Initial Environmental Examination

Document Status: Draft
Project Number: 47084
June 2016

Republic of Indonesia: Community-Focused Investments to Address Deforestation and Forest Degradation Project

(Subprojects: Bungan Jaya in Kapuas Hulu District and Tanjung Sari in Sintang District, West Kalimantan Province)

Prepared by the Ministry of Environment and Forestry for the Asian Development Bank

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK	1
III.	DESCRIPTION OF THE PROJECT	2
IV.	DESCRIPTION OF THE ENVIRONMENT	5
	A. Climate	6
	B. Physical	6
	C. Environmental Resources for Local Population (Biodiversity, Climate Change Issues)	7
	D. Human and Economic Development	7
	E. Quality of Life Values	9
	F. Spatial Plan	9
V.	FORECASTING ENVIRONMENTAL IMPACT AND MITIGATION MEASURES (THE ENVIRONMENTAL MONITORING PLAN)	11
	A. Potential Environment Impacts	11
	B. Other issues to explain the environmental impacts that may occur are:	12
	C. The benefits of land-based cultivation are:	13
	D. The benefits of ecotourism are:	13
VI.	INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN	13
	A. Environmental Management Plan	13
	B. Environmental Monitoring Plan	16
	C. Institutional Arrangements for Environmental Management and Monitoring	16
	D. Staff Requirement and Budget	24
VII.	PUBLIC CONSULTATION AND DISCLOSURE	24
VIII.	GRIEVANCE REDRESS MECHANISM	25
	E. The Grievance Redress Framework	25
	F. The Time Frame and Mechanisms to Resolve Complaints	25
IX.	CONSERVATION OF PHYSICAL AND CULTURAL RESOURCES	27
X.	FINDINGS, CONSULTATION, AND RECOMMENDATIONS	27
ANNEXES:		
1.	REA Checklist for Bungan Jaya	28
2.	REA Checklist for Tanjung Sari District	30
3.	Environment Screening Process	33
4.	Flowchart of Indonesian Environmental Clearance	34

CURRENCY EQUIVALENTS
(as of 2 June 2016)

Currency unit	–	rupiah (Rp)
RP1.00	=	$0.000073
$1.00	=	Rp13,660

ABBREVIATIONS

ADB	–	Asian Development Bank
AMDAL	–	Analisis Mengenai Dampak Lingkungan (environmental impact analysis)
EARF	–	environmental assessment review framework
EMP	–	environment management plan
EMMP	–	environmental management and monitoring plan
FIP	–	Forest Investment Program
FMU	–	Kesatuan Pengelolaan Hutan (forest management units)
GOI	–	Government of Indonesia
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
MOEF	–	Ministry of Environment and Forestry
PISU	–	project implementation support unit
REA	–	rapid environmental assessment
REDD+	–	reduced emissions from deforestation and forest degradation, conservation, sustainable forest management and forest carbon stock improvement (+ refers to the last three phrases)
RKL	–	Rencana Pengelolaan Lingkungan (environmental management plan)
RPL	–	Rencana Pemantauan Lingkungan (environmental monitoring plan)
SNI	–	Indonesia National Standard
SPPL	–	Surat Pernyataan Pengelolaan Lingkungan (environmental management statement letter)
SPS	–	Safeguard Policy Statement
UKL	–	Upaya Pengelolaan Lingkungan (environmental management effort)
UPL	–	Upaya Pemantauan Lingkungan Hidup (environmental monitoring effort)

MEASUREMENT UNITS

g	=	gram
Ha	=	hectare
Kg	=	kilogram
M	=	meter
m^3	=	cubic meter
Mu	=	Chinese area unit
T	=	ton
kg/ha	=	kilogram per hectare
m^3/a	=	cubic meters per annum
mg/l	=	milligram per liter
mg/m^3	=	milligram per cubic meter
ppm	=	part per million
t/a	=	tons per annum

EXECUTIVE SUMMARY

1. The activities of the Forest Investment Program (FIP) are focused in 13 villages in Kapuas Hulu and 4 villages in Sintang districts in West Kalimantan province. The Bungan Jaya Village in Kapuas Hulu village in Kapuas Hulu district and Tanjung Sari village in Sintang district are parts of the FIP subproject. FIP program has two groups of economic activities, namely:

(i) Land based cultivation with commercial tree species; and
(ii) Non-land based collaborative economic activities

2. Two different land based cultivation models for commercial tree species are designed as reduced emissions from deforestation and forest degradation (REDD+) demonstration activities. For Bungan Jaya, these include land-based activities such as 60 ha of project restoration, 50 ha of rubber (*Hevea sp.*), 5 ha of *gaharu* agroforestry, and non-land based activities such as: handicraft, tourism, road rehabilitation and drinking water facilities. For Tanjung Sari, land-based activities such as 110 ha of rubber (Hevea spp.) coffee agroforestry, 20 ha of gaharu-coffee agroforestry and non-land based activities such as handicraft, freshwater aqua culture, beeking, road rehabilitation and drinking water facilities.

3. These activities are expected to provide environmental and social benefits to local population, such as: (i) enhancement of carbon stocks; (ii) reduction of carbon emissions, (iii) improvement of livelihood of local communities; (iv) clarification of land use rights by local communities; and (v) conservation of biodiversity and ecosystem services.

4. Public consultations were undertaken in Bungan Jaya village and Tanjung Sari village in early April 2015. A grievance redress mechanism (GRM) is designed for people seeking satisfactory resolution of their complaints regarding the environmental performance of the project. The mechanism will ensure that (i) the basic rights and interests of affected people are protected; and (ii) their concerns during the phases of design, construction and operation activities are effectively and timely addressed.

5. The initial environment examination (IEE) indicates that there are no significant negative environmental impacts anticipated with the implementation of activities in the two villages. The screening processes through forestry rapid environmental assessment (REA) checklist and climate risk REA checklist was designed to identify any potential negative impact. Standard operating procedures will be put in place to mitigate any potential environmental impact. The environmental impacts of low magnitude had been identified, including ecological upgrading or rehabilitation tasks. Based on the impact assessment of subproject activities in Bungan Jaya and Tanjung Sari during preconstruction, construction, and operation, the environmental mitigation and monitoring will be carried out by the project implementation supporting unit (PISU) and reported to ADB and Government of Indonesia (GOI) every semester from preconstruction up to operation phase.

I. INTRODUCTION

1. ADB through FIP[1] of the Climate Investment Funds will support GOI in implementing the "Community-Focused Investments to Address Deforestation and Forest Degradation" project. The $17 million grant project is to implement REDD+ activities in West Kalimantan and support mechanisms for REDD+ processes at different levels (local, provincial and national).

2. The objective of the subproject in Bungan Jaya and Tanjung Sari villages is to transform behavior, policies, institutions, and technologies by focusing on activities to: (i) clarify forest land use by local population, (ii) prevent illegal logging and associated trade, (iii) suppress forest fires, (iv) support the forest management units (FMU) through community-based forest management, (v) support the implementation of the sub-national REDD+ strategy and action plan (including market-based REDD+ strategies), and (vi) support to improve national policy development that better values and conservation of natural resources.

3. A REA checklist was completed for the two villages (Annex 1 and 2). Based on the REA, the scale and locations of the proposed works have been classified as category B according to ADB's SPS 2009, and hence it requires an initial environmental examination or environment management plan (IEE or EMP). The project is expected to have predominantly positive impacts however some activities may have site-specific or localized adverse environmental impacts.[2]

4. This ADB category B project and its subprojects will, in general, require an environmental management or environmental monitoring effort (UKL or UPL). An assessment of the environmental regulation of Indonesia showed it fulfills ADB's SPS 2009, IEE content requirement, and the requirements of the environmental assessment and review framework (EARF). The project's environmental process at the subproject level is guided by the EARF, which defines the environmental assessment requirements in accordance with the applicable GOI regulations and ADB's SPS 2009.

5. The IEE includes an environmental management and monitoring plan (EMMP), institutional arrangements, budget, public consultation disclosure, and a grievance redress mechanism (GRM).

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

6. Indonesia's relevant environmental law and regulations focus on managing the environmental impacts of development projects. The legal framework includes:

(i) Law No. 32/2009 concerning environmental protection and management;
(ii) Minister of Environment Regulation No.5/2012 on the screening criteria (i.e., the type/scale/magnitude of activities requiring environmental impact assessment (*Analisa Mengenai Dampak Lingkungan* – AMDAL) (Annex 2);
(iii) Minister of Environment Regulation No.16/2012 on guidance to prepare UKL-UPL;

[1] Indonesia is one of the eight countries selected to receive support from FIP, one of the three sub-programs under Strategic Climate Fund of Climate Investment Funds. ADB, in collaboration with World Bank and IFC, assisted the government in preparing the forest investment plan, which was endorsed in November 2012.

[2] ADB's Environment Assessment Review Framework, project preparatory technical assistance: Community-Focused Investments to Address Deforestation and Forest Degradation. Manila. (PPTA 8660-INO).

(iv) Minister of Environmental Regulation No.17/2012 concerning public participation and information disclosure in AMDAL Process; and
(v) Government Regulation No. 27/2012 on environmental permits.

7. Projects requiring an environmental measure need a UKL or UPL. The UKL or UPL pertains to the management and monitoring efforts conducted by the proponent on activities that have no *significant* impacts on the environment. The UKL or UPL is required to make a decision on the implementation of the business and/or activity. Annex 3 shows a flow chart of Indonesian Environmental Clearance.

8. The environmental document (AMDAL, UKL or UPL, and Environmental Management Statement Letter [SPPL]) is guided by the Minister of Environment Regulation No. 16/2012 in Indonesia.The project proponent must obtain the environmental permit from the appropriate government authority ***before*** implementing the project (Regulation No.27/2012).

9. In accordance with GOI regulation No 5/2012 (Article 4), projects that are exempts from the AMDAL include activities that support the conservation of protected areas, or cultivation with native species within a fixed area (assuming that the said cultivation does not reduce the function of the protected area). Subprojects currently listed under the project do ***not*** require AMDAL because:

(i) The subprojects are small scale and no significant impacts are expected;
(ii) The proposed activities will support conservation and will not reduce the function of the protected areas; and
(iii) The subprojects will require a UKL or UPL.

10. The local environmental management body is responsible at the provincial and at the district level of ensuring compliance of projects with the environmental law. Under the project, UKLs or UPLs will need to be submitted to the provincial or district environmental management body for approval. The environment permit will also be obtained at provincial or dstrict level, depending on whether a single or more than one district boundaries are involved in the proposed activities.

11. Three regulations issued by the Ministry of Forestry support carbon sequestration and REDD+ activities: (1) Regulation No. P.36/*Menhut*-II/2009 regarding License Procedures for Carbon Sequestration and / or Carbon Storage Business in Forest Production and Protection Forests; (2) Regulation No P.68/*Menhut*-II/2008 regarding Implementation of Demonstration Activities for Reducing Carbon Emissions from Deforestation and Forest Degradation; and (3) Regulation No P.30/*Menhut*-II/2009 regarding Procedures for REDD+. These regulations support sustainable forest management, REDD+ procedures and environmental services.

