims at the enhancement of key components of sustainability such as capacity building, transfer of technology at Assam, national and international levels, improved information sharing, infrastructure development etc..

A strategic aspect of sustainability to be promoted by the project is the important effort developed towards the local population, either through existing participatory vehicles such as JFMCs or EDCs, or through better capacity building, communication and information sharing, self help initiatives, support to local production and marketing, through an overall promotion of transparency in every project supported activity.

Most project activities will have effects lasting longer than the project duration, some of them several decades later, such as the buildings and other infrastructures, the plantations, but also, most importantly, the capacities of officers, forest staff, and villagers in Assam. The main expected project achievement, with an impact on sustainability, has been listed below according to three main categories: policy measures, appropriate technology and enhanced capacity.

Policy measures

- Better information and access to law and regulations
- Fuel wood policy : better access to the limited access, better transparency of access rights,
- Improved participatory and transparency approach
- Revision of selected policies
- Mid and long forestry strategy for Assam, with the opportunity to implement major

Appropriate technology

- Landscape strategic planning
- Integrated/Master plans
- Systematic design of master plans for all forestry Divisions in Assam
- Networking capacities
- GIS technology and cartography
- Integrated support to protected areas
- Carbon project design and assessment
- Agro-forestry
- Improved sawmill technology
- Support to ecotourism development

Enhanced capacities

- Comprehensive capacity building programme for the human resources of the forestry department:

- Operational capacity : Infrastructure, new and/or restoration : better access to the field level and better motivation for field staff
- Range of technical equipment at field and office levels
- Support and capacity building at village level to improve production and marketing of local forest products and village production.

8 Project monitoring

The evaluation of the project activities can be broadly categorized into following three aspects: Forestry aspects, Livelihood aspects and Institution Building/Empowerment aspects.

Potential indicators have been identified to monitor and evaluate the impact of project with regards to above three aspects. They are listed below:

Forestry indicators:

- Change in vegetation cover and growing stock
- Survival Percentage of plantations
- Incidence of grazing and illegal felling in JFM allotted area
- Incidence of poaching
- Impact on water sources
- Collection of Fire-wood by head load and Bicycles

Livelihood indicators:

- Wage employment for JFM Committee members
- Increase in NTFP production, processing, marketing and additional income to villagers
- Infrastructure development in the villages
- Impact on water harvesting and ground water recharge

Institution Building indicators:

- Participation in microplan preparation and management of physical and financial assets by the villagers
- Participation of women and other weaker sections in planning and decision making
- Coordination with the Forest and other line Departments
- Formation of Self Help Groups

The first step will focus on the design of a set of indicators, which will be tested through the implement a baseline study. The study will require the coordinated contributions of the multi-disciplinary expertise involve on the project, in social, economic and environmental sectors.

A range of monitoring data will be collected, under the supervision of the PMU and the DFO at PIU levels, and gather at Assam level for a global analyse. The objective is to provide relevant tools for decision making, through a perennial approach: data collection and analysis should be designed in an affordable way, in terms of financial and human resources.

Evaluation will also be made in respect to specific questions raised during the development of the project. Professional consultants with sound track record may also be engaged for the evaluation

of the project. The evaluation of an ongoing activity would help to make mid-course corrections. The results of studies should be disseminated to all project personnel as well as target group.

9 Risks assessment

Here we discuss the possible factors, outside the control of the Project Implementation team, and that could potentially prevent the project from delivering the expected outcomes. These risks are discussed, together with the coping strategies envisaged to minimize exposure and reduce vulnerabilities.

9.1 Insurgency

Insurgency in Assam is on decline and the situation has improved over the last decade. In development activity, insurgency does not interfere since the local communities benefit from the development brought. The World Bank project on joint forest management was started in 2006. It started in two districts, and has been extended to 7 more. Similarly, JICA project has already been approved by the GoI, and KfW project on climate change adaptation is under active consideration with the German Government. Similarly, a number of centrally sponsored programs such as the National Afforestation Program, the National Bamboo Mission and the Forest Village Development, Integrated Wildlife Habitat Development Program, are being implemented in the State Forest Department without hindrance from insurgency. All these initiatives show that it is possible to deliver a development project in Assam successfully.

9.2 Floods and other natural hazards

Floods are recurring phenomenon in Assam, except for the hill districts. They cause disruption in surface communication and considerable hardship (loss of crop, property, life) to affected people. They can cause damage to plantation through submersion, especially in the initial stages of the plantation establishment. They also seriously impact the wildlife populations in the protected areas. However, they also have a positive impact in the flood plains ecosystems and are the main driver behind the ecological dynamics of the flood plain.

To deal with this risk, the project will select specific flood tolerant species for planting in water logged areas and select appropriate sites and adopt planting methods such as tall planting to avoid failures in the sensitive areas.

The disruption of communications they can cause is routinely mitigated by the staff of the department through the use of rugged vehicles, elephants and boats to reach isolated areas.

Assam is characterized by high mobility of land and people and by instability. The landscape is not fixed and changes from one year to the other. Accessing land is a crucial issue in the region, competition for land is intense.

In the Brahmaputra plain, the great earthquake of 1950, frequent floods, the instability of riverine terrain, and the setting up of PAs and their subsequent extensions have led the population to make frequent moves. As a result, villages disappear or are relocated. Everywhere in the region, cultivable land is a key resource, and conflicts over land are common. While the growing population and the landless claim land, each year floods from the Brahmaputra wash away land belonging to farmers, protected areas and tea gardens. As for PA such as national parks or wildlife sanctuaries, where the protection of wildlife is proving a success, they are claiming more land and are extended because the elephants and rhinoceros whose number has increased lack sufficient space. Besides, herds of elephants destroy crops and houses in the area surrounding these PA. Some social instability is fuelled by all these problems. In the hills, mobility is also the rule, due to shifting cultivation.

The landscape approach has to take into account the mobility and not to give a fixed picture of the situation. Studies and maps have to include data at different dates covering at least the twenty last years (time scale satellite/SPOT imagery for example). In order to understand land use and its consequences in the hill areas, a yearly study covering the last 20 years is needed to include the natural processes, changes and to plan for adapted measures. Ex: traditional Mishing houses built with bamboo, wood , thatched roof and standing on stilts are more adapted to the seismic and flood risk than the new ones proposed when Mishings are relocated, which are made of concrete with corrugated iron roofs. Study of the comparative cost (including risks) of the two kinds of house has to be made.

Earthquakes are very puzzling natural hazards for scientists, in the sense that despite the fact that it is impossible from the state of the art of science to predict the exact date of an event, evidence exists that sooner or later, a major earthquake will happen in the North Eastern region of India. Assam State belongs to an area known to be one of the most prone to earthquakes in the world, due to the collision of the Indian shield into Himalaya. History recalls of some of the most intense events ever recorded on the planet, the latest one being the 1950 earthquake (8.6 on Richter scale) which saw mountain slopes collapse, which drastically changed the flood regime of the Bramaputra river, and killed thousands downstreams.

So basically the question is not to ask if a major earthquake will occur –it will. The question is when it would occur, and in terms of statistics, it could be tomorrow as well as next century.

9.3 Activities overlapping with the implementation of the Forest Rights Act, 2006

The schedule tribes and traditional forest dwellers act 2006 recognizes and vest forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded. These rights include responsibilities and authority for sustainable use, conservation of biodiversity and maintenance of the ecological balance, strengthening the conservation regime of forests while ensuring livelihood and food security of the communities. In the project area, this could translate into vesting rights on certain land currently notified as reserve forests, to specific communities.

The project activities would not undermine the implementation of the FRA, 2006 or any other law in force in the State of Assam. They would be designed and implemented in a way to act in synergy with it, not supplant it.

Thus, it is proposed to avoid interference with implementation of the FRA, 2006 and the project activities through appropriate site selection. According to the Forest Department officials, all the target villages will be either forest or forest fringe villages, where JFMCs are already established and registered and sites selected will not be affected by FRA,2006. The encroached areas shall be avoided for project purpose to the extent possible.

9.4 Internal organisational factors

During the time of the project, it will be inevitable that some of the officers in charge of the implementation are transferred. The normal tenure is three years. The charge report contains summarized information on all activities, problems and priorities, achievements and unfinished tasks of the assignments. This ensures that the transfer happens smoothly without loss in continuity. The transfer and posting of the officials has not adversely affected the implementation of the others projects, such as the World Bank.

Another problem identified is that of the existing workload of DFO and forest officers. The foresters, in addition of their day to day tasks, act as secretaries of several Joint Forest Management Committees. The social forestry wing has establishment only till the ranger level, not closer to the

field. The role of the forester is essential, since often villagers do not have the technical knowledge to manage the paperwork. Likewise, both the signatures of the forester and the president need to produced for the money to flow. This is a legal requirement since it is government money that is being handed. This however can reduce the flexibility and adaptability of the village level institutions. As part of the empowerment component of the project, more flexible accountability systems can be developed and tried on a pilot basis. An example is the double account system used under the World Bank project, where the committee deposit part of the funds derived from the share of the forest activities, as a revolving fund for future village activities. The second account is the one used to receive the money and pay for the project related activities.

Finally, based on the past experiences of the department in execution of externally funded projects and centrally sponsored schemes, extensive checks and balances will be inbuilt in the project such as submission of monitoring reports, financial auditing and transparent competitive biddings for purchases and awarding contracts. This has resulted in complete transparency and best quality of execution under the World Bank project as indicated by the monitoring and evaluation report of the World Bank.

9.5 Local factors

Past experiences with Joint Forest Management elsewhere in India has identified obstacles in the social dynamics of the villages engaged in a process of joint forest management. Lack of leadership, lack mutual trust/ internal dissents and difficult relations with the Forest Department, and in the end lack of involvement, that can be analyzed as passive resistance against activities that the local communities disapprove of, but have no effective power to counter.

The project has drawn the lessons from the implementation of JFMC in India. In order to reduce the risks of stalling, an entire component has been devoted to the empowerment of the communities. The outcomes of this component will be a progressive involvement of the communities, with gradual building of confidence and skills.

The local economic measures proposed have to take into account the opening of new passes, bridges and roads between India and China that will completely change the state of the market in the following years.

Two specific topics are not covered in the project: the management of *chaporis* (riverine islands) and the resettlements from forest dwellers inside protected areas. Both topics are sensitive and source of potential conflicts will local communities and require multi-sectoral approaches not contemplated within the framework of this project. Excluding them from the scope of the projects therefore reduces the possibility of conflicts between stakeholders.

