

Jambi Emission Reduction Program (JERP) - Indonesia:

Emission Reduction Program Document (ER-PD)

November 2023

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LIST OF ACRONYMS/ ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Use
APBD	Anggaran Pendapatan Belanja Daerah (Regional Revenue and Expenditure Budget)
APBN	Anggaran Pendapatan Belanja Nasional (National Revenue and Expenditure Budget)
APL	Areal Penggunaan Lain (Land for other purposes)
BAPPEDA	Badan Perencanaan Pembangunan Daerah (Regional Development Planning Agency)
BAPPENAS	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency)
BAU	Business As Usual
BioCF-ISFL	BioCarbon Fund Plus Initiative for Sustainable Forest Landscapes
BLU	Badan Layanan Umum (Public Service Agency)
BPDLH	Badan Pengelolaan Dana Lingkungan Hidup (Indonesian Environment Fund)
BRGM	Badan Restorasi Gambut dan Mangrove (Peatland & Mangrove Restoration Agency)
BSM	Benefit Sharing Mechanism
BSP	Benefit Sharing Plan
CBFM	Community–Based Forest Management
CF	Carbon Fund
CIFOR	Center for International Forestry Research
СОР	Conference of the Parties to the 1992 United Nations Framework Convention on Climate Change (UNFCCC)
CSO	Civil Society Organization
CSR	Corporate Social Responsibility
DBH	Diameter at Breast Height
DD	Deforestation and Forest Degradation
DGCC	Directorate General of Climate Change
DPRD	Dewan Perwakilan Rakyat Daerah (Regional House of Representative)
ER	Emission Reduction
ERPD	Emission Reductions Program Document
ERPA	Emission Reductions Payment Agreement
ESMF	Environmental and Social Management Framework
FCPF	Forest Carbon Partnership Facility

FMT	Fund Management Team
FGD	Focus Group Discussion
FGRM	Feedback and Grievance Redress Mechanism
FIP	Forest Investment Program
FLEGT	Forest Law Enforcement Governance and Trade
FMU	Forest Management Unit (Kesatuan Pengelolaan Hutan)
FOERDIA	Forestry and Environmental Research Development and Innovation Agency
FPIC	Free and Prior Informed Consent
FREL	Forest Reference Emission Level
FRL	Forest Reference Level
FSC	Forest Stewardship Council
GGP	Green Growth Plan (<i>Rencana Pertumbuhan Hijau</i>)
GHG	Greenhouse Gas (GRK: Gas Rumah Kaca)
Gol	Government of Indonesia
HCS	High Carbon Stock
HCV	High Conservation Value
HCVF	High Conservation Value Forest
HD	Hutan Desa (Village Forest)
HKm	Hutan Kemasyarakat (Community Forestry)
HL	Hutan Lindung (Protected Forest)
НР	Hutan Produksi (Production Forest)
НРН	Hak Pengusahaan Hutan (Logging Concession)
НРТ	Limited Production Forest (Hutan Produksi Terbatas)
нті	Industrial Timber Plantation (Hutan Tanaman Industri)
HTR	Community Plantation Forest (Hutan Tanaman Rakyat)
ICRAF	The International Centre for Research in Agroforestry - World Agroforestry Center
IEF	Indonesian Environment Fund (Badan Pengelola Dana Lingkungan Hidup)
IPCC	Intergovernmental Panel on Climate Change
ISFL	Initiative for Sustainable Forest Landscapes
ISPO	Indonesian Sustainable Palm Oil
IUCN	International Union for Conservation of Nature
JERP	Jambi Emission Reductions Progam
JSLMP	Jambi Sustainable Landscape Management Program