12. West Kalimantan Regulation Number 7/1988 on Management and Conservation of the Environment and West Kalimantan Governor Decree No. 120/1989 on Environmental Quality Standards guide environmental management at the provincial level. The Ministry of Forestry Decree No. SK. 791/Menhut-II/2009 dated December 7, 2009 determines the zoning area in KPHP Model Sintang.

III. DESCRIPTION OF THE PROJECT

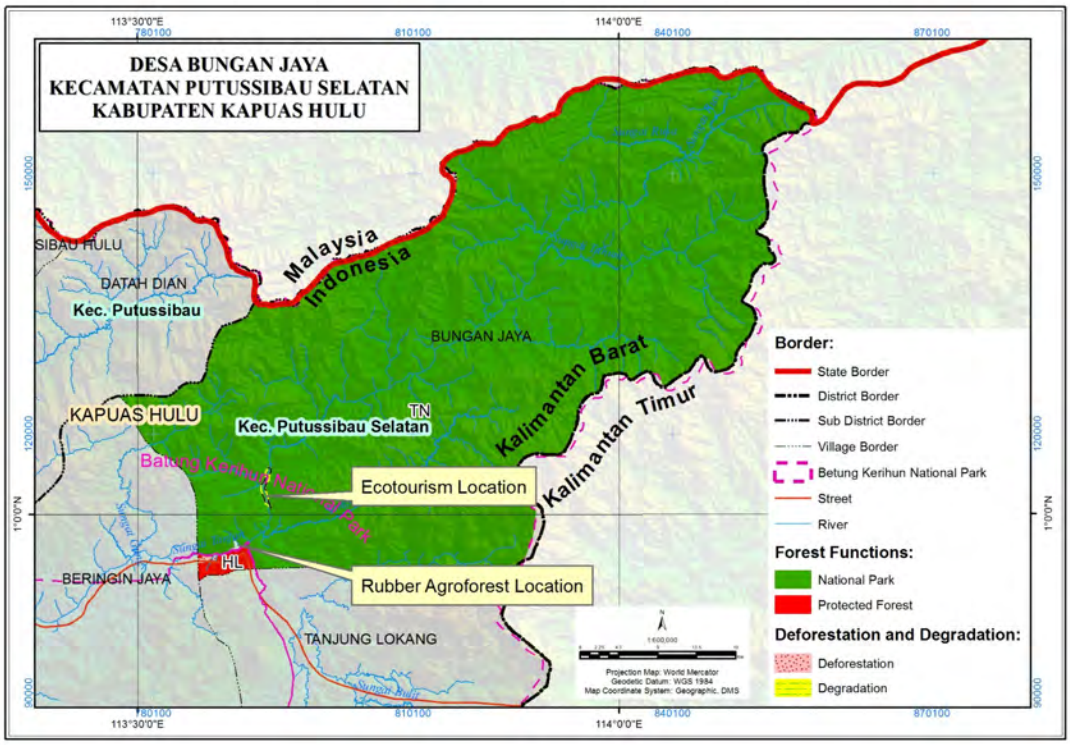
13. The activities of the project will be focused in 13 villages in Kapuas Hulu District and four villages in Sintang District in West Kalimantan province. The Bungan Jaya village in Kapuas

Hulu and Tanjung Sari village in Sintang District were selected for the IEE. Overall, there are two groups of economic activities that will be created through FIP, namely:

(i) Land based cultivation with commercial tree species
(ii) Non-land based economic activities

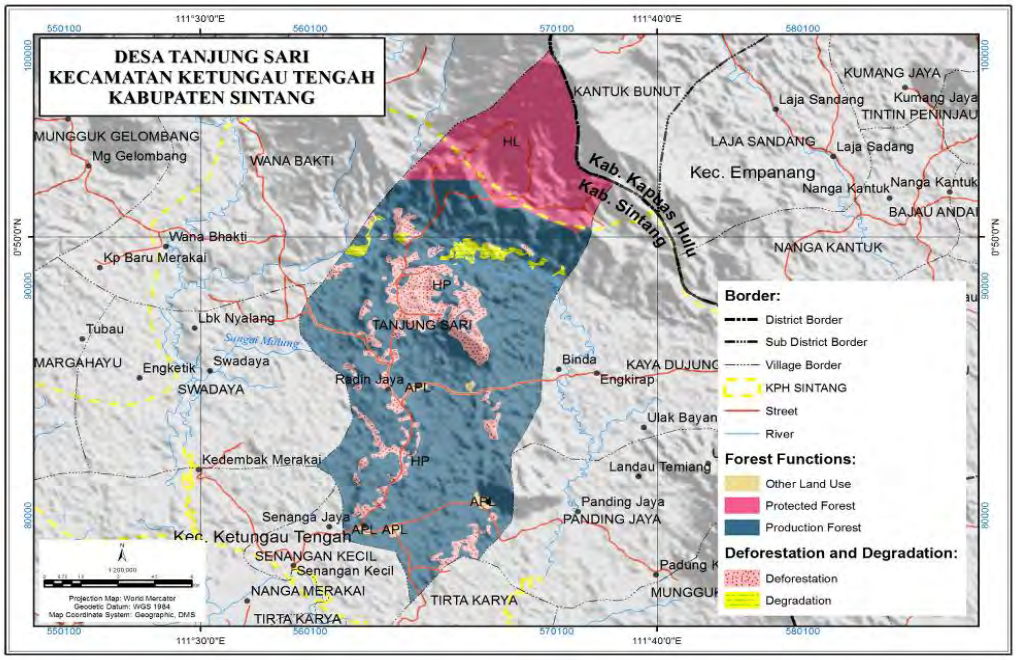
14. There are two different land based cultivation models for commercial tree species designed for REDD+ demonstration activities in Bungan Jaya village, i.e. 50 ha of rubber (*Hevea spp.*) with coffee in agroforestry system, 5 ha of *gaharu* with coffee in agroforestry system. Agroforestry outside the forest area will be along the existing road only based on *SK 733/2014*. The location of those activities is shown in the Figure 1. Non-land based activities include handicraft making and ecotourism.

Figure 1: Bungan Jaya Location Map



15. For Tanjung Sari village, land based cultivation models for commercial tree species will include 110 ha of rubber (*Hevea* spp.) with coffee in an agroforestry system (50 ha inside land categorized as forest, and 60 ha outside land categorized as forest) and 20 ha of gaharu/agar wood (Aquilaria spp.) with coffee in agroforestry (inside forest area). These two agroforestry systems have coffee trees as the buffer cropping. As in Bungan Jaya village, agroforestry outside the forest area will be along the existing road only based on SK 733/2014. The location of those activities is shown in Figure 2. Non-land based activities include beekeeping, fish cultivation and handicrafts.

Figure 2: The Tanjung Sari Location Map



16. In addition, some small-scale infrastructures of the proposed subproject include drinking water facilities (mini reservoir for water), and a road village network (road widening with 2 m wide and total length 2 km within the village).

17. For land-based cultivation, the project will provide the community with seed, fertilizer, pesticide and also other equipment on degraded lands.

18. Agroforestry is practiced for a variety of objectives, which represents an interface between agriculture and forestry and encompasses mixed land-use practices. Theoretically, there are three attributes which all agroforestry systems possess namely:

(i) **Productivity**. Agroforestry systems mostly aim to maintain or increase production of preferred commodities as well as productivity of the land, e.g. through increasing output of tree products, improved yields of associated crops, reduction of cropping system inputs, and increased labor efficiency.

(ii) **Sustainability**. By conserving the production potential of the resource base, mainly through the beneficial effects of woody perennials on soils, agroforestry can achieve and indefinitely maintain conservation and fertility goals.

(iii) **Adoptability**. The improved or new agroforestry technologies that are introduced into new areas should conform to local farming practices.

19. Besides land-based cultivations, ecotourism will be also developed in Kapuas Hulu as a buffer for the Betung Kerihun National Park. Ecotourism development is an important element of the Heart of Borneo (HOB) initiative. The objective is to recognize and protect the value of special natural and cultural places or sites within the HOB area, especially in Bungan Jaya. This community-based ecotourism will provide an alternative to generate income for communities while protecting the natural environment. The nature ecotourism investments will include development of facilities for tourists around the protected area, especially in the village.

20. Beekeeping and fish cultivation will be developed in Tanjung Sari village aside from land-based cultivations.The objective is to recognize and to protect the value of special natural and cultural places or sites within the HOB area, and provide an alternative way to generate income for community while protecting the natural environment especially in Tanjung Sari.

IV. DESCRIPTION OF THE ENVIRONMENT

21. Bungan Jaya village is located in the Kapuas River Water Catchment area, Putusibau Selatan Subdistrict, Kapuas Hulu district (Figure 3). It is close to Betung Kerihun National Park (Figure 4) and shares a boundary with the national park. The village is located in the strategic positions protecting at least one of the two nation nal parks, namely Betung Kerihun and Danau Sentarum.