10 Economic analysis

10.1 Preliminary assumptions

- **Focusing on 5 assets:** for several decades, the State of Assam has been facing an insufficient supply of many forest raw materials: fuelwood, timber, fodder, bamboo,… (NAP, 1995). This project promotes a better management of the forest resources as a means to sustainably provide these commodities for the economic growth as well as to improve rural livelihoods. Assam forests produce a large spectrum of resources (NWFP, medicinal plants,…) but only a few forest or agricultural uses will be tentatively improved in the framework of this project by concrete and specific operations:

timber, carbon, jhumming, agro-forestry and fuel-wood

Many other (institutional, organization, technical,…) advantages are to be provided by the project but their financial impact is hard to assess. They are rather considered as preliminary conditions to the implementation of concrete initiatives that will produce tangible benefits. The scope of this financial analysis is thus restricted to these five assets.

- **Financial versus economic analysis**: the analysis only considers financial revenues expected from the project and not all economic benefits, including non-monetary advantages. The shortage of economic data, the duration of the mission, and the complexity of the Assam forest sector are strong constraints to come out with an economic analysis. In addition, many approaches, tools and scopes are to be clarified during the first year of the project before having a clear picture on its precise implementation and outcomes. This context explains why an economic analysis has not been undertaken. The World Bank faced similar difficulties in pre-assessing its NaRMIL project, which started without a financial analysis being done.
- **Additional financial benefits**: the financial analysis only considers the additional advantages that would be brought by the project, i.e. all the new activities that would be added to the business-as-usual current running of the Assam Forest Department. These new activities are funded by the project: the project budget is then considered to cover all the costs related to these additional activities.
- **Gross benefits**: it was not possible to evaluate the net benefits expected from these new activities, due to the lack of data on operating costs, especially for the improvement of jhumming, carbon sequestration and timber logging in Assam. This financial analysis is restricted to the assessment of the financial revenues coming from these additional activities, assuming that the running costs would be taken in charge by the project.
- **Constant currency**: all financial assessments are given in 2010 constant rupee.
- **Discount rate**: an 8% discount rate is used, based on the current Bank of Bengal rate of discount, which can be considered as the opportunity cost of capital.
- **Time scope**: a 10 year life-span is used to assess the project's benefits and costs. It is twice longer than the project duration, while remaining a reasonable period to extrapolate benefits over the long run. There is no operational activity – thus no benefit – during the first year of the project
- **Geographical scope for timber, carbon uses and fuel-wood:** the Forest Division is considered as the relevant level to organize new forestry operations. The project would start in 4 Divisions, one in each eco-region of Assam (Upper Brahmaputra valley, Central valley, Lower valley, Hills regions). As an average for Assam, one Division includes 12 Reserved Forests (Indian State of Forest, 2009), where logging and carbon sequestration will progressively be implemented. The mean surface of a Reserved Forest is 4 300ha.

A substantial effort is put to extend fuel-wood plantations at the Division scale, both in Reserved Forests and in Joint Forest Management areas. A new fuel-wood plantation of 1000 ha will be created in 10 Divisions on Year 2. The same will happen on Year 3 in another 10 Divisions.

- **Geographical scope for agro-forestry and jhumming :** the average number of Joint Forest Management initiatives is 15 per Division (Indian State of Forest, 2009). The average surface of one JFM is 159ha, where agro-forestry and improved jhumming are to be applied. The project starts these activities with all JFMCs (60) of the four sampled Divisions in Year 2 and 3, then included 6 other Divisions (90 JFMCs) on Year 4 and 5. By the end of the project, 150 JFMCs should be involved. It is proposed to extend these initiatives to 150 new JFMCs (located in 10 other Divisions) during the following five years (Year 6 to 10) under the Assam Forest Department budget.

10.2 Unit quantities for economic estimations

Table 10 Unit quantities for economic estimations

	Duration of the project : 5 years					Phase post project				
	Phase 1			Phase 2						
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
No Divisions involved new/yr		2	2	3	**3**	2	2	2	2	2
No Divisions Total	*0*	*2*	*4*	*7*	***10***	*12*	*14*	*16*	*18*	*20*
No Reserved Forests new/yr	0	24	24	36	**36**	24	24	24	24	24
No RF Total	*0*	*24*	*48*	*84*	***120***	*144*	*168*	*192*	*216*	*240*
Surface RF new/yr (ha)	0	103 200	103 200	154 800	**154 800**	103 200	103 200	103 200	103 200	103 200
Surface RF Total (ha)	*0*	*103 200*	*206 400*	*361 200*	***516 000***	*619 200*	*722 400*	*825 600*	*928 800*	*1 032 000*
Teak surface harvested new /yr (ha)	0	1 032	1 032	1 548	**1 548**	1 032	1 032	1 032	1 032	1 032
Teak surface harvested Total (ha)		*1 032*	*2 064*	*3 612*	***5 160***	*6 192*	*7 224*	*8 256*	*9 288*	*10 320*
No JFM new/yr	0	30	30	45	**45**	30	30	30	30	30
No JFM Total	*0*	*30*	*60*	*105*	***150***	*180*	*210*	*240*	*270*	*300*
Surface JFM - New/yr	0	4770	4770	7155	**7155**	4770	4770	4770	4770	4770
Surface JFM - Total	*0*	*4 770*	*9 540*	*16 695*	***23 850***	*28 620*	*33 390*	*38 160*	*42 930*	*47 700*
Surface JFM Jhum - New/yr	0	298	298	447	**447**	298	298	298	298	298
Surface JFM - Jhum - Total	*0*	*298*	*596*	*1 043*	***1 491***	*1 789*	*2 087*	*2 385*	*2 683*	*2 981*
Surface JFM Agro-forestry - New/yr	0	1 193	1 193	1 789	**1 789**	1 193	1 193	1 193	1 193	1 193
Surface JFM Agro-forestry - Total	*0*	*1 193*	*2 385*	*4 174*	***5 963***	*7 155*	*8 348*	*9 540*	*10 733*	*11 925*

1 division =	12	Reserved Forest
1 Reserved Forest =	4300	ha
Area planted =	5%	of Reserved F area
Plantation success rate =	20%	Planted area
1 division =	15	JFM
1 JFM =	159	ha
For each of the 2 land uses =	0,25	Total JFM area
jhum in =	25%	Divisions

10.3 Timber logging

Timber logging has been restricted to working plan prescriptions since 1998 in the Assam State. One objective of the project is to explore and test new ways of exploiting the existing and old plantations in a sustainable manner. There is presently a strong pressure on forest to provide timber and teak plantations can be an answer to supply this commodity while preserving the forest cover.

To resume timber harvesting will require a cautious approach that starts with the writing of adequate Working Plans. They are to be submitted and approved by the Supreme Court of India. We assume that getting this approval takes three years. On years 4 and 5, it is proposed to launch 4 logging pilot sites to experiment and fine-tune timber harvesting in 4 Reserved Forests, each one being located in every sampled Division. It is assumed that these pilot experiences are then

progressively extended to the 4 Divisions, with an average of 11 additional Reserved Forests per Division on year 6 to 9. On year 10, a new Division (i.e. 12 Reserved Forests) is submitted to logging.

Several assumptions are made to assess logged timber volume:

- in each Reserved Forest, only 5% of the surface has been planted by teak. The planting success rate is 20%. This means that only 1% of the Reserved Forest surface is under logging.
- the stem density of a successful teak planted hectare amounts to 2 400.
- the thinning rate is 50%. The felling cycle is 15 years, and the rotation is 50 years. The growth rates of the plantation are given in chapter on Carbon Finance
- The average volume of a teak log is 0,5 m^3
- The current price of one cubic meter of teak is Rs 9 000 in Assam. It is expected that this unit price decreases by 3%/yr with the increase of timber supply in the Assam State.

According to Milne et al. (2006-b), 50 percent of the net thinning revenues should be given back to neighboring communities. Since thinning have not been undertaken so far in the JFMC managed areas the factual position can not be commented upon. Still, it is presumed that a minimum of 10% of these gross revenues should reach the concerned communities.

Table 11 Estimated revenues from timber logging

Years	1	2	3	4	5	6	7	8	9	10
Number of new Reserved Forest concerned /yr				2	2	11	11	11	11	12
Number of Reserved Forest concerned - Total				2	4	15	26	37	48	60
Harvested surfaces /yr				86	86	473	473	473	473	516
Revenues from teak plantations harvesting	**0**	**0**	**0**	**464 400 000**	**450 468 000**	**2 403 246 780**	**2 331 149 377**	**2 261 214 895**	**2 193 378 448**	**2 320 993 195**
Revenues (Euros)				7 272 158	7 053 993	37 633 053	36 504 062	35 408 940	34 346 672	36 345 023

Explanatory variables

Stem density (No/ha)	2400
Thinning intensity	50%
Average log volume (m3)	0,5

10.4 Carbon sequestration

Carbon sequestration will be achieved through teak plantations after they are harvested (see above) and through the extension of agro-forestry systems (see following chapter).

- **Teak plantations**

The assessment of the carbon sequestration benefit is built on the same assumptions as for logging. This is done progressively, starting on Year 4 and 5 in 4 Reserved Forests. In Years 4 and 5 respectively, 86 ha of teak will be harvested and replanted.

Carbon credits of forest projects are not considered permanent. They are usually based and monitored in a five-year cycle. The payment is done after the monitor is successful, that is five years after the creation of the teak or agro-forestry plantations. The payments will then occur in Years 9 and 10 for the plantations done in Years 4 and 5 respectively.

As described in the chapter on Carbon Finance, the net stock of carbon of a 5 year old teak plantation amounts to 50t.

Carbon markets are nowadays numerous but do not proceed along the same lines. The lower the price, the simpler the procedures. For instance, the present price of one ton of CO_2 on the Climate Change Exchange of Chicago is US$ 0.11, mainly because this voluntary market does not include stringent procedures and monitor. This is not the case on the Over The Counter (OTC) market, where the carbon ton from Afforestation/Reforestation Plantation is sold US$ 6.4 (Ecosystem Marketplace, 2009). However, two conditions are to be met on the OTC market: the carbon sequestration scheme must be (1) additional and (2) properly registered and monitored. In Assam State, the additionnality criterion is supposed to be respected: without a formal and adequate management, these plantations will probably disappear in the coming years due to encroachments and illegal cuttings. On the other hand, putting in place a carbon monitoring system is costly and reduces the expected net benefits of selling carbon.