KLHK	Kementerian Lingkungan Hidup dan Kehutanan (Ministry of Environment and Forestry)
КРН	Kesatuan Pemangkuan Hutan (Forest Management Unit)
NGO	Non-Government Organization
Lol	Letter of Intent
MAR	Monitoring, Analysis and Reporting
MoEF	Ministry of Environment and Forestry
МоНА	Ministry of Home Affairs
MoU	Memorandum of Understanding
MRV	Measurement Reporting and Verification
NDC	Nationally Determined Contribution
NFI	National Forest Inventory System
NFMS	National Forest Monitoring System
NGO	Non-Government Organization
NTFP	Non-Timber Forest Product
OPD	Organisasi Pemerintah Daerah (Provincial Government Organization)
РВРН – НА	Perizinan Berusaha Pemanfaatan Hutan – Hutan Alam (Business Permit for Forest Utilization)
PBPH – HT	Perizinan Berusaha Pemanfaatan Hutan – Hutan Tanaman (Business Permit for Forest Utilization)
PBPH - RE	Perizinan Berusaha Pemanfaatan Hutan – Restorasi Ekosistem (Business Permit for Ecosystem Restoration)
РВРН – ВК	Perizinan Berusaha Pemanfaatan Hutan —Bukan Kayu (Business Permit for non-timber product)
PHPL	Pengelolaan Hutan Produksi Lestari (SFM: Sustainable Production Forest Management)
PPI	(Direktorat Jenderal) Pengendalian Perubahan Iklim (DG Climate Change)
P3SEKPI	Pusat Penelitian dan Pengembangan Sosial, Ekonomi, Kebijakan dan Perubahan Iklim (Centre for Research and Development on Socio-Economic, Policy and Climate Change)
RAD GRK	<i>Rencana Aksi Daerah Penurunan Emisi Gas Rumah Kaca</i> (Regional Action Plans to Reduce Greenhouse Gases)
RBP	Results Based Payment
REDD+	Reducing Emissions from Deforestation and Forest Degradation
REL	Reference Emission Level
RILRPHJP	Reduced Impact Logging

	<i>Rencana Pengelolaan Hutan Jangka Panjang</i> (Provincial Long Term Forest Development Plan)
RPJMD	<i>Rencana Pembangunan Jangka Menengah Daerah</i> (Provincial Mid Term Development Plan)
RSPO	Roundtable for Sustainable Palm Oil
RTRW	Rencana Tata Ruang Wilayah (Regional Spatial Plans)
S-G	Secretary General
SEKDA	Sekretaris Daerah (Provincial Secretary)
SESA	Strategic Environmental and Social Assessment
SIGN-SMART	National GHG (Greenhouse Gas) Information System of the Climate Change DG of the MoEF
SIS REDD+	Safeguards Information System for REDD+
SKPD	Satuan Kerja Perangkat Daerah (Regional and Local Government Agencies)
SRAP – REDD	Strategi Rencana Aksi Provinsi - REDD (REDD Strategy and Action Plans at Provincial Level)
SRN-PPI	National System Registry of the Climate Change DG of the MoEF
SVLK	Timber Legality Verification Standard
TFCA II	Tropical Forest Conservation Act II
UNFCCC	United Nations Framework Convention on Climate Change
UU	Constitution
WPK	Wilayah Pengukuran Kinerja (Performance Measurement Area)

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Section 1: General Information and Guidance

1.1. Purpose of the Program Document (PD)

The Government's Emission Reduction Program known as the Jambi Emission Reduction Program (JERP) was included in the pipeline of the Biocarbon Fund Initiative for Sustainable Forest Landscapes (BioCF-ISFL).

The JERP is designed according to the BioCF-ISFL Program Requirements. The Final Program Document (PD) for the JERP, in combination with other documents, such as the Benefit Sharing Plan and Safeguards documents, will be used as references for the World Bank and BioCF-ISFL to begin negotiations with the Government of Indonesia (GoI) to sign an Emissions Reduction Purchase Agreement (ERPA).

Prior to the PD being considered final, the draft PD will be reviewed and commented on by thetechnical assessor (auditor).

This Program Document contains the most relevant data and information for assessing the JERP. Supporting data and information are presented in the specified attachments.

Following the guidance, the information provided is 'condensed' to the number of words specified for the specific section.

Assessment process for the PD

Following the final assessment report produced by the auditor, the government will revise the PD for final resubmission.

Section 2: Executive Summary

2.1 ER Program Description

2.1.1. Program Area information

Jambi Province has 9 districts, 2 cities, 141 sub-districts, 1,375 villages, and 187 "*kelurahan*", and is located in the heart of Sumatra Island, bordering Riau Province and Riau Islands Province in the east, West Sumatra in the west, and South Sumatra and Bengkulu in the south. Jambi has natural wealth and rich biodiversity, including peatland ecosystems. This province is the only one in Indonesia that has 4 national parks.