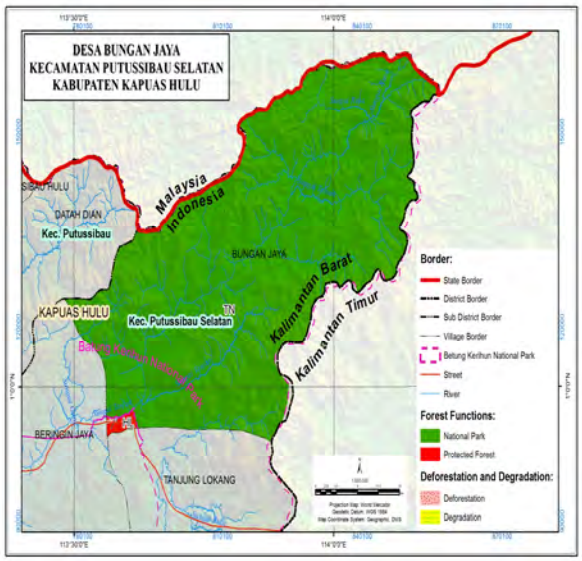


Figure 3: Bungan Jaya Village

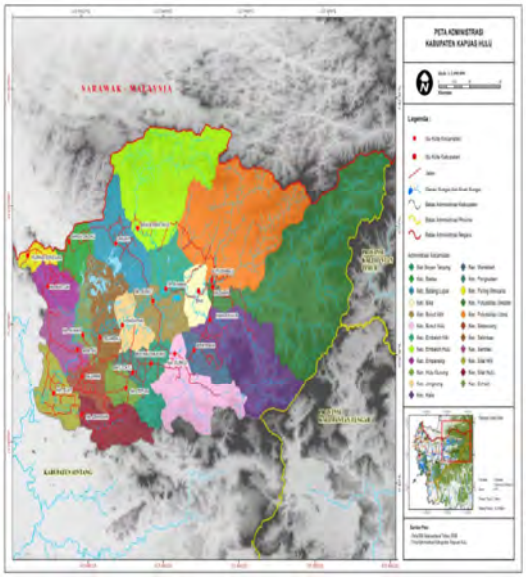
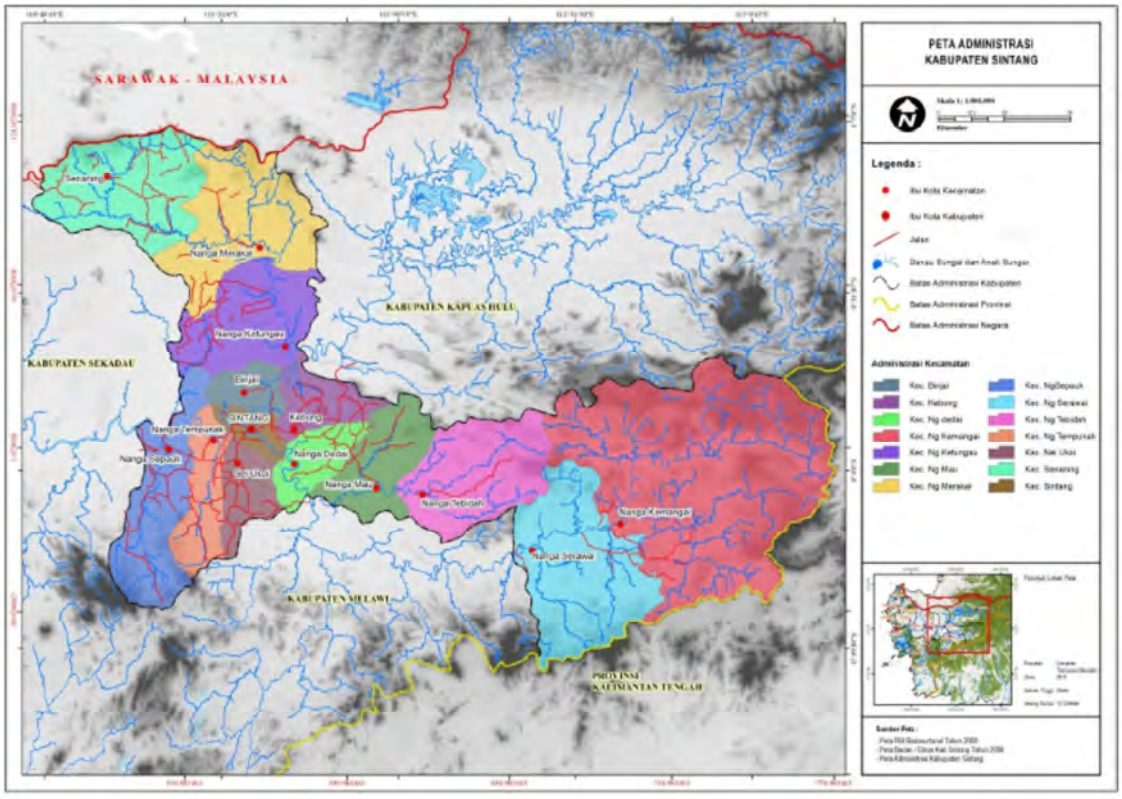


Figure 4. Kapuas Hulu District

22. Tanjung Sari village is located in the northwest head of Sintang district, in the subdistrict of Ketungau Tengah, roughly 17 miles south of the border with Malaysia. The village is accessible via rough roads about a four-hour ride from the district capital city of Sintang and also by speedboat via Kentungau River. The location of Ketungau Tengah subdistrict in Sintang district is shown in Figure 5.

Figure 5: Ketungau Sub District



A. Climate

23. Bungan Jaya's climate is classified as tropical. The average temperature is 25.2°C, with precipitation annual average of 4,088 mm. There is significant rainfall throughout the year; even the driest month still has a lot of rainfall. Precipitation is lowest in July, with an average of 232 mm. Most precipitation falls in December, with an average of 416 mm. The Köppen-Geiger climate classification is Af. With an average temperature of 25.6 °C, May is the hottest month of the year. February is the coldest month, with an average daily temperature of 24.8 °C.

24. Sintang has a tropical climate. The average annual temperature is 26.9 °C and the annual average rainfall is 3,514 mm. The driest month is July, with 204 mm of rainfall. The warmest month of the year is in May, with an average temperature of 27.5 °C. January is the coldest month of the year with 26.3 °C on average.

B. Physical

25. Bungan Jaya is located in the Kapuas Hulu Basin. The topography of Kapuas Hulu Basin encompasses plains, hill and mountainous area, with elevation ranging from 30 – 2000 m above sea level. The upstream of this area is part of the Muller Mountain range and the Kapuas Hulu Mountain range. *Embaloh* Group dominates the geological unit of the area (85%) and the remainder falls under the category of Kapuas Complex, Sintang and Selangkai Stones and Lapung Volcanic. The soils of Kapuas Hulu belong to *Ultisol (Podsolic), Inceptisol (cambisol), Histosol (organosol), Gleysol (Glei humus),* and *Entiso*l (Alluvial). In this village, the soils are black (fertile soils), normally found along the river and upstream. They will produce 'white' (clear) water. This type of soil is called *tulin soil* and *bengkinai* and *meranti* trees are normally

found in fertile soil. In the upstream area, the land use systems are less permanent, are subsistent in nature and rely on less technology.

26. The type of soil in the village of Tanjung Sari is red yellow podsolic, a type of soil that is particularly sensitive to erosion. Its thick soil solum is 90-180 cm, color ranging from red to yellow while texture is sandy loam, structure blocky, consistency loose at the top and firm in the bottom layer, organic matter content is less than 5%. The nutrition content (phosphorus, nitrogen, potassium, calcium, magnesium, sulfur, zinc) is low, soil reaction (pH) is very sour and slightly acidic with pH between 4 to 5.5. Overall, the soil has poor chemical properties and iron toxicity is indicated. The soil fertility is low to moderate.

C. Environmental Resources for Local Population (Biodiversity, Climate Change Issues)

27. Unlike the muddy situation found downstream, water from Bungan is clear and lush vegetation can be seen on both sides of its banks. Ensurai trees thrive along the riverbanks, despite the strong currents, while in the interior of the forest, meranti trees dominate. Local people value trees with high economic potential and ecological value such as *meranti, tengkawang* and *durian*, which has strong roots. *Bayuan, tebelian air, sengkuang, rabug* and *ensura*i are good trees to prevent river bank collapse. *Bungo tree* and *araso grass* are good for landslide prevention. In local perception, erosion and landslide along the river are caused by logging activities in the upstream area and riparian zones and this has resulted in high economic loss.

28. Tanjung Sari is one of several villages in Sintang district, with forest protected for cultural practices by local community (protected area). Local communities are located in hamlet or Dusun Sebara and Dusun Mangerat. In the village, former forestland has been cleared to establish other land use such as crops. Once new crop finishes its production, land is abandoned as bare land where soil is exposed to wind and rain resulting in erosion. In addition, forest loss has affected honey production which is one of the economic activities local population rely on. Many native species are used by Dayak Iban (local tribe) for medicinal purposes. There are 65 kinds of medicinal herbs from 38 plant families. Many come from the family of Zingiberaceae (12.3%), Euphorbiaceae (7.6 %) and Poaceae and most of them are collected from the forest.

29. Rubber tree *(Hevea brasiliensis)* or *"karet"* is one of the most common commodities cultivated by local people in West Kalimantan, specifically in Kapuas Hulu and Sintang districts. This tree initially grew in the Amazon Rainforest. Rubber trees were brought to the botanical gardens at *Buitenzorg*currently known as Bogor, West Java, Indonesia in 1883 and today, most rubber tree plantations are in South and Southeast Asia, including Kalimantan.[3] In West Kalimantan, there are a total of 379,038 ha of rubber tree plantation, distributed in the districts of Bengkayang, Kapuas Hulu, Ketapang, Landak, Melawi, Sambas, Sanggau, Sekadau, Sintang, Kota Pontianak, and Kota Singkawang.[4] A dense, pristine rain forest flourishes in the area.

D. Human and Economic Development

1) Bungan Jaya

[3] http://en.wikipedia.org/wiki/Hevea_brasiliensis. Downloaded 14.02.2015.
[4] Nurhakim, Y.I & Hani, A. (2014). Perkebunan Karet Skala Kecil Cepat Panen. Intra Pustaka. Depok.

30. Bungan Jaya has four hamlets: Nanga Bungan, Nanga Lapung, Aso and Tona Kulan. The communities in this village do not tend to live in typical *Dayak l*onghouses, although they do offer tourists durable homemade woven handicrafts. They also stage traditional dances and music, especially during the gawai, or harvest, in April or May.

31. The *Dayak* sub ethnic group, namely the *Punan (Hovongan*) is predominantly found in the upper Kapuas Basin. They live a traditional nomadic lifestyle however, they became a sedentary community due to the influence of Christian missionaries during the eighteenth century. They do not recognize the long house culture as practiced by other sub-ethnic groups, such as the Iban, Taman and Tamambaloh. In addition to Bungan Java village, the Punan also live in villages, such as Tanjung Lokang, Nanga Enap, Nanga Erak, Sepan, Salin and Belatung. Punan are hunter-gatherers, living in small groups and leader structures are based on seniority and skills.

32. Punan society has a very high level of dependence on natural resources. In this group, farming is not a primary activity; therefore gardening management skills are still relatively simple. The Punan Uheng-keriho which live in Nanga Enap and Nanga Erak have somewhat more advanced agricultural skills due to their interactions with other Dayak groups from downstream, but for *Punan* groups that are still living in the upper river regions, such as in BunganJaya, hunting is a daily job.

33. Bungan Jaya has two elementary schools, and one village clinic (Polindes). There have been some government-funded village development projects from: PNPM (2009 and 2010), WWF (2006 and 2010), and Betung Kerihun National Park (2009). This village has a population of 691 with 109 households. The population density in Kapuas Hulu is equal to 8.10, meaning that for every 1 km in Kapuas Hulu, there are about eight inhabitants. Average population growth in Kapuas Hulu as of 31 October, 2012 was around 2.03%. In Kapuas Hulu, Putussibau Selatan subdistrict is home to a significant number of poor people (14.49% in 2012).

34. Besides hunting, most of the households of Bungan Jaya rely on the collection of birds' nests for their income. Other sources of local income include traditional gold panning, incense wood (*gaharu*) collection, river fishing, non-timber forest product (NTFP) extraction, animal husbandry, dry land agriculture, *rubber* garden, and limited fishponds. Some of the local peoples work as tourist guides and operate motorized longboat. In addition, local residents sell *Dayak* bead handicrafts and *mandau* traditional daggers.

2) Tanjung Sari

35. Ketungau Dayak tribe is one of the sub-Ibanic tribe that are divided into multiple division based on region and genomic imprinting. Ketungau tribe is the inhabitants of Ketungau Tengah, one of sub districts of Sintang district. This ethnic is known as purih (descendants of the native inhabitants of Ketungau group).

36. Agricultural patterns include shifting cultivation for rice and other crops, while for permanent agriculture, it is generally rubber planting. Local population extracts firewood and timber for house construction purposes. The community also markets various sap wood products such as sap of Jelutung and Nyatoh. Other NTFP include honey and cane. Storage of rice, vegetable, fish (aquaculture) exists along with food hunted in the woods.