- **Agro-forestry systems**

Agro-forestry will be promoted in all the JFMCs based in the sampled Divisions (i.e. 2 Divisions in Year 2, 2 additional Divisions in Year 3, 3 additional Divisions in Year 4, 3 additional Divisions in Year 5). The average number of Joint Forest Management initiatives is 15 per Division (Indian State of Forest, 2009). The average surface of one JFM is 159ha. Each JFMC would dedicate 25% of the JFM area to agro-forestry outside RF.

As described in the chapter on Carbon Finance, the net stock of carbon of a 5 year old agro-forest amounts to 40t.

The payment for carbon sequestration happens after 5 years of effective existence of the agro-forest.

Table 12 Carbon revenues from 2 models : teak plantations and agro-forestry

Years	1	2	3	4	5	6	7	8	9	10
Number of new Reserved Forest concerned /yr				2	2					
Harvested and replanted surfaces /yr of teak				86	86					
Carbon revenues (OTC price) - Teak plantations	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1 265 920**	**1 265 920**
Euros	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*19 823*	*19 823*
Number of Division concerned / yr	0	2	2	3	3					
Number of new JFM concerned /yr	0	30	30	45	45					
Surface of new agro-forest / yr	0	1 193	1 193	1 789	1 789					
Carbon revenues (OTC price) – Agro-forestry	**0**	**0**	**0**	**0**	**0**	**0**	**14 042 880**	**14 042 880**	**21 064 320**	**21 064 320**
Euros	*0*	*0*	*0*	*0*	*0*	*0*	*219 901*	*219 901*	*329 852*	*329 852*
Carbon revenues (OTC price) - Total	**0**	**0**	**0**	**0**	**0**	**0**	**14 042 880**	**14 042 880**	**22 330 240**	**22 330 240**
Euros	*0*	*0*	*0*	*0*	*0*	*0*	*219 901*	*219 901*	*349 675*	*349 675*

Explanatory variables			
Carbon stock of a new teak plantation / ha	50		
Carbon stock of a new agro-forest / ha	40		
OTC price (Afforestation/Reforestation Plantation)	6,40 USD	Rs294,40	
1 Division =	15	JFM	
1 JFM =	159	ha	
Agro-forestry system =	0,25	JFM total surface	

10.5 Fuel-wood

An intense effort will be put to extend fuel-wood plantations. The objective is to create a 1000 ha fuel-wood plantation in every ten sampled Divisions during the second year of the project, and to reiterate this experience in Year 3. All the plantation costs would be covered by the project and the Forest Department budget.

Several species can be chosen for fuel-wood plantations: Moj, Kadam, Koroi, Ghoraneem Bhe, Jiapoma, Mahaneem Sain, Suagamoni.

The financial returns of fuel-wood plantations are given by the Assam Forest Department, especially in the consulted micro-plans: RS.750 at year 3,Rs. 3, 750 at year 4,Rs. 7, 500 at year 8 on one hectare basis.

As there is a huge lack of fuel wood in Assam State, which would be partly compensated with these new fuel-wood plantations, it is assumed that its unit price will not decrease over the project duration.

Table 13 Expected income from fuel-wood plantation

Years	1	2	3	4	5	6	7	8	9	10
Number of Division concerned / yr	0	10	10	0	0	0	0	0	0	0
Surface of new fuel-wood plantation / yr	0	10 000	10 000	0	0	0	0	0	0	0
Revenues of Fuel-wood plantation (plantation Y2)	0	0	0	0	7 500 000	37 500 000	0	0	0	75 000 000
Revenues of Fuel-wood plantation (plantation Y3)	0	0	0	0	0	7 500 000	37 500 000	0	0	0
Fuel-wood plantation Total	**0**	**0**	**0**	**0**	**7 500 000**	**45 000 000**	**37 500 000**	**0**	**0**	**75 000 000**
Euros	*0*	*0*	*0*	*0*	*117 444*	*704 666*	*587 222*	*0*	*0*	*1 174 444*

Explanatory variables

Revenus from fuel-wood plantations (Rs/ha/yr) : year 3=750 Rs., year 4=3,750 Rs., year 8=7,500 Rs

Size of the new fuel-wood plantation / Division = 1000

10.6 Agro-forestry

Agro-forestry will be promoted in all the JFMs based in the sampled Divisions (i.e. 2 Divisions in Year 2, 2 additional Divisions in Year 3, 3 additional Divisions in Year 4, 3 additional Divisions in Year 5, and 2 additional Divisions from Year 6 to 10 respectively). The average number of Joint Forest Management initiatives is 15 per Division (Indian State of Forest, 2009). The average surface area of one JFMC is 159ha. Each JFMC would dedicate 25% of the JFM area to agro-forestry outside RF.

Agro-forestry offers potential short- and intermediate-term economic returns. Mixing lower value subsistence agricultural crops, such as paddy rice, with higher income horticulture, poles, or nontimber forest product trees planted along field boundaries or through intercropping can significantly increase average annual net revenues per hectare. There is a great diversity of agro-forestry systems in India (cf. ICRAF or “Greening India” websites), that are fine-tuned to specific environments. For reason of simplicity, the economic assessment of agro-forestry benefits in Assam is built on two basic models:

- Irrigated agro-forestry, combining Gmelina/paddy/linseed that would be implemented in half of our sampled JFMCS. The annual gross benefit varies Rs 13, 800 and Rs. 8, 280 per hectare.

- Rainfed agro-forestry, combining Bamboo/Dichanthium that would be also implemented in half of our sampled JFMCs. The annual gross benefit varies Rs 5, 000 and Rs. 30, 000 per hectare during the first ten years of production.

Each agro-forestry model is supposed to cover 50% of the agro-forestry surface implemented in the JFM initiatives.

Input/output analyses of these two agro-forestry models are provided by the Agro-forestry Database Development Programme (http://mirror.iasri.res.in/net/eco_zone.asp), from both technical and economic point of view. The unit (constant) prices of these products are supposed to remain constant over the project period.

Table 14 Revenues from agro-forestry

	1	2	3	4	5	6	7	8	9	10
Number of Division concerned / yr	0	2	2	3	3	2	2	2	2	2
Number of new JFM concerned /yr	0	30	30	45	45	30	30	30	30	30
Surface of new agro-forest / yr	0	1 193	1 193	1 789	1 789	1 193	1 193	1 193	1 193	1 193
Surface of agro-forest - Total	0	1 193	2 385	4 174	5 963	7 155	8 348	9 540	10 733	11 925
Irrigated Agro-forestry	0	8 228 250	15 139 980	25 170 217	34 159 580	38 941 921	43 160 629	46 860 112	50 081 744	52 864 063
Rainfed Agro-forestry	0	2 981 250	5 962 500	10 434 375	14 906 250	107 325 000	20 868 750	23 850 000	26 831 250	29 812 500
Agro-forestry Benefits Total	**0**	**11 209 500**	**21 102 480**	**35 604 592**	**49 065 830**	**146 266 921**	**64 029 379**	**70 710 112**	**76 912 994**	**82 676 563**
Euros	*0*	*175 532*	*330 449*	*557 541*	*768 334*	*2 290 431*	*1 002 652*	*1 107 268*	*1 204 400*	*1 294 653*
Explanatory variables										
Revenues of Irrigated Agro-forest - Gmelina/paddy/linseed	0	13 800	12 696	12 061	11 458	10 885	10 341	9 824	9 333	8 866
Revenues of Rainfed Agro-forest - Bamboo/Dichanthium	0	5 000	5 000	5 000	5 000	30 000	5 000	5 000	5 000	5 000

	63,9	
Irrigated Agro-forestry =	50%	Agro-forestry total Surface
Rainfed Agro-forestry =	50%	Agro-forestry total Surface
1 division =	15	JFM
1 JFM =	159	ha
Agro-forestry system =	0,25	JFM total surface

10.7 Improvement of jhumming practices

This activity will be carried out by the concerned JFMC located in the Hills regions, i.e. a quarter of our sample. The JFMCs would dedicate 25% of their area to improve their current practices of shifting cultivation. In these regions, the vast majority of forest-fringe communities are primarily dependent on agrarian-based economies (Milne et al, 2006-b). Some evidence shows that jhum tends to be a sustainable form of agriculture best suited to the rainy hill regions of Northeast India, over other forms of agriculture such as valley or terrace cultivation (Ramakrishnan, 1992). However, the productivity of jhumming systems in Assam is low and far behind the average Indian level (Ashokvardan, 2004; Government of Assam, 2008). Simple techniques are suggested to improve the productivity of these crops (Milne et al., 2006-a) and can be quickly implemented to reduce the discrepancy between Assam and national levels.

To estimate the potential productivity gains, we consider a jhum model combining winter rice, wheat, rapeseed and mustard. Their current yield rates (per hectare) are drawn from the Assam

Development Report (2004), while the improved yields come from the same report and from Sarma et al. (2003). The data are presented in the table below:

	Current productivity (kg/ha)	Potential productivity (kg/ha)	% Increase
un irrigated winter rice	660	904	+ 37%
un irrigated wheat	700	1 295	+ 85%
rapeseed & mustard	600	1 002	+ 67%

To assess the economic benefits of these improved cultivations, we use the constant price of these three commodities on Assam markets, indicated by the **Directorate of Marketing & Inspection, Ministry of Agriculture, Government of India (**http://agmarknet.nic.in/**)**

Table 15 Expected income from Jhum improvement

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Number of Division concerned / yr	0	1	1	1	1	1	1	1	1	1
Surface JFM Jhum - New/yr	0	298	298	447	447	298	298	298	298	298
Surface JFM Jhum - Total	0	298	596	1 043	1 491	1 789	2 087	2 385	2 683	2 981
Improved jhumming Benefits	**0**	**5 694 843**	**11 389 687**	**19 931 952**	**28 474 217**	**34 169 060**	**39 863 904**	**45 558 747**	**51 253 590**	**56 948 434**
Euros	*0*	*89 177*	*178 354*	*312 120*	*445 885*	*535 062*	*624 239*	*713 416*	*802 593*	*891 770*