Name of the ISFL ER Program	A jurisdictional program in Jambi province: The Jambi Emission Reduction		
	Program (JERP) in Jambi ("the Program").		
Name of the Program Area	Province of Jambi		
Geographic area of the Program	Jambi has an area of 5,295,242 hectares, with a land area of		
Area (hectares)	4,907,145 hectares. The forest area are 2,123	3,550 hectares of which	
	964,078 hectares are still forested (2021)		
	Districts and Cities of Jambi Province	Hectare (ha)	
	- Kerinci	344,945	
	- Merangin	755,126	
	- Sarolangun	594,553	
	- Batanghari	545,870	
	- Muaro Jambi	516,386	
	- Tanjung Jabung Timur	509,409	
	- Tanjung Jabung Barat	500,153	
	- Tebo	610,699	
	- Bungo	476,452	
	- Jambi City	17,002	
	- Sungai Penuh City	36,542	
	Total province area	4,907,145	
Population of the Program Area	The total population in Jambi Province is 3.6	77.894 (2020) ¹	
	Population of the Capital (Jambi City) in	Individual	
	2020; consist of:		
	- Kerinci	239 606	
	- Merangin	394 174	
	- Sarolangun	307 585	
	- Batanghari	275 504	
	- Muaro Jambi	454 524	
	- Tanjung Jabung Timur	221 619	
	- Tanjung Jabung Barat	359 280	
	- Tebo	300 193	
	- Bungo	611 353	
	- Jambi City	91 739	
	- Sungai Penuh City	3 677 894	
	Total population	510771054	
	(Source: Badan Pusat Statistik (bps.go.id))		

TABLE 1.	PROGRAM	AREA	INFORMATION
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¹ <u>https://jambi.bps.go.id/indicator/12/32/1/penduduk-provinsi-jambi.html</u>

	te of emission With	onsideration of the ability to reduce deforestation rate of at least
reductions (ERs) for the ISFL ER 10%, the estimated reduction in CO_2 emissions by the end of 2025 is 19^2) for the ISFL ER 10%, 1	he estimated reduction in CO ₂ emissions by the end of 2025 is 19 ²
Program (tonnes of CO ₂ e) MtCO ₂ e.	es of CO ₂ e) MtCO	e.



Figure 1. The Map of Jambi Province Administrative Area

 $^{^{\}rm 2}$ The current estimated calculation of ER by 2025 is 19 MtCO_2e.

2.1.2. Selection of the Program Area

Based on an analysis of drivers of deforestation and forest degradation (2006-2018), the JERP is being implemented in all forested areas in Jambi Province, including state forest areas (FMU and Conservation Areas), and forested areas in other land uses/non-state forests area, especially in areas surrounding state forest areas, in the entirety of Jambi province. Priority areas are in 9 FMUs (4 UPTDs FMU), 5 conservation areas (4 National Park Service (*Balai Taman National*/BTN), and 1 Natural Resources Conservation Office (*Balai Konservasi Sumber Daya Alam*/ BKSDA), including other land use areas close to it.

	Forest and land	Unit	Unit Management	Area (ha)	Forested
	Function		(UPT/ UPTD)		Area (ha)
Α.	State Forest				
1.	Conservation Areas	a. CA Hutan Bakau Pantai Timur	BKSDA Jambi	5,140	2,334
		 b. CA Durian Luncuk I dan II c. CA Sungai Batara d. KSA/ KPS Buluh Hitam/ 		123 660	83 0
		Pasir Mayang Danau Bangko		456	0
		e. Tahura Bukit Sari		427	266
		f. Tahura Sekitar Tanjung (Orang Kayo Hitam)		19,024	1,379
		g. Tahura Sultan Thaha		15,92 4	0
		h. TWA Gua Ulu Tiangko		718	0
		a. TN Berbak	TN Berbak – TN Sembilang	141,498	95,262
		b. TN Bukit Dua Belas		54,792	45,148
		c. TN Bukit Tiga Puluh		35,788	35,224
		d. TN Kerinci Seblat		427,975	368,430
	Total Conservat	ion Areas		702,525	548,126
2.	Protected and	Unit I	KPHP Kerinci	34,250	5,639
	Production Forest	Unit II Unit III	KPHP Bungo	115,044	62,420
		Unit IV Unit V Unit VI	KPHP Merangin	180,191	93,486
		Unit VII Sarolangun	KPHP Limau	116,007	101,536
		Unit VIII	KPHP Hilir Sarolangun	107,519	11,991
		Unit IX	KPHP Tebo Barat	146,293	10,425
		Unit X	KPHP Tebo Timur	105,492	21,961
		Unit XI Unit XII	KPHP Batang Hari	184,831	19,731
		Unit XIII	KPHP Muara Jambi	98,363	30,176