37. The local communities have been involved in collection of NTFP from forest area for their income. Some NTFPs include: tengkawang (Shorea spp.), collection of natural wild honey, as well as rattan, including rattan fruit jernang (dragon blood) and gaharu

(Aquilariamalaccensis). Hunting, including of orangutans, was common until 10-15 years ago, but ceased due to local extinction of macro fauna.

E. Quality of Life Values

38. Bungan Jaya is located near the confluence of the Kapuas River and its tributary the Bungan River. It is located deeper in the park, and is in the upper limit of Kapuas. It is about a three- to four-hour journey from Nanga Bungan by longboat. Travelers must also take a 10-minute walk along the river's banks and cross a hazardous wooden bridge. During the dry season, boats attempting to travel the rapids can be dashed against the many rocks and boulders visible in the stream. When the river is at its highest, the truck-sized boulders cannot be seen.

39. The location of the settlements in Bungan Jaya has created strong links to land use systems and livelihood options, as well as influencing perceptions and attitudes towards the management of natural resources. Land use patterns also change along the river. In the upstream area, the land use systems are less permanent, are subsistent in nature and rely on less technology. In terms of livelihood options, upstream communities also carry out hunting and gathering activities. These activities provide a higher income but at the same time higher uncertainty. The communities have limited access to market, and higher transportation costs.

40. Source of water in Kapuas Basin are from river, rainfall and springs. Rainwater harvesting systems have been used since antiquity, and examples abound in all the great civilizations throughout history. The main cultivated plants here are pepper, rubber, tobacco, tengkawang, fruits, ginger (*Zingiber officinale*), turmeric (*Curcuma domestica*). The NTFP are rattan, damar (*Shorea sp*), asam kandis (*Garcinia urophylla*), sengkuang (*Dracontomelon dao*).

41. Local livelihood systems are the most direct link between the human population and the watershed natural environment. They comprise the asset, strategies, norms and institution that allow households to make a living and reproduce within a particular natural and political environment. The wide-ranging nature of non-land based activity implies a very wide range and heterogeneity of activities, which make classification quite complex such as handicraft and ecotourism. Handicrafts create employment at low levels of investment that make effective use of local resources and create vertical linkage with communities that supply inputs.

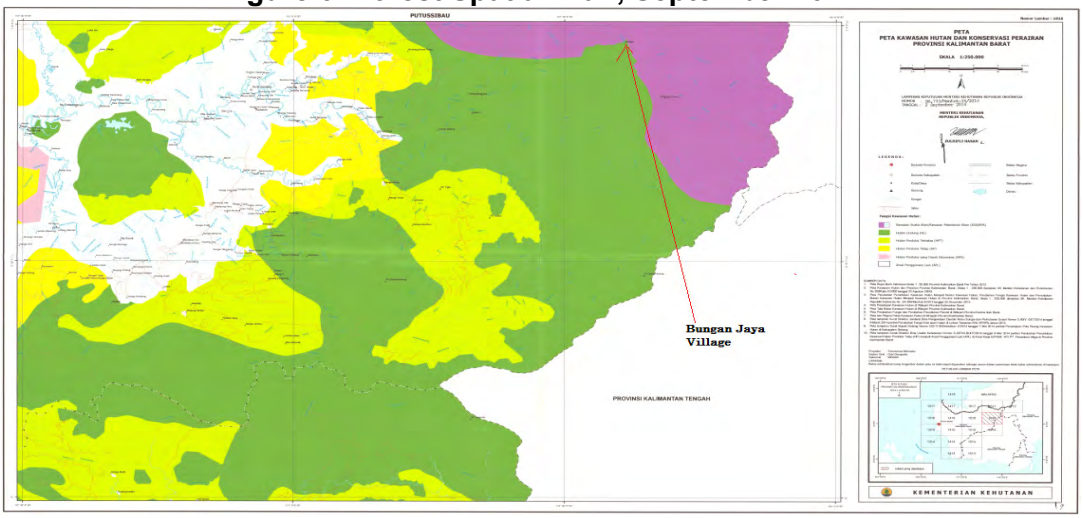
42. Some initial initiatives to promote environmental-friendly enterprises were identified in Tanjung Sari village, such as micro hydropower electricity development, palm sugar production, tengkawang processing, tenun/weaving and ecotourism.

F. Spatial Plan

43. Based on the Forest Spatial Plan *Kabupaten* of Kapuas Hulu (Figure 6) Bungan Jaya village is located in the enclave of protection forest.

44. Based on Ministry of Forestry Letter Decree No. 791/Menhut-II/2009, dated 7 December 2009, the total area of the forest management unit (KPHP) Model Sintang in Kabupaten Sintang is ± 56.893 ha, which consists of protection forest (± 10.420 ha) and production forest (± 46.473 ha). KPHP model Sintang provides responsibility for the implementation of forest management, which includes planning, organizing, implementation of development, control and supervision.

Figure 6: Forest Spatial Plan, September 2011



45. Tanjung Sari village is located in the middle of KPHP Sintang as shown in the KPHP Model Sintang Map (Figure 7). Both the central residential and business area are within the KPHP area. Tanjung Sari villageis not located in the protected forest area based on Forest Spatial Plan Kabupaten Sintang as shown on Figure 8.

Figure 7: KPHP Model Sintang Map

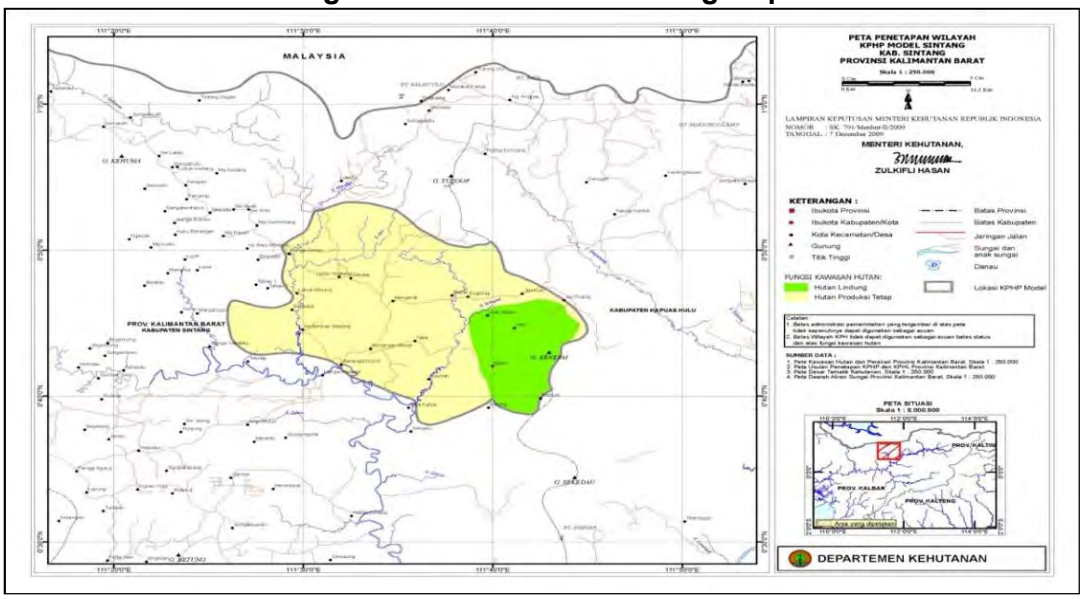
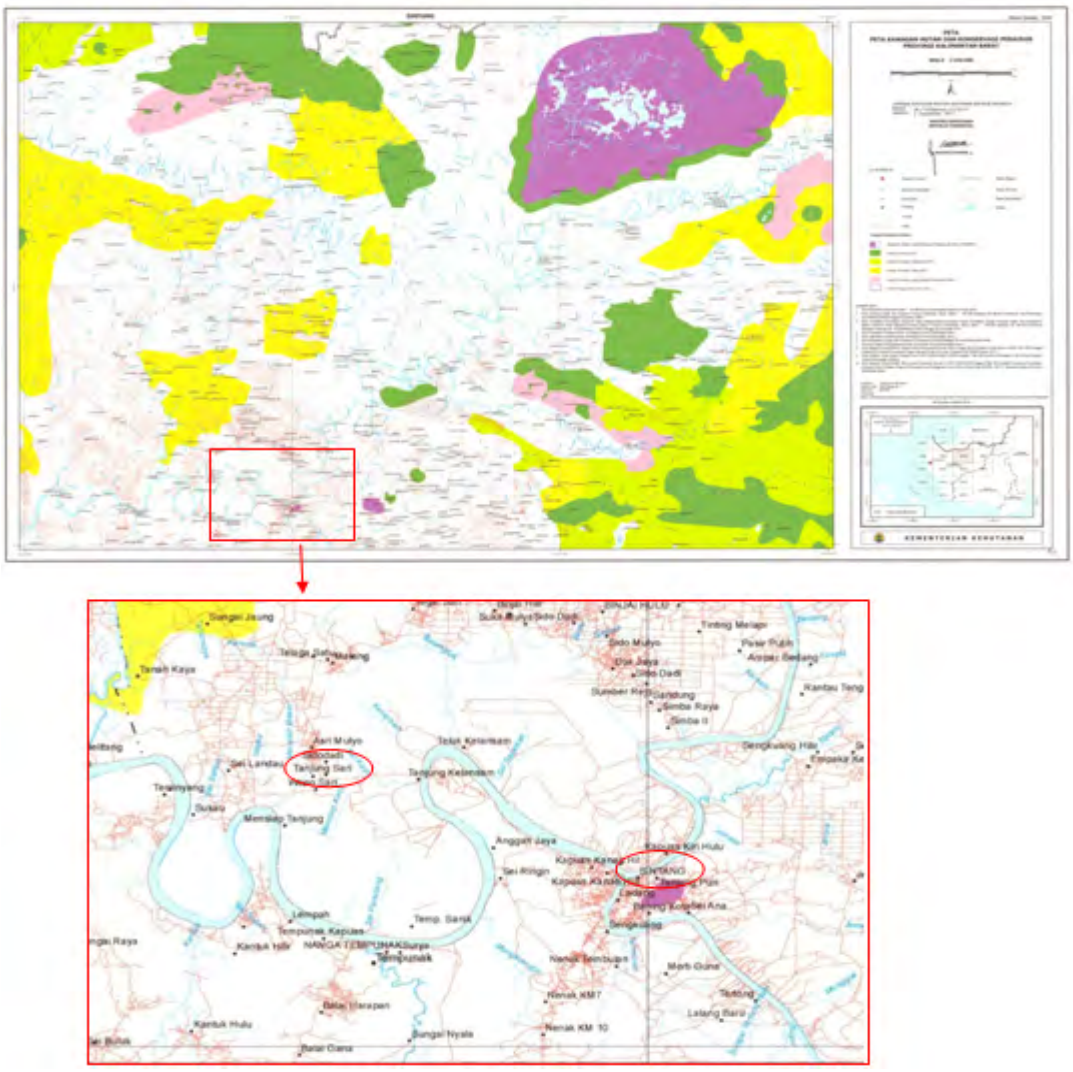


Figure 8: Forest Spatial Plan, Sintang District



V. FORECASTING ENVIRONMENTAL IMPACT AND MITIGATION MEASURES (THE ENVIRONMENTAL MONITORING PLAN)

A. Potential Environment Impacts

46. Potential environmental impacts from the implementation of project activities can be expected from: (i) land-based cultivation such as agroforestry cultivation and gaharu agroforestry, (ii) handicraft (weaving), (iii) eco-tourism, (iv) beekeeping; (v) fish cultivation; and (vi) small-scale infrastructures such as road rehabilitation and water supply system. The social issue is the limited knowledge from the communities to use forest products as raw materials for handicrafts such as weaving which if not done with natural raw materials can cause natural pollution. Specific potential impacts may include:

47. **Construction.** Probably the most significant impact that can occur during construction:

(i) Temporary use of land immediately adjacent to the road for sitting of contractor's yard, asphalt plant mixing plant, and construction camps can reduce air quality and visibility, and/or noise pollution from construction activities, material storage sites, excavations, vehicle and equipment use and asphalt mixing plants.
(ii) Water quality may be affected (water and soil pollution)as a result of improper waste management of construction materials and workers.
(iii) Vegetation in the surrounding area of the construction may be affected by waste.