Explanatory variables				
	Present Productivity (k/ha)	Expected Productivity	Unit Price	Benefit /ha
un irrigated winter rice	660	904	21	**5 128**
un irrigated wheat	700	1 295	12	**7 140**
rapeseed & mustard	600	1 002	17	**6 834**
				19 102
Jhum system =0,25		JFM total surface		

10.8 Financial profitability of the project

Table 16 Synthetic Table of Benefits and Costs

years	1	2	3	4	5	6	7	8	9	10
Revenues from teak harvesting	0	0	0	464 400 000	450 468 000	2 403 246 780	2 331 149 377	2 261 214 895	2 193 378 448	2 320 993 195
Revenues from carbon sequestration	0	0	0	0	0	0	14 042 880	14 042 880	22 330 240	22 330 240
Revenues from improved jhumming	0	5 694 843	11 389 687	19 931 952	28 474 217	34 169 060	39 863 904	45 558 747	51 253 590	56 948 434
Revenues from agro-forestry	0	11 209 500	21 102 480	35 604 592	49 065 830	146 266 921	64 029 379	70 710 112	76 912 994	82 676 563
Revenues from fuel-wood	0	0	0	0	7 500 000	45 000 000	37 500 000	0	0	75 000 000
Revenues - TOTAL	**0**	**16 904 343**	**32 492 167**	**519 936 544**	**535 508 047**	**2 628 682 761**	**2 486 585 539**	**2 391 526 634**	**2 343 875 273**	**2 557 948 432**
Euros	*0*	*283 630*	*545 171*	*8 723 768*	*8 985 034*	*44 105 415*	*41 721 234*	*40 126 286*	*39 326 766*	*42 918 598*
Costs - TOTAL	**593 178 074**	**838 173 803**	**610 966 747**	**612 058 661**	**122 613 869**	**0**	**0**	**0**	**0**	**0**
Euros	*9 952 652*	*14 063 319*	*10 251 120*	*10 269 441*	*2 057 280*	*0*	*0*	*0*	*0*	*0*
Net revenues	**-593 178 074**	**-821 269 460**	**-578 474 580**	**-92 122 117**	**412 894 178**	**2 628 682 761**	**2 486 585 539**	**2 391 526 634**	**2 343 875 273**	**2 557 948 432**
Euros	*-9 952 652*	*-13 779 689*	*-9 705 949*	*-1 545 673*	*6 927 755*	*44 105 415*	*41 721 234*	*40 126 286*	*39 326 766*	*42 918 598*

- Financial Internal Rate of return: 39%
- Distribution of benefits and costs over the project life-span
- Sensitivity analyses:
  - No timber logging: IRR < 0
  - Starting of timber logging in Year 6 rather than Year 4: IRR = 29%
  - 2010 Price of the teak m^3 at Rs 7500: IRR = 34%
  - 2010 Price for carbon ton at US$ 0,1: IRR = 39%
  - 20% decrease of 2010 prices for agroforestry products: IRR = 38%
- Distribution of gross financial benefits among the stakeholders

11 Opportunities offered by carbon finance: REDD+ and CDM

11.1 REDD+ and CDM options

This Project will explore the opportunities offered by carbon finance as one of its strategies of sustainability. Carbon finance offer several options for generating long-term revenue streams. One option is through the new REDD+ mechanism that is emerging from the negotiations around the UN Framework Convention on Climate Change. Under this mechanism, activities that reduce emissions from deforestation and from forest degradation are eligible for financing. While deforestation and forest degradation emissions are not a large part of India's emissions, they are proportionately a larger part of emissions from Assam state, which has a low level of industrialization. The REDD+ mechanism may also allow opportunities associated with rehabilitation of degraded forests, although a final decision on this is pending. The REDD+ mechanism is likely to be launched in 2012. The Project should monitor the international negotiations and evaluate opportunities to engage with this mechanism. It will be essential for the Project to be in frequent contact with the UNFCCC Focal Point in the Ministry of environment and Forests

The second option is through afforestation and reforestation activities in either the Clean Development Mechanism (CD) or in voluntary markets. The CDM offers carbon certified emissions reduction (CER) credits as offsets to companies in developed countries when they cannot meet emissions reductions themselves. Voluntary markets offer so called voluntary emissions reductions (VERs) to companies that wish to reduce their carbon footprints as part of a sense of corporate social responsibility.

The CDM offers two approaches to carbon crediting based on the length of time for which credits are valid. Long-term CERs (lCER) offer long-term guarantees that carbon will be sequestered, but carries liabilities for project proponents to ensure that carbon remains sequestered for long periods up to 60 years. The liabilities of lCERs are generally seen as unacceptable to project developers and they are seen as too risky by buyers. As a result no projects have yet been based on the lCER option. The second option offers temporary CERs (tCER) that must be renewed every 5 years. These types of credits offer flexibility to project proponents and are more suited to community-based projects as they offer flexibility to land owners. The Project should explore the opportunities that tCERs offer.

Prices in the CDM market are generally significantly higher than in voluntary markets, but transaction costs are also considerably higher. The Project should explore both market opportunities and assess the appropriateness of each one for different components of the Project. The Project may decide that CDM is appropriate for one subset of activities and the voluntary market is appropriate for another subset.

11.2 Initial and baseline studies

In anticipation of seeking carbon finance from the different options offered, the Project will undertake the following activities:

1. **Determination of baselines and reference emission levels:** Baselines are generally determined for afforestation and reforestation projects. They consist in estimating carbon stocks on the landscape in the absence of project activities. Reference emissions levels are the corollary in REDD projects and consist of estimating future emissions in the absence of the project.
    a. Significant data on forest area and forest quality exist at the CCF office. There is additional data with the national Forest Survey of India office in Dehradun. The Project will determine current land use, expected future land use and land-use

change in the absence of the Project and expected future land-use as a result of the Project. Land use and land-use change should be made in a spatially explicit manner.

b. The Project will determine the different drivers of deforestation in each sub-region of the state and will determine the economics behind deforestation.

c. A modeling or projection exercise will be required to estimate future likely deforestation rates in a spatially explicit manner. Determining a baseline or reference emission is not an exact science because one is attempting to prove the counter factual – land-use change and associated emissions that did not take place. The best approach at the moment is to develop several future scenarios based on reasonable assumptions about likely economic futures. Deforestation rates estimated for each scenario should be converted emissions numbers. External expertise may be required to implement this.

2. **Establishment of a State-wide system for carbon stock monitoring:**

   a. The FSI already conducts national forest inventories and there is a lot of appropriate data available on forest stocks. These stocks will need to be converted into carbon numbers. Outside assistance would be needed to do this.

   b. There is a need for the Project to provide training in the IPCC approach to carbon accounting. The 2003 Good Practice Guidance provides methods for project-level accounting. These methods were extended in the 2006 National Greenhouse Gas Inventory Guidelines. If the Project is going to consider using carbon finance as part of its sustainability strategy, there is a need to create a small cadre of staff who understand these methods and who can ensure that they are implemented properly. This could be supported either locally or internationally. There is expertise at the University of Bangalore and the World Bank is supporting development of a carbon monitoring system for agro-forestry systems through the Carbon Poverty Reduction Project led by ICRAF.

   c. Community based monitoring will be an important component of the measurement and monitoring system to facilitate community participation in the carbon finance components of the Project, to help ensure transparency in reporting and to increase community buy-in.

3. **Education of community leaders:** Ensuring the sustainability of carbon benefits will require community participation and cooperation. It is essential that communities understand and provide informed consent to participating in any carbon finance scheme.

4. **Negotiate benefits sharing agreements with participating communities:** Whereas communities will be altering their current land management practices, and may undertake activities with longer-term payoffs but significant up-front costs and lost production, they need to share in the benefits of carbon finance schemes. Comprehensive benefits sharing agreements are going to have to be worked out on a community by community basis for this Project.

5. **Explore the possibilities of CCBA certification.** The Climate, Community and Biodiversity Alliance (CCBA) has created an internationally recognized set of standards for carbon finance projects that ensures projects deliver multiple benefits in a sustainable manner. All activities undertaken in this Project should use these standards as design guidelines. Furthermore, the Project should work with CCBA to develop appropriate documentation to meet the requirements of certification and the Project should seek such certification.

6. **Accessing carbon finance:** Several opportunities to access carbon finance are available to the Project. The Project should begin conversations with UN-REDD, the Forest Carbon

Partnership Facility, the BioCarbon Fund and private brokers to explore bringing projects to market. The Project should engage the services of consultants to advice on developing appropriate documentation.

7. **Assess social impact of carbon sequestration projects:** Carbon sequestration projects could have both negative and positive impacts on communities, and this is likely to vary between different types of communities (forest villages, villages in revenue lands, etc.). The Project needs to assess positive and negative impacts ad develop a mitigation plan for all negative impacts identified.
8. **Conduct an environmental impact assessment.** Most C finance buyers require an environmental impact assessment (it is likely that the GoI will likely require such an assessment for this Project independently of whether C finance is involved). One likely negative effect is water availability and the impact of increase tree cover on water availability must be assessed. Communities that we visited during this mission already listed water availability as a major problem.

11.3 Estimated emissions

State level statistics are available on rates of deforestation over different periods from the Forest Survey of India. No statistics are available on degradation, but degradation can be inferred from the change matrix published in the biennial State of Forests in India reports. Major uncertainties about degradation come from the fact that only net changes are reported. So for example, where a net loss of dense forest is reported in a district it cannot be clear that increases in moderately dense forest correspond to losses of dense forest or whether these forests are new plantation sites. Thus, for this estimate, we calculated emissions from deforestation only and made no attempt to estimate degradation emissions. We converted area loss using forest stocking data from the Forest Survey of India and global IPCC conversion factors. The Project will need to do a more rigorous exercise, using spatially explicit information and remote sensing data to estimate past deforestation rates. The results of the calculations are presented in the figure below. Emissions are expressed in tons of carbon dioxide equivalents as per the practice of IPCC.