Table 2. Program Area

	Forest and land Function	Unit	Unit Management (UPT/ UPTD)	Area (ha)	Forested Area (ha)
Α.	State Forest				
		Unit XIV	KPHP Tanjung Jabung Timur	86,070	13,397
		Unit XVI Unit XVII	KPHP Tanjung Jabung Barat	233,988	42,555
	Total Protected	and Production Forest		1,408,049	413,322
Β.	B. Total other land use/Non-State Forest		2,796,572	57,378	
	TOTAL JAMBI Province (A+B)		4,907,145	1,018,826	

The rationale selection of Jambi as the program area is as follows:

- a. the most complete forest ecosystem on the island of Sumatra
- b. strong commitment and has established its institutional arrangement for climate change (such as the Jambi Working Group for REDD+)
- c. has issued supporting policies (for example forest fire prevention, conflict resolution, CBFM, having a Joint Secretariat for Forest Resource Management, Social Forestry Acceleration Working Group)
- d. need national attention since Jambi is one of the provinces experiencing high deforestation
- e. a strong initiative to implement REDD+; and
- f. one of the provinces that has made progress in preparing the REDD+ implementation

Based on the spatial analysis of forest cover across Jambi province in 2006-2018, most of the deforestation occurred in production forest areas. The remaining forest cover of production forests are under the management of Forest Management Units (FMU or *KPH/KPHP* in Bahasa). Some of the remaining forests are also in conservation areas. Therefore, the JERP will also focus on national parks (or Taman National in *Bahasa*, abbreviated to TN) as well as some Nature Reserves (*Cagar Alam*, called as CA) and Forest Parks (*Taman Hutan Raya*, called *Tahura*). Both TNs and CAs are managed by the Ministry of Environment and Forestry (MoEF), whereas *Tahura* are managed by either the provincial or district government.³

Emissions from peatland decomposition, as the second largest contributor of total emissions, will also be the focus of JERP activities, which span the KPH Tanjung Jabung Barat and TN Berbak Sembilang. In addition, considering that peatlands encompass a stretch of tidal ecosystems that are inseparable, activities related to fire prevention and management must cover buffer zones in both regions.

2.1.3. Description of Jambi Emission Reduction Program vision, design, and expected outcomes

The Green Growth Plan (GGP) outlines the vision to create inclusive and low emission economic growth across the jurisdiction of Jambi Province from 2019-2045. Under the GGP, a combination of implementing regulations at provincial level and a suite of on-going and future initiatives will be used to meet this goal, which also feed into the FOLU net sink 2030 and NDC targets. Currently, the J-SLMP pre-investment grant is a major investment in the landscape. There is also a broader suite of planned and ongoing initiatives funded by government and others (private sector, development partners, CSOs), as well as the World Bank's wider engagement in Jambi aimed at achieving inclusive and low emissions growth. Together these will generate Emission Reductions on forest and non-forest lands, which will in turn form the basis for the ER payments.

³ Government Regulation No.28 Year 2011 (Article 12).

The GGP by the Jambi Provincial Government has been integrated into the Jambi Mid-Term Development Plan 2021 – 2026 (RPJMD 2021-2026)⁴. In order to achieve the GGP's vision for low emission economic growth, 5 (five) important desired outcomes have been established, as follows:

- 1. Sustainable economic growth
- 2. Inclusive and equitable growth
- 3. Social, economic and environmental resilience
- 4. Healthy and productive ecosystems provide environmental services
- 5. GHG emission reduction

Furthermore, to address the five desired achievements, The GGP has set out 3 (three) main strategies:

- 1. Sustainable Land Use, Recovery and Productivity Improvement
- 2. Capacity of Human Resources and Institutions through Increasing Access to Development and Livelihood Capital and Utilization of Environmental Services
- 3. Connectivity and a Sustainable Value Chain

Based on these 5 goals and 3 strategies, the implementation of the GGP is expected to support a decrease in the average rate of deforestation to 1,770 ha/year compared to the BAU scheme at 4,730 ha/year. Meanwhile, in 2045, the implementation of the GGP is expected to be able to restrain the GHG emissions growth rate of 860,000 tons of CO2e per year compared to the BAU scheme which amounted to 1,310,000 tons of CO2e. In other words, the implementation of the GGP is expected to contribute to the reduction of Jambi Province's average annual emission rate of 38.74% per year.5 These calculations were based on the estimated effectiveness of the green growth scenario in reducing GHG emissions from land-based activities until 2045. By the year 2045, the green growth scenario is projected to reduce emissions by 19.8% compared to BAU. Since the GGP has been integrated into the RPJMD 2021-2026, the provincial governments' workplans and strategies will have to be streamlined with the RPJMD, including the GGP scenarios.