48. **Operations.**

(i) Inappropriate quality and quantity of road and track networks (Example: roads/tracks do not follow natural contours of the landscape) can make soil erosion.
(ii) Domestic waste from tourism and inappropriate waste disposal and dumping, and increased access to forest recources can have adverse impact on forest (e.g., illegal cutting of trees or poaching of wild animals).
(iii) Over fishing by tourists, unregulated discharge of sewage water, oil leakage from motorboats leads to contamination of waterbodies, and can cause fish decline in inland water bodies.
(iv) Inappropriate disposal of non-biodegradable litter by tourists such as plastic bottles and bags, batteries and aerosol cans can produce soil contamination.
(v) Sometimes pesticide residues are found in the honey thus rendering the product as unqualified for "organic honey" quality standards, which are demanded in the markets. Integrated pest management needs to be practiced in agroforestry systems.
(vi) The negative environmental impact attributed to fish culture has mostly resulted from poor planning, inadequate site selection, inappropriate management procedures (e.g., excessive use of feeds) and lack of attention to environment protection.
(vii) For the operational stage, a potential negative effect is that the reservoirs can become breeding grounds for disease vectors. This holds true especially in tropical areas where mosquitoes (vectors for malaria) and snails (vectors for *Schistosomiasis*) can take advantage of this slow flowing water.

B. Other Issues to Explain the Environmental Impacts That May Occur:

49. As the project location is in protection forest, the project in Bungan Jaya should consider the spatial plan (forest spatial plan, and district/ *kabupaten* spatial plan) in the planning stage. Distribution of planting land not only affects the efficiency of mixed forests but also the habitat of wildlife and the landscape of nature reserves.

50. Other activity in this stage is the selection of trees to plant. Not every introduced species has adverse effects on the environment, but some have a tendency to spread, which is believed to cause damage to the environment, human economy and/or human health.

51. Excessive and continuous application of chemical fertilizers over a long duration will change physical and chemical features of the soil and result in soil hardening and damage, and deteriorate soil quality and reduce productivity

C. The Benefits of Land-Based Cultivation:

(i) Improve air quality by lowering temperatures, filtering dust, and absorbing ozone, carbon monoxide, and by releasing oxygen
(ii) Help counteract the greenhouse effect and global climate change by taking carbon out of the atmosphere and storing it in the form of wood.
(iii) Reduce erosion and causethe soil to recuperate when trees are planted and grown
(iv) Reduce temperature extremes by providing shade and the cooling effects of evapotransporation

Trees are assets that farmers can often use as collateral for obtaining benefit, providing a multitude of by products such as fuel wood and medicines, and performmany environmental functions such as curbing soil erosion, sustaining biodiversity, and sequestering carbon. There will be a significant major source of income for many rural households as well as employment for some smallholders, who dominate tree crop production.

D. The Benefits of Ecotourism:

(i) Enhance and promote the local people's connectivity with the outside people.
(ii) Createsadditional economic income for local people in an area while protecting natural forests.
(iii) Creates job opportunities, infrastructure development and business scope for the local communities. Local people can participate in ecotourism management and operation activities by partnership basis.
(iv) Creates wider markets for local goods and enhance low-cost strategies for local goods and business.
(v) Improves knowledge/data and awareness on the importance of natural resources and local plant and animal distribution and behavior.
(vi) Locals promote the protection of native flora, and wildlife.

VI. INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

A. Environmental Management Plan

52. An adequate selection of the sites to implement the agroforestry systems and fresh water aquaculture activities will help mitigate the potential environmental impacts from project activities. Specific mitigation actions include:

(i) In the early stages of planning, the selection of sites will be consulted with local community to avoid conflict regarding land ownership and compensation. The project area should be consistent with KPHP Model Kapuas Hulu and Sintang and Kabupaten Kapuas Hulu and Sintang Spatial Plans.
(ii) Other impacts can be minimized mainly through careful planning at feasibility and detailed design stages to minimize land problem such as erosion, decline of fertility, etc.
(iii) Project activities will be implemented in degraded lands only.
(iv) Planting trees selection needs to be raised from seeds originating locally and that match well to the local site conditions.

(v) The species mixture has to respect the individual growth characteristics and should be geared to generate synergies in the vegetation cover and improvement of soil quality. Otherwise, the plantation will not bring the expected benefits.
(vi) During implementation good practices to implement agroforestry management should be followed such as use of leguminous cover plants between the rows to assist with nitrogen fixations to enrich organic matter.
(vii) The location and construction offish cultivation ponds site plan should not cause destruction of habitats such as wetlands, lagoons, rivers, inlets, swamps, marshes or high wildlife-use areas.

53. To mitigate the potential impact of chemical fertilizers activities, the use of toxic chemical fertilizer should be avoided. If needed, use of inorganic fertilizer must be already registered and certified under the Indonesia National Standard (SNI). Integrated pest management systems should be followed wherever feasible.

54. To mitigate any potential environmental impact by the use of pesticides**:**

(i) the packing receptacle of the pesticides and fertilizers should be collected and treated centrally, and the containers must not be washed in the river or lake.
(ii) use of toxic chemical pesticides should be avoided. If needed, use of inorganic pesticide must be already registered and certified under the SNI. The application volume and rates should be in accordance with pesticide labeling requirements.

55. Mitigation actions for weaving impact include**:**

(i) Turning to a natural dye source for textiles is a huge step in mitigating toxins in water and the environment. Using plants to create colour is an age-old process, but a process perhaps even more relevant today, and will help deter the runoff off of more toxins into the watershed.
(ii) Surface water pollution is a major issue due to effluent discharge in textile dyeing industry. To try and control the pollution problem, best management practices including housekeeping, to minimize water and chemical use and any residual pollution, should be treated in a sedimentation pond through coagulation processes.
(iii) Monitoring effluents from settling ponds or other waste treatment structures to verify that no further treatment is required.
(iv) Best management practices will be followed to minimize use of chemicals, water and energy during weaving operations.

56. Actions to mitigate road construction and water supply reservoir construction impact:

(i) For construction of camp site, camp size should be kept to a minimum. Require that crew preserve as much vegetation as possible, e.g., by creating defined footpaths and provide temporary sanitation on site, e.g., pit latrine
(ii) Set guidelines prohibiting poaching and collection of plants or wood with meaningful consequences for violation (such as termination of employment).
(iii) Adhere to district specifications for road design and maintenance that will ensure proper drainage.
(iv) Emissions from all the construction activities including transportation activities are kept to an absolute minimum through the use of efficient equipment and through good management and maintenance activities, and any emissions shall

not exceed the values stated in the applicable Laws (Refer specifically to Government Regulation (Peraturan Pemerintah) No.41 Year 1999 regarding Air Pollution Control).

(v) Any damaging liquid or solid contaminant, such as hydraulic or lubricating oils, dropped or spilled upon any portion of the site work and adjacent environment, base camp, or haul route shall be cleaned up immediately in order to avoid contamination of water and soil.

(vi) Washing of equipment shall only be permitted in specially designated and equipped areas and shall not be permitted in any existing water courses.

(vii) Necessary precautions have to be taken to minimize the amount of noise and vibrations coming from construction and transportation activities, by all vehicles and equipment, through the use of modern vehicles and equipment and through good management and maintenance. Noise and vibration levels from construction activities have to be in accordance to applicable Laws. (Refer specifically to Decree of Minister of Environment No.48 Year 1996 regarding Noise Level Standard and Decree of Minister of Environment No 49 year 1996 regarding Level of Vibration).

(viii) Activities shall: (i) comply with all applicable safety regulations (Refer specifically to Law No. 1 Year 1970 regarding Work Safety and Law No. 12 Year 1999 regarding Fire Safety in work sites); (ii) take care for the safety of all persons entitled to be on the Site; and (iii) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land.

57. The strategies to mitigate any impact from the implementation of ecotourism include:

(i) Follow the mitigation activities for construction mentioned earlier, if any small infrastructure is built.

(ii) Development of management plan including the calculation of the carrying capacity of the ecosystem to avoid degradation

(iii) Raising awareness activities for tourist on how to behave when in the area regarding the extraction of plants and animals and waste management.

(iv) The ecotourism must ensure social, economic and environmental benefits for the local people, and consider strategies for managing facilities for maintaining environmental sustainability (e.g., energy, water, waste, etc).

58. To mitigate the potential environmental impacts from fish cultivation**:**

(i) Incorporate the applicable best management practices into the siting, design and operation of an aquaculture facility;

(ii) Locate ponds in sites where they will not cause destruction of habitats such as wetlands, lagoons, rivers, inlets, swamps, marshes or high wildlife-use areas;

(iii) For constructing ponds, line bottoms and sides of ponds with impervious matter in order to prevent seepage into surrounding soils and groundwater;

(iv) Treat effluents in setting with filter feeders and constructed the freshwater ponds with the wetland before discharge; and

(v) Use of best management practices for feed operations to minimize water pollution.

B. Environmental Monitoring Plan

59. A program of environmental monitoring will be formulated to ensure that all parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. During construction, environmental monitoring will be conducted to ensure the protection of landslide, side slopes, embankment from potential soil erosion, water pollution, air pollution, sitting of work sites and material storages, sitting of asphalt plants, preservation of religiously sensitive locations, community relations, and safety provisions.

60. During operation, surface water quality monitoring, land use changes, seeds quality, pesticide use, ecotourism management of subproject activities will be important parameters of the monitoring program. Other monitoring activities include:

(i) Inspection checklists will be prepared to inspect facilities for proper environmental mitigation activities during both construction and operational phases.
(ii) The pH, turbidity and total suspended solids will be monitored in area streams adjacent to project interventions, one for baseline prior to activities, once during construction and during every semester following construction.
(iii) The environmental monitoring period is every semester, and the environmental monitoring report will be submitted to environmental agency in Kapuas Hulu by PISU and to be disclosed to the project stakeholders. ADB will receive these reports as requested but they will be included in the quarterly reports to ADB from the project executing agency.