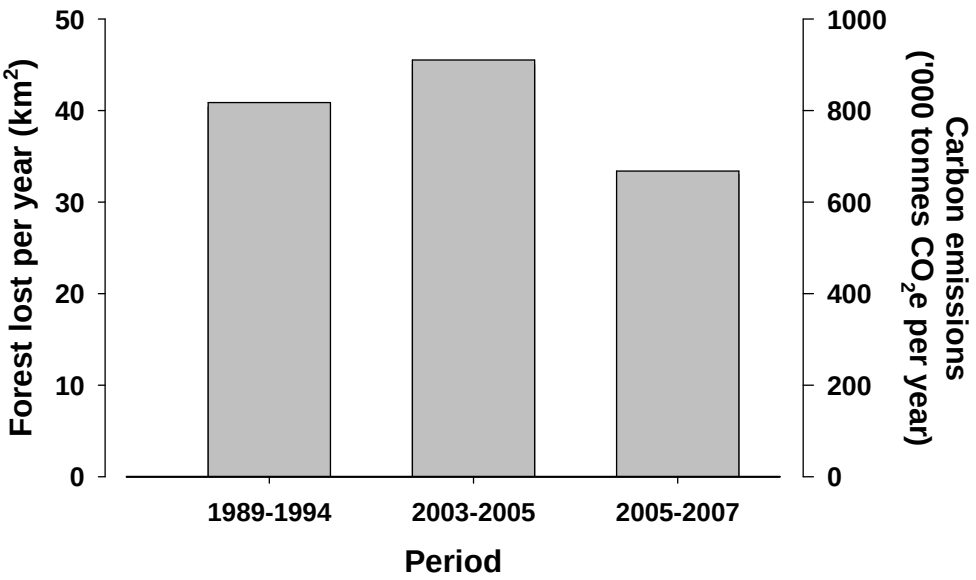

Figure 5 Forest lost (and carbon emissions) per year in Assam from 1989 to 2007

The calculations show that while the State does have significant deforestation rates despite a ban on logging, emissions are not particularly high and opportunities for emissions reductions are probably low. Better estimates of emissions related to forest degradation are required. If India does

elect to participate in an international REDD+ mechanism, these emissions cannot be ignored. For the Project, however, greater impact is likely to be achieved through the elements of carbon finance related to enhancing carbon stocks, conservation of forests, reforestation and afforestation.

11.4 Carbon sequestration

Several activities considered by the Project are likely to enhance forest carbon stocks. At the time of writing this section, quantitative objectives for the Project were still being defined. Thus, we have made projections of carbon sequestration for 1 ha of two types of plantations, using information about local silvicultural practices.

Carbon sequestration projects based on afforestation and reforestation have a maximum length of 60 years in the CDM. However, tree plantations in Assam range from 50 years up to 90 years. We made accumulation projections for the five major carbon pools required in carbon finance projects over the life of a 60 year project, using available silvicultural data from Division Working Plans, information provided by Forest Department Staff and IPCC conversion factors for several types of plantations. Projections were done using the Encofor carbon model (www.joanneum.au/encofor). The figures presented below are net accumulations over and above the baseline case.

Case 1: Teak plantation on poorly regenerating old field. For the case presented of teak, a plantation was established to rehabilitate a degraded site on an abandoned agricultural field or degraded grassland with low woody aboveground biomass (~15 tonnes) that was regenerating slowly. The site was partially depleted in soil organic matter. We used a stand table form Darrang West Division, along with data from Kraenzel et al.4 and mean annual increment of 6 m^3 from Pandey and Brown5. Two plantation thinnings were included as per local practice; each thinning involved the removal of half of the trees. Initial planting was at 2m $\times$ 2m spacing for a total of 2400 trees ha^{-1}. The final crop was 600 trees. No projection was made for harvested wood products as there is no agreement among climate change negotiators and these stocks are currently not credited in carbon sequestration projects. Thus, the average net carbon sequestration benefit over the lifetime of the plantation, compared to the baseline scenario is 142 tonnes of biomass, which is equivalent to 244 tonnes of CO_2 equivalents (CO_2e)6 per hectare.

In some instances the Forest Department would extend the length of the rotation and conduct a third thinning at 50 years and plan for a final harvest at between 75 and 90 years. Since this extends beyond the carbon crediting period, we did not make longer-term projections. We assumed that the stand would be liquidated at 50 years and replanted. The point of this is to illustrate that despite harvesting, plantations sequester carbon and if they are replanted and issues of non-permanence can be avoided.

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4 Kraenzel et al. 2003. Carbon Storage of harvest age Teak (Tectona grandis) plantations, Panama. Forest Ecology and Management 173:213-255.

5 Pandey, D. and Brown, C. 2000. Teak: a global overview. Unasylva 51:3-13.

6 To convert biomass: CO2e= B2×4412

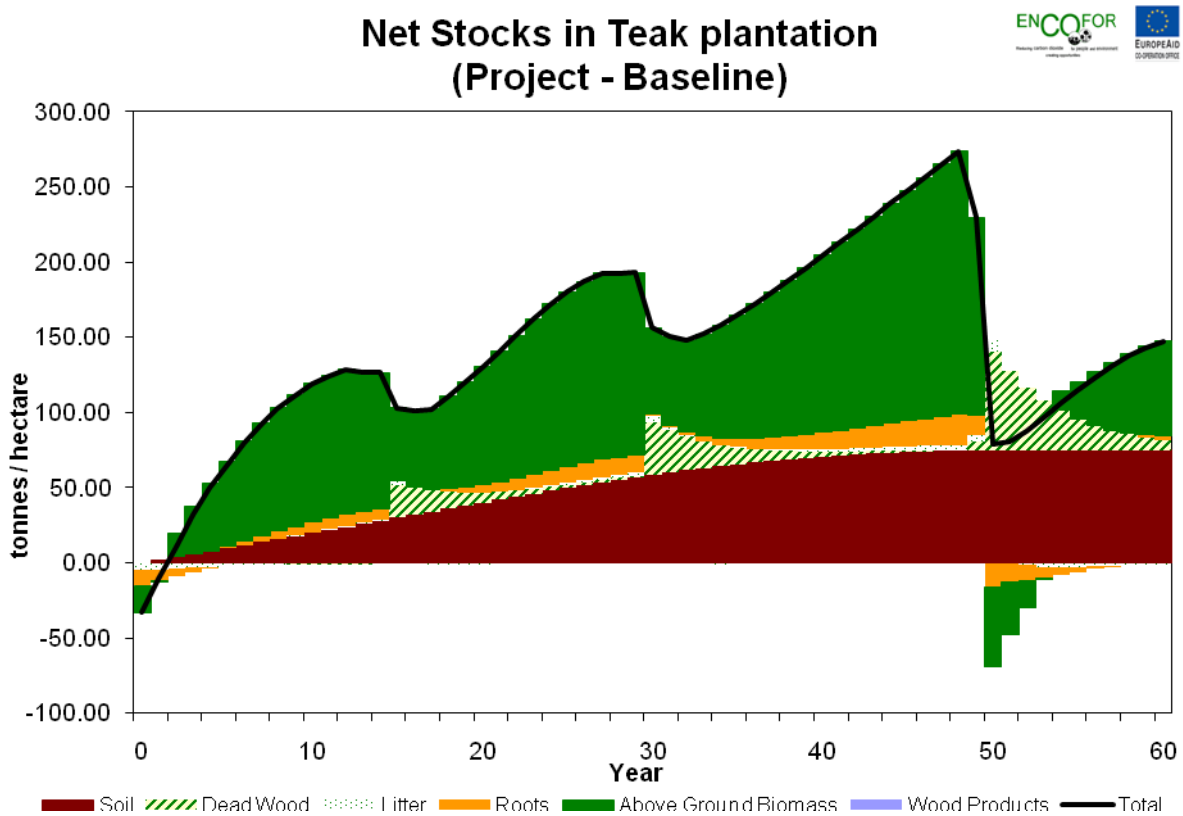

Figure 6 60 years evolution in net carbon stocks in teak model plantation

Case 2: Agro-forestry. The second case we estimated was the conversion of a degraded swidden (locally referred to as 'jhum') field to permanent agro-forestry. The fallow cycles in jhum areas are shortening and discussions with farmers in a number of villages between Diphu and Nagaon indicated that productivity was decreasing in these fields, partly due to reduced fallowing time, but also as a result of the drought conditions that have persisted in the area for the past two years. Jhusm sites are often found on sloping land and as they degrade they become subject to erosion which further reduces the productive capacity of the soils and reduces the regenerative effects of the fallow periods. In addition, degraded jhum sites are becoming important sources of sand that is covering extensive areas of productive rice growing areas. Stabilizing and transforming jhum sites will be an important activity for this Project.

In this system, aboveground tree biomass stabilizes at 50t ha^{-1} after 16 years and additional growth in trees is offset by annual extraction of wood for energy, construction or other uses. Non-tree biomass averages 12t ha^{-1}. There is significantly more storage in belowground carbon pools in this scenario compared to the baseline. In this scenario, soil organic carbon density increases from 0.7 to 2.7% under agro-forestry since significant amounts of organic matter from both the crop and tree clippings are returned to the soil surface and incorporated. Thus, the average net carbon sequestration benefit over the lifetime of the plantation compared to the baseline scenario is 138 tonnes of biomass, which is equivalent to 238 tonnes of CO_2e per hectare.

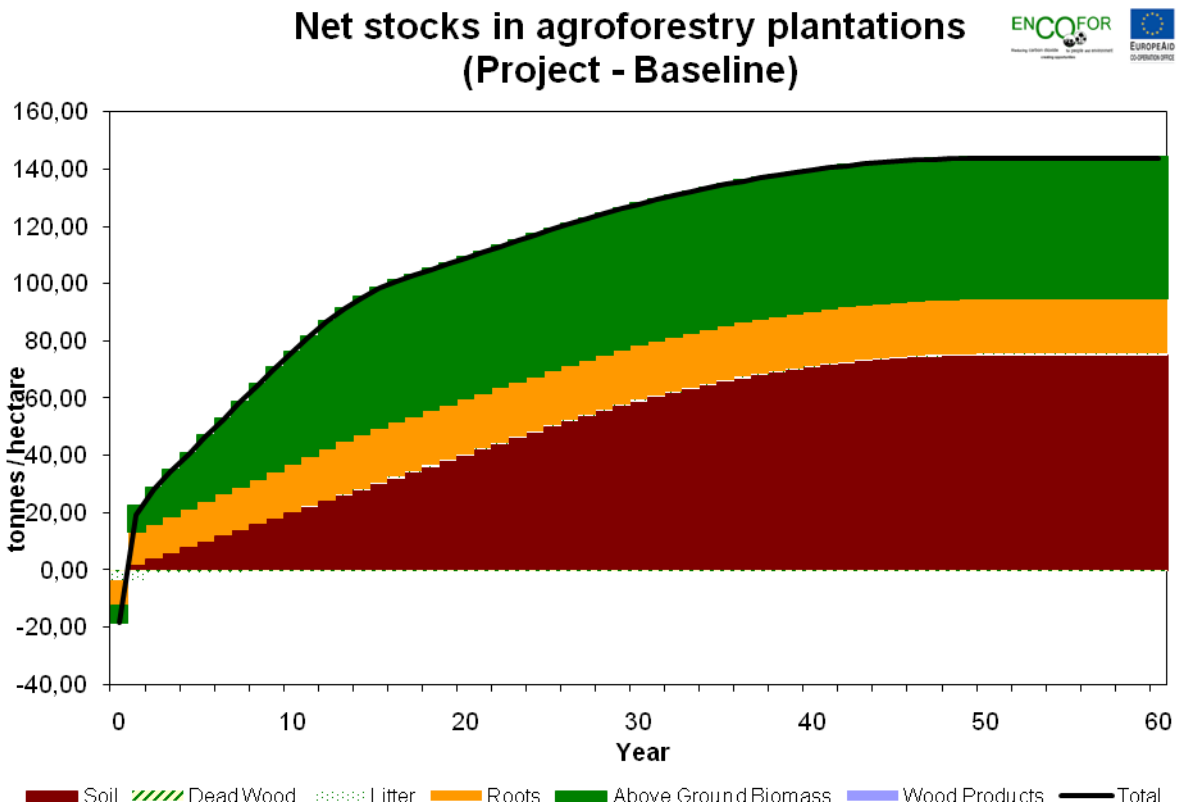

Figure 7 60 years evolution in net carbon stocks in agroforestry model plantation