The JERP is a government-led program intended to promote and reward GHG emission reductions and increase carbon sequestration through better landscape management. It is not only pre-investment but also include resultbased payment ER program in Jambi. It is designed to play a significant role as a catalyst as well as a contributor to the achievement of the GGP target on low carbon development and additional income generation for the community. The outcomes of this program are the increased contribution of green growth to government revenues, improving community welfare, including indigenous peoples, and the preservation of essential ecosystems in Jambi Province. The inclusion of forest and non-forest lands in the landscape-based program, including agriculture and peatlands makes this program unique.

The JERP contribution of the ER Program to the GGP and RPJMD of Jambi Province is described below:

⁴ Implementasi Pertumbuhan Ekonomi Hijau Provinsi Jambi di Tahun 2022 – #SepucukJambiHijau (jambiprov.go.id)

⁵ Masterplan and Roadmap for Regional Development 2019-2045, Toward Green Growth Plan in *Bumi Sepucuk Jambi Sembilan Lurah*. Government of Jambi Province, 2020



Figure 2. Contribution of the JERP towards the GGP and RPJMD

The institutional arrangements of the ER program in Jambi will use the existing arrangements established for the JSLMP pre-investment grant (Figure 3). At the national level, there is a National Steering Committee (NSC) chaired by the Secretary General of the MoEF. The NSC provides policy guidance on the implementation of the ER program. The NSC is supported by a National Technical Committee (NTC) that provides technical guidelines. The NTC is led by the Secretary General of the MoEF. The National Project Management Unit (NPMU) is responsible for day-to-day operations of the JSLMP pre-investment grant. However, for the JERP in Jambi, program implementation will be managed by the Sub-national Project Management Unit (SNPMU). The SNPMU is chaired by the Provincial Planning Agency (Bappeda) and is managed with close coordination with the Forestry Service (Dishut), Environmental Service (DisLH), Estate Plantation Service (Disbun), and Agriculture Service Agency (Dinas Tanaman Pangan, Hortikultura, dan Peternakan). The SNPMU will facilitate the involvement of these government services/agencies during the implementation of the ER program. In addition, the SNPMU is responsible for the implementation of social and environment safeguards-related tasks, ensuring distribution of benefits to beneficiaries, monitoring and reporting of the ER program, including reporting on carbon accounting.

The Joint Secretariat for Forest Resource Management (Sekretariat Bersama Pengelolaan Sumberdaya Hutan-SEKBER), on the other hand, has a key role in coordinating knowledge exchanges, learning and information of landbased activities within multi-stakeholders in Jambi (Governments, Academics, NGOs, and private sectors). The SEKBER has been established through a Head of Provincial Forestry Service Decree.⁶ The Head of SEKBER is led by an appointed person from the private sector and acts as a member of the PTC. The SEKBER is outside of the SNPMU and has a coordination role with SNPMU related to ER program in Jambi.



Figure 3.Implementation Arrangements for JERP

Program implementation at the village level is conducted by community groups through activities including social forestry, strengthening of farmer groups, and developing alternative land-based livelihoods. The involvement of women's groups is implemented by strengthening the capacity of women's groups at the village level in decision-making and implementing activities, including identifying potential strategic livelihoods to increase economic, social and environmental benefits for women and other marginal groups.

The strengthening of forest and land management is facilitated for indigenous peoples who have or have not been legally recognized by the government. The process of identifying and recognizing indigenous peoples through land certification will be carried out to ensure that indigenous peoples can be actively involved in the implementation of the program.

Social and Environmental Safeguards have been prepared to ensure that any social, economic and environmental impacts, including negative impacts, on indigenous peoples and other marginal groups, are avoided (See Safeguards document – 2022).⁷ A Strategic Environmental and Social Assessment (SESA), Environmental and Social Management Framework (ESMF) and Indigenous People Policy Framework (IPPF) were prepared together with this ERPD, which contain analysis of potential negative and positive impacts, accompanied by mitigation measures. The Jambi

⁶ Head of Provincial Forestry Service Decree on Establishment of the Joint Secretariat for the Management of Jambi Province Forest Resources and Appointment of Management for the 2021-2023 Period (SK.37/Kep.KDK/Dishut-5/I/2023).