C. Institutional Arrangements for Environmental Management and Monitoring

61. Most of mitigation activities during construction stage arethe responsibility of the PISU. The environmental specialist of the project will be in charge of making sure that activities will comply with environmental safeguards and that guidelines for mitigation of potential impacts are being followed during implementation. The environmental specialist will also be in charge of the monitoring during the implementation of the activities. Monitoring reports will be prepared every six months. The PISU shall also undertake establishment of ambient baseline data (air quality and noise, water quality, etc.) before site works and ambient monitoring during constructionbased on the environmental monitoring plan. The mitigation requirements will be included as part of the contractor’s agreement. The environment specialist will coordinate with districts environmental unit in obtaining necessary environmental permits for project interventions in accordance with environment assessment and review framework.

62. **Compliance Monitoring**

(i) ADB will monitor the compliance of the environmental assessment with the environmental provisions in the grant agreement by (i) reviewing regular progress reports, and (ii) by periodic supervision missions;
(ii) The Ministry of Environment and Forestry (MOEF) of GOI, as the principal environmental regulator will monitor implementation by the Project of any conditions imposed on construction through the Indonesian environmental approval system;
(iii) The environmental specialist will: (i) obtain necessary environmental clearances (ii) undertake internal quality control procedures, (ii) conduct site inspections, and

(iii) directly supervise contractors and workers, in order to implement appropriate health, safety and environment ractices on site and initiate corrective actions for non-compliance.

(iv) The PISU with assistance from the consultants will monitor the work of the contractors responsible for the physical works, which will include health, safety nd environment monitoring in accordance with national and local occupational and health safety standards.

63. **Reporting.** PISU shall submit the following environmental reporting documentation to ADB:

(i) Baseline monitoring reportshall be submitted to ADB prior to commencement of civil works, baseline environmental data (including data collection locations, parameters), relevant standards and data collection responsibilities.

(ii) Environmental monitoring reports will include environmental mitigation measures undertaken, environmental monitoring activities undertaken, details of monitoring data collected, analysis of monitoring results, recommended mitigation measures, environmental training conducted, and environmental regulatory violations. The environmental monitoring reports will be submitted to ADB twice annually during the construction period and annually for three years after completion of construction.

(iii) Project completion environmental monitoring reportwhich will summarize the overall implementation of the EMP will be submitted to ADB three years after completion of construction.

(iv) The anticipated environmental impacts and mitigation measures discussed in the previous section is presented inTable 1.The table also shows allocated responsibilities for implementing the mitigation measure and for the conduct of monitoring activities.

Table 1: Environment Mitigation and Monitoring Plan

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
Design and Location / Pre construction / Precultivation Phase					
Survey and design including improvement options of subproject activities and location	➢ There is no or limited direct impact. However, change in subproject's design especially activities and location options and scales may result in changing the scope or scale of environmental impacts	Entire project area in Bungan Jaya and Tanjung Sari Villages	➢ Conduct the Consultation with stakeholders to select appropriate location, design with minimal negative impacts ➢ Coordinate with other related implementation programs in the project area; follow the construction standards and guidelines	➢ Entire subproject design including activities, location and mode of implementation ➢ Monitoring in every semester during preconstruction	PISU, FMU, local community
Preparation of subproject detailed design and bidding	➢ There is no direct impact. However, exclusion of environmental management and mitigation measures during contracting and construction may lead to increase impact scale and significance	Entire project area in Bungan Jaya and Tanjung Sari Villages	➢ Incorporation of all mitigation measures into the subproject detailed design as well as contract/bidding	➢ Ensuring that detailed design as well as contract/bidding completed with the Environmental Management and Monitoring Specification ➢ Monitoring in every semester during preconstruction	PISU/ Procurement officer
Establishment of agroforestry systems and fish cultivation site selection	➢ Detrimental to regional biodiversity and integrity. Distribution of planting land not only affects the efficiency of mixed forests but also the habitat of wildlife and the landscape of nature reserves	Plantation areas and areas where fresh water aquaculture will be established	➢ Project activities will be implemented in degraded lands only. ➢ Locate ponds in sites where they will not cause destruction of habitats such as wetlands, lagoons, rivers, inlets, swamps, marshes or high wildlife-use areas.	➢ The land type of project location ➢ Monitoring in every semester during preconstruction	PISU, FMU, local community
Planting material selection	➢ Invasive species proliferation	Plantation areas and areas where fresh water aquaculture will be established	➢ Planting material selection needs to be raised from seeds originating locally and that match well to the local site conditions.	➢ The local originally seeds ➢ The quality of seeds ➢ Monitoring in every Semester during preconstruction	PISU, FMU, local community
Fish cultivation species selection	➢ Introduction of exotic species	Freshwater aquaculture area in Tanjung Sari village	➢ Freshwater aquaculture species selection should be based on local species that matches well the local site conditions.	➢ Ensuring that aquaculture species are selected ➢ Monitoring in every Semester	PISU, FMU

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
Construction Phase					
Road improvement/new road construction and water supply reservoir construction	➢ Soil erosion ➢ Water quality degradation through poor road construction and reservoir construction practices and maintenance	Road construction and reservoir construction in Bungan Jayaand Tanjung Sari	➢ For construction of camp site, require that crew preserve as much vegetation as possible, e.g., by creating defined footpaths and provide temporary sanitation on site, e.g., pit latrine, the contents of which should be disposed in an environmentally appropriate manner.	➢ Incorporation of all mitigation measures into the subproject detailed design as well as contract/bidding and also during implementation ➢ The Contractor shall ensure that polluting effluent shall not exceed the values stated in the prescribed applicable laws (*Refer specifically to Government Regulation (Peraturan Pemerintah) No.82 Year 2001 regarding Water Quality Management and Water Pollution Control).* ➢ Noise and vibration levels in accordance with the applicable Laws. *(Refer specifically to Decree of Minister of Environment No.48 Year 1996 regarding Noise Level Standard and Decree of Minister of Environment No 49 year 1996 regarding Level of Vibration.)* ➢ Comply with all applicable safety regulations *(Refer specifically to Law No. 1 Year 1970 regarding Work Safety and Law No. 12 Year 1999 regarding Fire Safety in work sites);* ➢ Monitoring in every semester during construction	PISU, FMU, contractors
	➢ Damage of local habitat, compact soil and create erosion through building of construction camps, ➢ Contaminate surface water and spread disease via solid waste and feces generated by camps ➢ Deplete local fauna and flora (during land clearing and fuel wood) via poaching and collection by construction crews ➢ Noise and vibrations coming from construction and transportation activities, ➢ Human health and safety ➢ Impact to fauna and flora during construction and water pollution to area .		➢ Set guidelines prohibiting poaching and collection of plants/wood with meaningful consequences for violation such as termination of employment. ➢ Adhere to specifications for road design and maintenance that keep water off road surfaces. ➢ The contractor shall ensure that emissions from all the Contractor's activities including transportation activities are kept to an absolute minimum through use of well-maintained equipment and through good operational management and maintenance, and any emissions shall not exceed the values stated in the applicable Laws (Refer specifically to Government Regulation (*Peraturan Pemerintah) No.41 Year 1999* regarding Air Pollution Control) ➢ Any damaging liquid or solid contaminant, such as hydraulic or lubricating oils, dropped or		PISU, FMU, contractors

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
			spilled upon any portion of the site work and adjacent environment, base camp, or haul route shall be cleaned up immediately by the contactor in order to avoid contamination of water and soil. The engineer must approve the completion of the cleanup. ➢ Washing of contractor's vehicles and equipment shall only be permitted in specially designated areas and shall not be permitted near in any existing water courses. ➢ The contractor shall take all necessary precautions to minimize the amount of noise and vibrations coming from construction and transportation activities, by all vehicles and equipment, through the use of well-maintainedvehicles and equipment and through good operational management and maintenance. The contractor shall ensure that all noise and vibration levels from all the Contractors Activities are in accordance with the applicable Laws. *(Refer specifically to Decree of Minister of Environment No.48 Year 1996 regarding Noise Level Standard and Decree of Minister of Environment No 49 year 1996 regarding Level of Vibration.)*		

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
			➢ The contractor shall: (i) comply with all applicable safety regulations *(Refer specifically to Law No. 1 Year 1970 regarding Work Safety and Law No. 12 Year 1999 regarding Fire Safety in work sites);* (ii) take care for the safety of all persons entitled to be on the Site; and (iii) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land ➢ Contractor shall use legal wood when they need the wood material for the construction work.		
Operation / cultivation Phase					
Use of fertilizer	➢ Excessive use of chemical fertilizers, ➢ Inappropriate application methods and wrong proportions result in the seepage of chemicals into underground aquifers as well as loss through surface runoff and rainwater discharge. ➢ change physical and chemical features of the soil and result in soil hardening and damage, ➢ Deteriorate soil quality and reduce productivity.	Plantation areas in Bungan Jaya and Tanjung Sari	➢ Use organic fertilizers ➢ Avoid toxic chemical fertilizer. ➢ If needed, use of inorganic fertilizer must be registered and certified under the Indonesia National Standard (SNI). ➢ Follow integrated pest management and pesticides/fertilizer labeling requirements.	➢ Fertilizer used (registered and certified under the SNI. ➢ Monitoring in every Semester during operation	PISU, FMU, community

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
Plant diseases and insect pests control/pesticides	➢ The application of pesticides can kill the natural predator of harmful insects, and biodiversity decline and the unbalance in species, pollute water supplies and soil, endanger the health of the residents, livestock, crops, and wild animals, directly or indirectly.	Plantation areas in Bungan Jaya and Tanjung Sari villages	➢ if needed, plant diseases and insect pests control/pesticides should use precaution and microbiological processes. ➢ The packing receptacle of the pesticides and fertilizers should be collected and treated centrally, and also the container must be forbidden to wash in the river or lake. ➢ Avoid use of toxic chemical pesticide. If needed, use of inorganic pesticide must be registered and certified under the SNI.	➢ Pesticides used (registered and certified under the SNI. ➢ Monitoring in every semester during operation	PISU, FMU, local community
Handicraft (weaving)	➢ The large volumes of wastewater generated may contain a wide variety of chemicals, used throughout processing.	Weaving activities in Bungan Jaya and Tanjung Sari villages	➢ Advocate use of natural dye source ➢ Introduce the sustainable nature dye into the weaving to the local community	➢ Implementation on used natural dye ➢ The implementation of waste water treatment plant ➢ Monitoring in every semester during operation	PISU, FMU, local community
Fish cultivation	➢ Adverse effects associated with aquaculture include habitat destruction, discharge of effluents containing high concentrations of organic matter (in aquaculture operations) ➢ Introduction of exotics, which may alter the diversity of the natural flora and fauna.	Aquaculture activity in Tanjung Sari village	➢ Provisions are made to incorporate the applicable best management practices into the location, design and operation of an aquaculture facility. ➢ Locate ponds in sites where they will not cause destruction of habitats such as wetlands, lagoons, rivers, inlets, swamps, marshes or high wildlife-use areas. ➢ The site should have good soil, preferably clay-loam or sandy clay, that will retain water and be suitable for building dikes.	➢ Implementation of management practices into the siting, design and operation of an aquaculture facility. ➢ Follow best practices for aquaculture feed and waste management ➢ Monitoring in every Semester during operation phase	PISU, FMU, local community

Key Activities (likely to cause negative impacts)	Potential Impacts and/or Risk	Location	Mitigation and/or Enhancement Measures	Monitoring	Responsible Institution
			➢ Alkaline soils (with pH of 7 and above) are preferable to avoid problems resulting from acid-sulfate soils such as poor fertilizer response, low natural food production and slow growth of cultured species and probable fish kills. ➢ Acid and organic soils (high in humus or compost) are not suitable.		