12 Environmental & social impact assessment aspects

The project is designed around three main categories of activities : enhancing capacities of the Assam Forestry Department, developing sustainable participatory forestry and natural resources management and promoting economic forestry related development for the benefit of local populations. Each category of activities is expected to generate a different range of environmental and social impacts.

12.1 Institutional strengthening

Among institutional strengthening activities, capacity building, including carrier enhancing, or in service training all share as a global objective to increase the efficiency of the forestry administration. No direct negative environmental or social impacts should be expected, but conversely, better sustainability, with better insertion of forestry within its social and economical context. The same positive impacts are aimed by strategic planning activities, relying on an in-depth landscape assessment.

Project activities relating to infrastructure rehabilitation or construction would require a more careful attention.

- Road restoration should remain at local scale, facilitating access to villages, based on local man power
- Restoration of degraded buildings may generate rather classical negative direct environmental impacts, relating to civil works : noise, dust, machine oil or fuel spills, soil compaction, surface or ground water pollution. Indirect impacts may come from extraction of gravels and sand which may originate from quarries with poor environmental concern. Although the dimension of each construction site should remain limited, the location might be sensitive, especially in natural remote areas, with a special concern for protected areas.

➔ As a consequence, the project will hire a specialised short term expertise commissioned to design additional environmental specifications, to be added to the standard specifications, for every restoration site. The PMU will submit the standard environmental specifications for approval by the Governing body, and to non objection by the AFD. In addition, the specification will include the services of an external auditor, especially dedicated to monitor the environmental commitments for the works.

- Construction of new buildings, in addition to the impacts mentioned above relating to the construction phase itself, generates new or additional activities which generate their own specific related impacts. The choice of their location will therefore be critical, as well as the category of activities which would be developed from these new infrastructures : homes, offices, garage, warehouse, etc do not generate the same environmental nuisances. In addition, a specific attention is drawn for every new construction in protected areas. Non avoidable impacts on natural resources are to be expected : therefore, a very clear balance will have to be established between these negative impacts, and the positive consequences which justify such infrastructure. I.e. natural resources/landscape degradation caused by the building of a new watch tower must be compensated, if not largely overcome, by the positive impacts of the protection allowed by such tower.

➔ It is therefore proposed that (i) every new construction financed by the project would be preceded by an environmental impact assessment notice, including the specification for the civil works, as well as mitigation and compensation measures for the negative impacts caused by the utilization of the planned building. (ii) in the case of any new infrastructure planned inside a protected area, an environmental impact assessment, following Indian law, would be undertaken, and submitted to agreement by the Governing Body of the project.

12.2 Sustainable forestry

Sustainable forest management activities will include forest restoration and plantations, as well as participatory activities with village populations living in or near to forests.

Impacts of sylviculture activities vary depending of the state of degradation of existing vegetation. Rehabilitation of degraded forest land, especially areas with less than 10% forest cover, is aimed at restoring a number ecological services provided by trees and forests : habitat and forest cover for biodiversity, protection of water and soils. Sylviculture operations in existing overgrown aging plantations would require in depth preliminary studies.

➔ In sectors were a significant biodiversity has settled, as a consequence to the total stop of sylviculture operations such as forest logging, thinning, clearing of plantations, specific measures will be implemented. They would include biodiversity surveys, studies of forest dynamics, promotion of low impact protocols, such as :

- Pre-harvesting planning of roads, skid trails and landings to minimise soil disturbance detailed mapping,
- Construction of roads, landings and skid trails following environmentally friendly design guidelines;
- Use of appropriate felling and bucking techniques including directional felling, cutting stumps low to the ground to avoid waste, and the optimal crosscutting of tree stems into logs in a way that maximises the recovery of useful wood;
- Winching of logs to planned skid trails and ensuring that skidding machines remain on the trails at all times;
- Where feasible, using yarding systems that protect soils and residual vegetation by suspending logs above the ground or by otherwise minimising soil disturbance;

- Conducting a post-harvest assessment in order to provide feedback to the resource manager and logging crews and to evaluate the degree to which the RIL guidelines were successfully applied

12.3 Carbon sequestration

Figures for carbon sequestration are extrapolated from the 60 years evolution as calculated above, for two models : teak and agroforestry as alternative to jhum.

Three stages of maturity for carbon stocks have been taken in consideration:

Table 17 : figures of carbon sequestration for teak and agroforestry per hectare

	Period 0-10 years	20 years	30 years
Teak	50 tons/yr	120 tons/yr	150 tons/yr
Agroforestry	40 tons/yr	100 tons/yr	120 tons/yr

Derived from the economic study, the following estimation for the carbon sequestration during the first ten years of the project have been calculated below (with respectively 50 and 40 tons/yr per hectare for teak and agroforestry)

Table 18 : 30 years total carbon sequestration impact of the project

Years	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**20**	**30**
TEAK												
Reserved Forest with plantation				2	2							
Harvested and replanted areas				86	86							
Carbon stocks /tons teak									4 300	4 300	10320	12900
AGROFORESTRY												
Number of Division concerned	0	2	2	3	3							
Number of new JFM concerned	0	30	30	45	45							
Area of new agroforest	0	1 193	1 193	1 789	1 789							
Carbon stocks /tons Agroforestry							47 700	47 700	71 550	71 550	178875	214650
Carbon stocks /tons total							*47 700*	*47 700*	*75 850*	*75 850*	*189 195*	*227 550*

12.4 Participatory development and income generating activities

Among the various participatory forestry activities to be promoted by the project, a specific attention will be drawn on the micro-planning of local activities with limited impact on the environment. Therefore, some categories of agriculture development, especially those requiring high level of chemical inputs (pesticides and fertilizers) , with potential harm for human health, as well as natural resources, would not be promoted. In addition, as respect to this forestry orientated project, any participatory activity leading to the definitive loss of forest should not be supported.

Similarly, income generating activities may generate different environmental and social impacts depending if they are based on the use of natural resources, or of local productions from agriculture, handicrafts or semi-industrialised goods. Production based on natural resources will need to assess the potential of natural regeneration for each product. Alternatives and promotion of domestication of species collected in the wild might be necessary.

13 Operating manual of the project/Implementation arrangements

13.1 Field Implementation

The Forest Department would act as implementing agency for all project activities, with the support of officers from partner Departments such as Agriculture or Tribal Affairs.

Use of NGOs would be made wherever villager interest or community groups are to be formed, such as for local development, or forest product marketing. To simplify implementation arrangements, one lead NGO would be engaged at each Division level to handle social mobilization and associated training needed for all project activities in that Division.

Field Implementation Units would be formed, comprising all implementing agencies active at FDA/Division level, chaired by the CF/DFO. The Divisional Project Coordination Committee (DPCC) would have responsibility for ensuring (i) participant selection criteria and (ii) at a micro level, the convergence of complementary activities is maximized. FIU would nominate the lead NGO for their Divisions and regularly monitor performance against agreed milestones, to which part of the NGO's contract fees would be tied. The PMU (Project Management Unit) would authorize engagement of all NGOs and meet monthly to monitor progress of Division plan implementation and performance.

An Operational Manual will be prepared explaining the roles and responsibilities of Division offices, project NGOs for all project activities, and detailing arrangements for the flow of funds down to implementing units in the field. Selection criteria for participating groups to ensure effective inclusion of vulnerable groups such as marginal farmers, the landless, scheduled castes and tribes, ands female headed households will be agreed, and included in the Operational Manual. A communications strategy to clarify and publicize project activities to village communities - detailing the project objectives, implementation modalities, the roles and responsibilities of all stakeholders; participants screening criteria; and, expected beneficiary contributions. Legal literacy programs are planned to help communities to understand their rights and responsibilities in using common natural resources such as forest areas for economic activities.

Implementation capacity would be strengthened by selective collaborations and technical assistance. Collaborations would be made with national institutions. Public works would be provided with technical assistance to undertake infrastructure construction or upgrading - with the appointment of a nationally recruited firm of consultants as the Engineer , if needed, to review designs, supervise construction, monitor quality and ensure environmental aspects are adequately handled. Nationally recruited consultant firms/NGOs would be engaged to support the development of a commercially oriented forest product marketing program; undertake project monitoring and evaluation; and conduct biennial environmental audits of project activities.

Overall management and coordination would be the responsibility of a Registered Society, established to implement the project. The Society will be controlled by a Governing Body, chaired by the Chief Secretary, and with active participation of the other members of the Governing Body. Day-to-day executive control rests with the Project Director, who heads the Society's PMU and is the Secretary to the Governing Body and reports to the Governing Body and the PCCF and HFF

The role of the PMU is one of implementation and administrative coordination, and technical support where the Department is opening new areas of operation, such as marketing, decentralised extension and supply chain development, computerised information systems (geographic and management).

Project monitoring and evaluation (M&E) contains three distinct but interrelated aspects. First, the forest department will regularly monitor and report on the project's physical and financial inputs and outputs. Second, an independent M&E agency (to be engaged as consultants for the duration of the project) will concurrently monitor and evaluate project processes, approaches, institutions and quantify short term output/outcome impacts. Third, the independent M&E agency

will carry out comprehensive outcome focused impact evaluations of the project at three pre-defined milestones --baseline, mid-term review and project completion. Project M&E mechanisms will emphasize stakeholder participation and will be designed to facilitate rapid identification of shortcomings and problem areas and facilitate mid term corrections, where necessary, to project design and /or implementation arrangements to enhance the chance of the project meeting its development objective.

The operational responsibility for planning and coordinating M&E activities would rest with the Project Management Unit (PMU), with one senior officer given full-time responsibility to oversee this activity. The PMU would utilize computerised project management techniques to monitor progress and to link with monitoring activities with partner departments at the state level as well as district offices. At the district level, PMU would be assisted by the Field Implementing Units in monitoring local activities. The independent agency would be engaged to undertake M&E work, which would include concurrent monitoring as well as periodic impact assessments based on independent surveys. The M&E agency would also offer support for the design and implementation of the monitoring system to be operated by the PMU with input from the participating implementing agencies. Specialists in economics, statistics, sociology, finance, information technology systems, and agriculture would constitute the core independent agency team.

Information generated by the project (primarily on inputs/outputs) and by the M&E agency (primarily on outcomes) would be consolidated by the PMU and used to update the key performance indicators for the project. These draft indicators would be developed during the baseline study and further refined as necessary by the PMU and partner departments during project implementation. Field level implementation would be independently monitored by the M&E agency, in consultation with PMU, by: (a) selecting 2-3 JFMCs within each division for intensive monthly visits and monitoring; (b) rotating monthly visits among the rest of the participating JFMCs within each division. As part of the work plan, the M&E agency would also prepare impact evaluation studies, including beneficiary assessments, at agreed periodic intervals. NGOs assisting with implementation of the project would also be involved with monitoring and evaluating community participation activities in the project.

The Forest Department, through its divisional offices would assume the primary responsibility for collecting data to update the input/output indicators. The data would be consolidated and managed by the PMU. The M&E agency would assist PMU to develop a computerised plan. For the concurrent monitoring and impact evaluation studies, the M&E agency would be primarily responsible for data collection and collation, using independent surveys, and for report preparation. Preparation of evaluation studies for different components would be an ongoing process culminating in one major interim review of the project (just prior to the Mid term review) and a final project completion review. A baseline survey would be carried out by the M&E agency in coordination with the Forest Department. The survey would be completed and a draft report prepared within six months of project effectiveness. Questionnaires and formats for this survey should be prepared within one month of the award of the M&E contract, pre-tested in the field, and cleared with the PMU prior to any actual data collection efforts. A decision on representative sample size of JFMCs/ villages, beneficiary/farmer groups, and beneficiary/ farmers will be agreed between PMU and the M&E agency taking account of statistical validation.

The project would be subjected to two major reviews to be carried out jointly by the Governing body and AFD. The first would be at the time of the mid-term review (MTR) of the project (at the end of year 3) and the second around the time of project completion. The first review would include an impact assessment of the project to date, but also focus on implementation processes and recommend adjustments in the project design and/or implementation arrangements to overcome identified bottlenecks. The second major review would be a comprehensive overall impact assessment including quantitative and qualitative assessment of progress against project development objectives. To enable comparative assessment of a with/without project situation (as

opposed to the more standard before/after project situation) the impact assessments and analyses would collect and use statistically robust comparable data from non-project areas also.

Reporting Arrangements.

PMU would submit to the Governing Body six-monthly progress reports. These would include:

(a) up-to-date physical and financial expenditure data compared to annual and end-project targets;

(b) updated indicators of project performance compared to annual and end-project targets;

(c) successes and problems encountered during the reporting period with suggested remedial actions, and;

(d) socio-economic and environmental impacts of the project. In addition, the Project's Annual Work Program to be financed under the project would be prepared and submitted for AFD review and comments by January 31 each year for the upcoming fiscal year April-March.

The M&E agency would submit:

(i) brief monthly reports summarizing concurrent monitoring observations to the PMU and respective implementing departments;

(ii) six-monthly reports summarizing project M&E of preceding six months, cross-cutting issues and recommendations, and updated project indicators and;

(iii) three comprehensive reports - the baseline survey and the two main impact evaluation assessments at the time of the project mid-term review and project completion.

13.2 Financial Management and Disbursement Arrangements

13.2.1 Country Issues

The following country issues would apply to the implementation of the proposed project:

Availability of funds on a timely basis is a generic issue in most state sector projects. The previous implementation of the World Bank funded ARIASP showed no particular problem. GOA has to demonstrate a high level of commitment to the project and to assure the AFD that counterpart mobilisation for the project will be accorded the highest priority.

At the country level, the financial management system that has to be designed for the project would enable Government of Assam to submit monthly reimbursement claims on a timely basis. The recently closed ARIASP, which was implemented by a specific Society, has not had any instances of significant delay in submission of claims in the recent past.

The number and quality of Departmental staff at district level and below might be variable. PMU will provide required training and support to finance and accounts staff of all department wings involved, and will monitor closely the agreed norms for staffing levels to ensure adequate staff at all times

Flow of funds through the various layers of the project might not be timely. By using commercial banking channels, funds flow is expected to be timely. Nevertheless, PMU would explore further improvement in banking arrangements to improve efficiency of fund flow. A requirement to regularly report bank balances will provide an additional check over accounting centers.

13.2.2 Fund Flow

State Level: The proposed project would be implemented by the Society through its PMU with the support of the Forest Department. In consultation with the PMU, the Forest Department will assess its funding requirements for the coming financial year, and forward this through the Planning

and Development Department to the Finance Department (FD) for inclusion in the State Budget. Once approved by the State Legislature, this will appear in the Budget as EAP (Externally Aided Project). As the Department requires funds, it will request the Finance Department to sanction release from the State Treasury for transfer to the PMU account in a commercial bank.

Field Level: Accounts with commercial or regional rural banks would be maintained at all operating levels in the project (i.e. at the District Level). To ensure efficient and economical transfer of funds, all accounting centers will be required to maintain accounts with branches of one of two nominated banks having a widespread network in the state, as determined by the PMU. Proposals for the use of funds will be prepared by accounting centers within the framework of the approved annual budget and annual work plan. These will be approved by the Head of the Department, before being sent to the PMU. Once verified, funds for the activities will be released by the PMU directly to bank accounts of accounting centers with intimation to the Department. Their use of funds will be monitored through review of periodic financial reports.

NGOs: As NGOs/CBOs would be providing support functions these will therefore be managed directly by the PMU. Funds will be released to NGOs based on specific agreements with them. This will include an initial payment based on an inception report followed by releases tied to milestones for specific deliverables, and timed releases for administrative expenditure. Adequate post-review mechanisms will be developed to ensure that the funds are utilized as per the agreement and duly accounted for.

User Groups: A range of user groups would be involved in the project (e.g. handicraft cooperatives…). An advance would be provided for start-up activities; and subsequent payments would be made based on submission of agreed expenditure information. Since many of the activities are being tried for the first time, it is planned to move to milestone-based payments only after the planning and control systems have been tested and deemed satisfactory.

Matching Grants: These will be provided to local groups for development of new technologies or adoption of specific equipment. In accordance with the MOU between the PMU and the commercial bank making these investment loans to project local groups, upon satisfactory compliance with agreed specific procedures, the matching grant funds would be released to the commercial bank by the PMU.

13.2.3 Staffing

The accounting function in the PMU is headed by a Chief Financial Controller with overall responsibility for receipt and release of funds, preparation and submission of monthly accounts, Statements of Expenditure (SoE) submission and finalization of annual accounts. The project is additionally supported by a Financial Advisor who provides advice on financial management and audit matters and communicates with Finance and other Departments and GOI. At field level, divisional accountants will be responsible for maintaining project accounts. For SoE preparation and submission, they will be guided by the accounts staff attached to office of the FIU. In addition, financial consultants engaged by the PMU will provide regular supervision - travelling to accounting centres, supervising and training divisional accountants on double entry accounting, maintenance of accounting records, and timely submission of reports, including the internal audits of accounting centres.

13.2.4 Training on Financial Management

Ongoing training and capacity building support to the project staff will be provided. This will cover not only the accounts staff in the field but also DFOs. Separate training modules will be developed for accounts staff and non-accounts staff. These initiatives will ensure not only that financial management staff are capable of discharging their responsibilities but also that operating staff are aware of their requirements so that they can provide adequate support to the finance and accounts staff working with them.

13.3 Accounting Policies and Procedure

A Financial Management Manual will be prepared and agreed, detailing accounting and financial management policies and procedures. The manual would be in two parts: one documenting the policies and overall financial management arrangements for the project; and the other in form of a field guide for use of Accounting Centres and other agencies.

Books of accounts for the project will be maintained using double-entry bookkeeping principles. Standard books of accounts (e.g., cash and bank book, and ledgers) will be maintained on manual basis/electronic form. Bank reconciliations will be carried out on a monthly basis. Accounting centers will retain all vouchers, bills, supporting documents and ensure that the bank passbooks are regularly updated.

A Chart of Accounts (activity list) will be developed to enable data to be captured and classified by each expenditure centre based on the project activity. This will be used by all the implementing entities to ensure consistency in recording o f information.

Guidelines as laid down in the manual cover arrangements regarding internal controls including safeguarding of cash, control over inventories, and segregation of duties. The key issues to be addressed in the design of the accounting policies and procedures are:

-Expenditure will be recorded only after agreed services have been rendered or agreed activities completed. Prior releases will be considered as advances under the project;

-Beneficiary contribution will be received in cash or in-kind. These will be considered as receipts for the project. Expenditures accounted at the project level will include these elements. Beneficiary contributions will not be taken into account while submitting withdrawal applications.

-Advances to beneficiary groups will be made up to a maximum of 20% of the proposed activities; these will be considered as project expenditures. Subsequent payments will be made on adequate submission o f expenditure information.

13.3.1 Audit

Audits of the Society will be conducted by a firm of Chartered Accountants. The qualifications of the firm of Chartered Accountants would be subject to review by AFD. The Terms of Reference o f the auditors will be subject to non objection by AFD and will be included in the Financial Management Manual. The audit would cover all accounting centres and will review transactions on a reasonable sample basis. The cost of this audit would be eligible for financing from the AFD Credit. Audits will be organised every 6 months, before submission of the budget to the Governing Body meetings for validation. The Special Account would be audited by the Comptroller and Auditor General of India.