D. Staff Requirement and Budget

64. The EA will hire an environmental safeguards specialist two social safeguards specialists and a safeguards information system specialist as part of PISU. The specialists will be accountable for implementing the EARF. The total budget for environmental management is estimated at Rp. 2.9 billion. The budget includes costs associated with environmental safeguards specialists, preparation of the UKL or UPL or SPPL documents, environmental permits, environmental monitoring (including field trips, auditing, and lab fees), development and implementation of environmental management plan (EMP) including costs for monitoring and mitigation during pre-construction, construction and operation phases, and training.

Table 2: Budget for Environmental Activities

Item	Unit Costs	Total Amount (Rp)
1. National Environmental Safeguards Specialist	Rp. 18 million /month for 30 months	540,000,000
2. National Safeguards Information System Specialist	Rp. 18 million/ month for 30 months	540,000,000
3. UKL or UPL and/or SPPL preparation *(and additions related to IEE requirements)*	Rp. 400 million per district x 2 districts	800,000,000
4. Budget for EMP, including monitoring and mitigation measures	Details to be elaborated during implementation	600,000,000
5. Training and Workshops on environmental management	For project staff and communities	200,000,000
6. Environmental Permit	Rp. 10 million per district x 2 districts	20,000,000
7. Water, soil, & air quality monitoring (tests)*	Rp. 50 million per monitoring (twice a year for 2 years)	200,000,000
TOTAL (IDR)		2,900,000,000

Notes:
*Monitoring is funded for only two years by the project
Travel costs are included in operational cost. Environmental assessment cost in the budget includes activities 3, 6 and 7 in the table.

VII. PUBLIC CONSULTATION AND DISCLOSURE

65. The public consultation concerning Community-Focused Investments to Address Deforestation and Forest Degradation has been undertaken several times in November and December 2014. Public consultation has been undertaken several times in Kapuas Hulu district especially for Bungan Jaya village. A public consultation in Putussibau in early April 2015 was attended by the FMU, head of Putussibau Selatan sub district and the officer of Bappeda of Kapuas Hulu district. Most of the participants agreed to welcome this project in these villages, but further investigation is required to ascertain the livelihood outcomes most appropriate to the community.

66. The public consultation in Sintang district was held on 7 April 2015 and was attended by the head of each village and some community members in Sintang. Most of the public consultation participants agreed to implement this project in their villages. An additional livelihood improvement was included during the meeting on 29 March 2015, that is the equipment for post-harvest traditional processing technology such as coffee processing (drying, soaking and processing) and seed for horticulture (home gardening).

67. Households or groups of households wishing to complain about the effects of construction works on their property, production system, economic well-being, spiritual life, quality of surface and ground water, quality of air, health, safety, welfare, or any other aspect of their lives shall make their complaint using the standard complaint form provided by the grievance redress mechanism.

68. **Information disclosure**. PISU shall be responsible for ensuring that all environmental assessment documentsand environmental monitoring reports are properly and systematically kept as part of theproject record. PISU shall make these documents available in a form, language and at a location in which can be easily accessed by stakeholders.

VIII. GRIEVANCE REDRESS MECHANISM

A. The Grievance Redress Framework

69. The grievance redress mechanism (GRM) is designed for people seeking satisfactory resolution of their complaints regarding the environmental performance of the project. The mechanism will ensure that (i) the basic rights and interests of every effected people are protected; and (ii) their concerns arising during the phases of design, construction and operation activities are effectively and timely addressed.

70. The PISU, the province and the regency concerned will make the public aware of the GRM through public awareness campaigns, training and capacity building. Each office will nominate and train one of their staff to be a grievance point person (GPP) for environment related issues. Any person who has complaints regarding the environmental performance of the subproject during pre-construction, construction and operation phases shall have access to the GRM described in the subsequent section.

71. The GPP will ensure that: (i) the GRM and the contact details of the GPPs are publicly disclosed, and posted in the offices of the affected communes and in strategic places of the subproject's area of influence; (ii) the GRM is accessible to all affected communities; (iii) the public, especially the residents and passers-by in the vicinities of influence of the subproject, are aware of their rights to access, and shall have access to, the mechanism free of administrative and legal charges; and (iv) a registry of grievances received is maintained for reporting to ADB and higher government authorities on associated follow-up, resolution or non-resolution of issues.

72. Based on ADB's requirements, the following will be posted on ADB website:

(i) The final IEE, upon receipt;
(ii) A new or updated IEE, if prepared, reflecting significant changes in the project during design or implementation;
(iii) Corrective action plan prepared during project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and
(iv) Environmental monitoring reports.

B. The Time Frame and Mechanisms to Resolve Complaints

73. The grievance redress unit (GRU) will follow up the grievances with the PISU. Following these discussions and agreement a letter of closure will be issued. Activities include undertaking

capacity building sessions in the regular monthly meetings with the local facilitators and following the joint inspection conduct with the contractors and PISU to verify the grievances.

74. **Follow up grievances**.The GRU team will verify new submitted grievances and follow up grievances which have not been resolved by the PISU. The team will also cooperate with the local facilitators and affected people based on the GRM. Following these discussions and agreements, Letters of Agreement and Closure will be issued.

75. **Local facilitator - regular coordination meeting.** The coordination meeting with the local facilitators aims to strengthen the relationship between the local facilitators and the PISU and also to submit monthly reports related to new grievances, Letters of Agreement, Letters of Closure, and construction reports in each activity with potential to create new grievances. In the coordination meeting the GRU will provide a session to strengthen the capacity of the local facilitators in performing their duties and functions. This meeting will also invite contractors, supervising staff and the PISU to share information on the project development and also their experience in handling grievances.

76. **Findings.** Since the GRM was shared within the affected communities and with other key stakeholder, all findings will be verified through the joint inspection, local facilitators' site visits and PISU supervision activities and will be registered in the grievance logbook.

77. **Update outstanding grievances status**. GRU will also follow up some outstanding grievances registered through the GRM. The mechanism helps the GRU to immediately respond and follow up grievances appropriately. With assistance from stakeholders, the outstanding grievances will be updated each month. The suggestion form is shown in **Table 3.** The environmental impact related GRM will be integrated with the project's overall GRM mechanism.

Table 3: Form of Updated Outstanding Grievances Status

No.	Log Complaint No.	Complainant	Location	Follow Up	Status*
					Note: GRU only use three types of status in order to simplify the grievance progress.* *Reported:*Grievance had been verified through fact-finding or inspection which cooperated with related parties, and reported to PISU, and or responsible parties *In Progress:*A reported grievance has been handled by responsible parties to be in process of resolution and it has been agreed through Letter of Agreement; and the work of agreement is executing or would be executed immediately. *Closed:*The resolution of the work of agreement had been done. This condition is supported with Letter of Closure that acknowledged by related parties especially the complainant.

IX. CONSERVATION OF PHYSICAL AND CULTURAL RESOURCES

78. The environmental assessment team will conserve physical and cultural resources and avoid damaging them during field survey's and other investigations by employing qualified and experienced experts. Best practice chance find procedures will be instituted for materials that may be discovered during project implementation.

X. FINDINGS, CONSULTATION, AND RECOMMENDATIONS

79. The project will generate positive environmental impacts and provide sources of income for some households. However, some of the project activities may generate localized, manageable negative environmental impacts. These impacts have been identified along with appropriate measures to prevent or mitigate them.

80. All project activities that will be defined during implementation will be subject to review for environmental impact during the planning stage and further, if and as required during detailed design, construction and operation.

81. There are no significant negative environmental impacts anticipated in the two subprojects. A screening process has been designed to identify minor negative impacts and a standard operating procedure will be put in place to successfully implement the environmental mitigation and monitoring.

82. Based on this IEE, a full AMDAL is not considered necessary and this document is therefore a complete and final environmental assessment. The IEE document will be processed to obtain the Environmental Permit (based on Government Regulation No. 27/2012 on Environmental Permits).

FORESTRY

Annex 1: REA Checklist for Bungan Jaya
Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (SDES) for endorsement by Director, SDES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	Indonesia/Community-Focused Investment to Address Deforestation and Forest Degradation
Sector Division:	Bungan Jaya

Screening Questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?		v	
Cultural heritage site		v	
Protected area	v		Based on the Forest Spatial Plan, 2014 that Bungan Jaya Village is located as an enclave in Protection Forest.
Wetland		v	
Mangrove		v	
Estuarine		v	
Buffer zone of protected area		v	The location is adjacent to the river Kapuas
Special area for protecting biodiversity		v	Bungan Jaya village is located close with Betung Kerihun National Park
B. Potential environmental impactswill the project cause…			
Increase in soil erosion and siltation?		v	
Increase in peak and flood flows?		v	
Loss of downstream beneficial uses (water supply or fisheries)?		v	
Impairment of ecological and recreational opportunities?		v	
Impairment of beneficial uses of traditional forests?		v	
Any loss of precious ecology?		v	
Possible conflicts with established management policies?		v	
Dislocation or involuntary resettlement of people?		v	

Screening Questions	Yes	No	Remarks
Loss of downstream ecological and economic functions due to any construction of social infrastructure (e.g., road, training or information center, office or housing)?		v	This location adjacent of Kapuas river.
Displacement of people or reduce their access to forest resources?		v	
Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?		v	
Uncontrolled in-migration, including the influx of workers and their followers, with opening of roads to forest area and overloading of social infrastructure?		v	
Unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species?		v	Project activities will not take place in natural forest.
Technology or land use modification that may change present social and economic activities?		v	
Ecological problems as well as community health and safety hazards due to land clearance prior to reforestation (e.g. soil erosion, disruption of hydrological cycle, loss of nutrients, and decline in soil fertility)?		v	
Other ecological problems as well as community health and safety hazards (e.g., pollution of water bodies from fertilizers, pesticides, and herbicides used in the plantation)?		v	
Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?		v	
Social problems and conflicts related to land tenure and resource use rights?		v	The project plan includes public consultations as well as it promotes the planning program which considers the land tenure and spatial plan
Social conflicts if workers from other regions or countries are hired?		v	Most labor is provided by the own participated household members, particularly for the establishment of agro forest in bare lands belonging to the people.
Risks to community health and safety due to the transport, storage and/or disposal of materials such as explosives, fuel, pesticide and other chemicals during construction and operation?		v	