The following audit reports will be monitored in the Audit Reports Compliance System (ARCS):

Implementing Agency	Audit	Auditors
Department of Economic Affairs / GoI	Special Account	Comptroller and Auditor General of India, New Delhi
Project Society	Statements of Expenditure, Project Audit	A firm of Chartered Accountants

Project funds would be made available to large numbers of community groups established for the project. The financial arrangements would emphasize providing local level transparency, social audit, and self-accountability. These measures would include a simple summary of the accounts (amounts received from the members and the project, amount spent and balances in hand) that will be posted in the notice board in the JFMC. In addition, the books/registers, vouchers, and bank pass books would be open for perusal by members.

13.3.2 Reporting and Monitoring

Project expenditure will be reported by the various accounting centres to the department and then forwarded to the PMU. This will be based on reporting formats which will be required to be filled in by all the accounting centres. Each report will capture the account head wise activity in the entity and balances for the month being reported on. These will be input at the departmental level for consolidation of information for the project as a whole. This information will be utilized to prepare quarterly Financial Monitoring Reports (FMRs) for the project. The FMRs will report opening and closing bank balances, expenditure incurred during the period and the level of advances.

A computerised Management Information System (MIS) will be implemented by the PMU for effective management of the project. This will record and capture information relating to physical progress, and procurement plan v/s action. MIS reports will be reviewed along-with the FMRs to obtain a holistic view o f the project and monitor progress effectively.

13.3.3 Information Systems

The Society will use a financial accounting software for maintenance of the PMU accounts. The software will consolidate financial information for all accounting centers. Monthly accounts of accounting centers shall be keyed into the system to obtain a picture of the project financial activities as a whole for the current month and year to date. Licensed copies of the software shall be installed at offices of the nodal officers of all the implementing sites.

13.3.4 Disbursement Arrangements

Disbursements from AFD will be made in the traditional system of replenishment and reimbursement with full documentation and against statement of expenditure.

A Special Account would be maintained in the Reserve Bank of India; and would be operated by the Department of Economic Affairs(DEA) of Govemment of India (GOI). The Special Account would be operated in accordance with the AFD's operational policies. The Special Account would be replenished monthly or when half of the advance to the Special Account has been utilized, whichever occurs first.

The Society will compile the financial information from all its implementing partners and prepare reimbursement claims on a monthly basis. The society will be responsible for submission of the withdrawal applications to the Department of Economic Affairs for onward submission to the AFD for replenishment of the special account or reimbursement.

Supervision Plan

The project will need intensive supervision especially in the initial stages. The focus during supervision will be on building capacity of the Department, divisions, community based organizations; internal controls, fund flows, assessment o f delays and lags in reimbursements; and, evaluation of entities and processes.

13.4 Procurement Arrangements

Learning from the ARIASP experience, procurement capacity of various line Departments in Assam has been built up and increased numbers of staff also exposed to procurement training. In all, 35 officers from various line departments have undergone training As such Government of Assam has created a fairly well trained pool of staff familiar with the World Bank’s procurement procedures, which is of high interest for the present AFD project. However, turnover of Government staff in India is a chronic problem and therefore transfer of these trained staff outside the project cannot be ruled out. Procurement training must therefore be considered as a continuous process during the implementation of the project. GOA is requested by the AFD to ensure continuation of the existing procurement specialist of the PMU, at least until the project procurement activity reaches a stable level.

As example for AFD, World Bank procedures for ARIASP is agreed, to facilitate the procurement decision-making process, i.e. :

- for contracts valued at above Rs 1.35m (approximately 22.500 Euros or US$30.000), two empowered committees will be constituted: one to decide on contracts estimated to cost above Rs.22.50 million (approximately 371 k€ or US$500,000); and the other to decide on contracts estimated to cost below Rs.22.50 million. Composition and the terms o f reference o f the committee should be finalised before the negotiations; and

- for contracts below Rs 1.35 million the powers to decide on procurement matters including award of contracts will be decentralized and rest with the head of implementing Department.

In addition to the procurement to be under taken by the Department, there is a substantial component group/community driven procurement for afforestation and village development in this project. The capacity building program of the community would also incorporate building up procurement capabilities.

It is also agreed that a procurement manual will be prepared by the PMU within six months of the project launch. This will be helpful for Government staff as well as community as reference and training material.

13.4.1 Procurement Guidelines/ Bidding Documents

Attention is drawn to AFD that the World Bank is applying its own procurement procedure. Therefore AFD would take a decision in the matter to either apply its won procedure or follow the World Bank framed procedure.

Goods & Works shall be procured in accordance with the provisions in the "Guidelines for Procurement under IBRD Loans and IDA Credits" published by the Bank in May 2004.

Services of Consultants shall be procured in accordance with the provisions in the "Guidelines for the Use of Consultants by World Bank Borrowers and by the World Bank as Executing Agency " published by the Bank in May 2004. Standard Bidding Documents/ Request for Proposals documents as finalized by the Government of India Task Force and amended from time to time, will be adopted for the procurement under the project.

13.4.2 Procurement Plan

Year wise items to be procured under the project would be identified. A detailed procurement plan for the first 18 months of the project will be prepared and made available in the PMU and shall also be published on the external web site of the AFD. The procurement plan will be updated annually or modified as needed.

13.4.3 Methods of Procurement for Works and Goods will include:

-International Competitive Bidding [ICB]

-National Competitive Bidding [NCB]

-International/National Shopping

-Direct Contracting [for proprietary items such as software, spare parts, books, periodicals, seeds, saplings etc.]

- Force Account [with the permission o f the AFD]

- Community driven procurement [This is expected to be followed for community investments and group investments.]

Methods for Selection of Consultants will include the following, depending on appropriateness in each case:

- Quality and Cost Based Selection [QCBS]

- Quality Based Selection [QBS]

- Selection under a Fixed Budget [FBS]

- Least Cost Selection [LCS]

- Selection Based on Consultants Qualifications [CQS]

- Single Source Selection [SSS]

- Selection of Individual Consultant

Frequency of Procurement Supervision

Two field supervisions will be required each year to undertake post reviews of procurement actions.

Category-wise Procurement Arrangements

Works: Rehabilitation and upgrading of buildings, rural roads and bridges is by far the largest cost item in the civil works category. The roads to be upgraded are small roads, scattered in remote areas. Therefore foreign contractors are not likely to be attracted to these works, which would most of the time be carried out by participating communities. However, foreign bidders would not be precluded from participating in the NCB procedure.

The other civil works include renovation of existing buildings/offices, construction of a limited number of buildings (offices or staff homes), cleaning and de-silting of ponds, etc. These are small and scattered works costing, in the main, less than Rs 3.0 million per contract, and would mostly be carried out by the Forest Department using NCB or the Shopping procedures depending upon the value of the contract, or by the participating community.

For community works, procedures have been agreed whereby communities can:

o undertake the works themselves;

o implement through direct contracting with NGOs; or,

o invite a minimum of three quotations from the qualified contractors.

An agreement has to been reached on the format to be used for the MOU between implementing agencies and communities to undertake works.

Goods & Equipment: Procurement under this category includes office equipment, computers and peripherals, computer software, vehicles, demonstration and research inputs, books and periodicals, material for training and demonstrations, and equipment for village development activities. Procurement procedures for line Departments would be NCB, Shopping or Direct Contracting depending on the nature o f supplies. The purchases are small and ICB procedures would not be feasible, nor required to generate maximum competition.

The agreed procedures for community driven procurement for goods and equipment are as follows:

o Shopping procedures for production inputs or,

o Direct Contracting from the manufactures associated equipment. For this purpose, the project authorities would seek expression o f interest from a range of equipment manufactures.

Consultancy and Training Services: The important consultancies under the project include

o Supervision and contract management for infrastructure upgrading and building

o Monitoring and Evaluation of project implementation.

o Financial Audit

In addition to these, there will be large number of smaller consultancy contracts for NGOs who would act as facilitators for community mobilization, environmental consultancies and consultancies related to communities/villages development, forestry, and research. The shortlist for consultancies estimated to cost US$500,000 or less may comprise entirely national consultants.

13.4.4 Proposed Procedures for National Competitive Bidding [NCB]

1. Only the model bidding documents for NCB agreed with the GOI Task Force (and as amended for time to time), shall be used for bidding;
2. Invitations to bid shall be advertised in at least one widely circulated national daily newspaper, at least 30 days prior to the deadline for the submission o f bids;
3. No special preference will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises or enterprises from any given State;
4. Except with the prior concurrence o f the AFD , there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder;
5. Extension of bid validity shall not be allowed without the prior concurrence of the AFD (i)for the first request for extension if it is longer than eight weeks; and (ii)for all subsequent requests for extension irrespective o f the period (such concurrence will be considered by Bank only in cases of Force Majored and circumstances beyond the control o f the Purchaser/Employer);
6. Re-bidding shall not be carried out without the prior concurrence o f the AFD. The system of rejecting bids outside a pre-determined margin or "bracket" of prices shall not be used in the project;
7. Rate contracts entered into by Directorate General of Supplies & Disposals, will not be acceptable as a substitute for NCB procedures. Such contracts will be acceptable however for any procurement under National Shopping procedures; and,
8. Two or three envelop system will not be used.

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15 Annexes

15.1 Annex I – MoEF Working Plan Guidelines

MoEF Working Plan Guidelines

15.2 Annex II – Supreme Court Ruling 1996

Supreme Court Ruling

15.3 Annex III – Organization Chart of the Assam Forest Department

Organizational Chart AFD

15.4 Annex IV – Forest Rights Act 2006

Forest Rights Act

15.5 Annex V – NAP Revised Operational Guidelines 2009

NAP Operational Guidelines 2009

15.6 Annex VI – NaRMIL Guidelines 2009

NaRMil Guidelines 2009

15.7 Annex VII – Assam Joint (people's participation) Forestry Management Rules (1998)

Assam Joint (people's participation) Forestry Management Rules (1998)

15.8 Annex VIII – Assam (Control of Felling and Removal of Trees from Non-Forest Lands) Rules, 2002

Assam (Control of Felling and Removal of Trees from Non-Forest Lands) Rules, 2002