FORESTRY

ANNEX 2: REA Checklist for Tanjung Sari District Project
Rapid Environmental Assessment (REA) Checklist

Country/Project Title: Indonesian/ Community-Focused Investment to Address Deforestation and Forest Degradation

Sector Division: Tanjung Sari

Screening Questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		v	
▪ Protected area		v	
▪ Wetland		v	
▪ Mangrove		v	
▪ Estuarine		v	
▪ Buffer zone of protected area		v	The location is adjacent to the Kapuas River.
▪ Special area for protecting biodiversity		v	
B. Potential environmental impacts Will the project cause…			
▪ Increase in soil erosion and siltation?		v	
▪ Increase in peak and flood flows?		v	
▪ Loss of downstream beneficial uses (water supply or fisheries)?		v	
▪ Impairment of ecological and recreational opportunities?		v	
▪ Impairment of beneficial uses of traditional forests?		v	
▪ Any loss of precious ecology?		v	
▪ Possible conflicts with established management policies?		v	
▪ Dislocation or involuntary resettlement of people?		v	
▪ Loss of downstream ecological and economic functions due to any construction of social infrastructure (e.g., road, training or informationcenter, office or housing)?		v	
▪ Displacement of people or reduce their access to forest resources?		v	
▪ Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		v	
▪ Uncontrolled in-migration, including the influx of workers and their followers, with opening of roads to forest area and overloading of social infrastructure?		v	

Screening Questions	Yes	No	Remarks
▪ Unnecessary loss of ecological value and decreased biodiversity by replacement of natural forest with plantation with limited number of species?		v	This project activities are not in the natural forest
▪ Technology or land use modification that may change present social and economic activities?		v	
▪ Ecological problems as well as community health and safety hazards due to land clearance prior to reforestation (e.g., soil erosion, disruption of hydrological cycle, loss of nutrients, and decline in soil fertility)?		v	
▪ Other ecological problems as well as community health and safety hazards (e.g., pollution of water bodies from fertilizers, pesticides, and herbicides used in the plantation)?		v	
▪ Dangers to a safe and healthy working environment due to physical, chemical and biological hazards during project construction and operation?		v	
▪ Social problems and conflicts related to land tenure and resource use rights?		v	The project plan includes public consultations as well as it promotes the planning program which considers the land tenure and spatial plan
▪ Social conflicts if workers from other regions or countries are hired?		v	Most labor is provided by the own participated household members, particularly for the establishment of agro forest in bare lands belonging to the people.
▪ Risks to community health and safety due to the transport, storage and/or disposal of materials such as explosives, fuel, pesticide and other chemicals during construction and operation?		v	

A Checklist for Preliminary Climate Risk Screening
Country/Project Title: INO:Community-Focused Investments to Address Deforestation and Forest Degradation

Sector:
Subsector:
Division/Department:

Screening Questions		Score	Remarks[5]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): Low

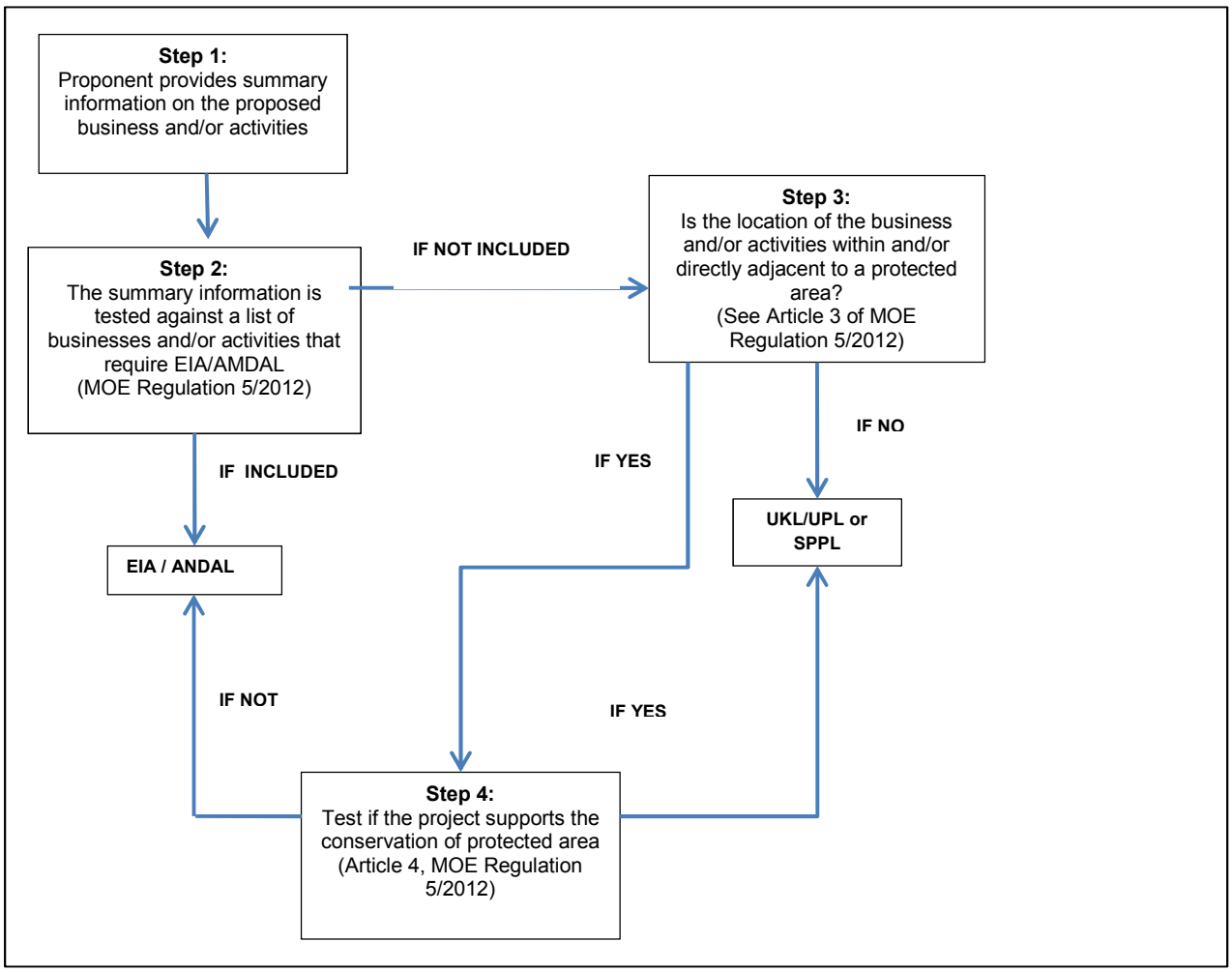
Other Comments: _____

Prepared by: _____

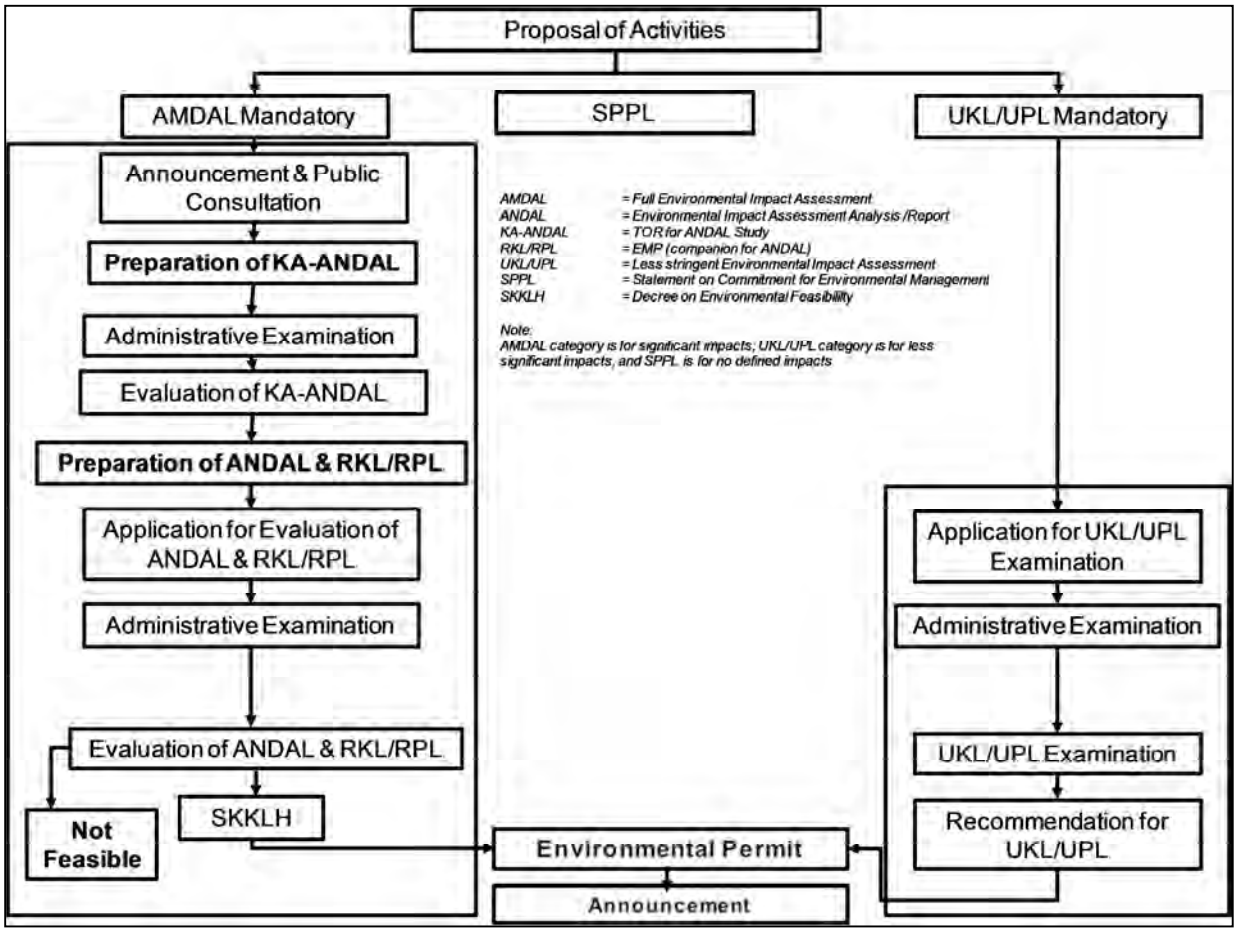
[5] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Annex 3 :Environment Screening Process

(Based on Minister of the Environment Regulation No 5/2012)



Annex 4: Flowchart of Indonesian Environmental Clearance[6]



Source: ADB. 2015. EARF for Indonesia: Flood Management in Selected River Basins Sector Project. Prepared by Ministry of Public Works and Housing of the Republic of Indonesia (June 2015).

[6] 'AMDAL' refers to the whole environmental impact assessment process, whereas *ANDAL* refers specifically to the environmental impact analysis. This ANDAL analysis is supported with a RKL/RPL (~EMP) to manage and monitor impacts.