⁷ <u>Dokumen Safeguard Bio Carbon Fund Integrated Sustainable Forest Landscape (BioCF ISFL) Provinsi Jambi -</u> <u>Kementerian LHK (menlhk.go.id)</u>

government ensured that Free, Prior, and Informed Consent (FPIC) would be carried out prior to the commencement of activities, especially to communities identified as being affected by program implementation.

2.1.4. Summary of JERP Financial Plan and Financing Gap

The summary of the JERP financial plan and financial surplus/gap is as follows:

	Financial Plan and Financial Surplus/Gap	USD (million)
A	The costs of implementing proposed Jambi ER program/JERP actions and interventions	40.9
В	Amount of financing identified/secured financing for planned actions and interventions are from:	
	 Mid-Term Development Plan/RJPMD 2021 – 2026 International projects operated in Jambi (including JSLMP Pre-investment 	44.9
	Grant)	57.0
С	Financing surplus (or gap) amount C = B - A	(+) 61.0

The Jambi ER Program (JERP) aims to reduce emissions by 19 MtCO₂e. The costs of implementing the proposed ER program actions and interventions are estimated to reach **USD 40.9 million**. However, based on the RPJMD 2021 – 2026, the Provincial Government of Jambi has proposed budget allocations from 2021 to 2026 related to land-based activities (forestry, agriculture, oil palm, environment) up to **USD 44.9 million**.⁸ In addition, based on MoEF's list of international donor projects operated in Jambi (registered under the Bureau of Foreign Cooperation at the MoEF⁹), the total funding from 13 out of 17 ongoing multilateral and bilateral donor projects related to climate change operating in Jambi province amount to roughly **USD 57.0 million**. This figure included USD 13.5 million financing from the JSMLP pre-investment grant. Thus, total secure budget for the Jambi ER Program until 2026 are **USD 101.9 million**, meaning that the ER program financing up to 2026 for Jambi is secured, with a surplus of **USD 61 million**. See Table **3**, This calculation has not been included yet the contributions to ER Program in Jambi from private sector. Further information on the financial plan and gap can be seen in Section 3.1.3.

2.2 JERP ER Program Implementation Arrangements

2.2.1. Program Entity that is authorized to negotiate/sign the ERPA with the ISFL

Table 4. Program Entity involved in the JERP

⁸<u>https://docs.google.com/spreadsheets/d/1xWlc5SNFCZqx5cUc862w8_aA5FvJ5fYS?rtpof=true&authuser=stepibuy</u> %40gmail.com&usp=drive_fs

⁹<u>https://drive.google.com/open?id=1wbLf1FPhHF_oZ0rUBntfTjUrbqiU4i5D&authuser=stepibuy%40gmail.com&usp=drive_fs</u>

Name of entity	Ministry of Environment and Forestry	
Type and description of organization	The MoEF is a line ministry of the Republic of Indonesia. It has responsibility under Law 41 of 1999 to sustainably manage the forests and forest resources of the Republic of Indonesia. The Secretariat General of the Ministry of Environment and Forestry (S-G MoEF) coordinates the implementation and provision of supporting administration to activities from all directorates within MoEF. The SG MoEF also has a role in coordinating the ER Program as it is implemented through the other Directorates-General	
Website	http://menlhk.go.id	
Main contact person	Dr. Bambang Hendroyono	
Title	Secretary General	
Address	Gedung Manggala Wanabakti, Jl. Jenderal Gatot Subroto, Jakarta (12070)	
Telephone	+62 21 5730191	
Email	Banghen_11@yahoo.co.id	

2.2.2. Organization(s) responsible for managing/implementing the JERP:

Name of entity	Ministry of Environment and Forestry	
Type and description of organization	The MoEF is a line agency of the Republic of Indonesia. It has responsibility under Law 41 of 1999 to sustainably manage the forests and forest resources of the Republic of Indonesia. The Secretariat General of the Ministry of Environment and Forestry (SG-MoEF) coordinates the implementation and provision of supporting administration to activities from all directorates within MoEF. The SG MoEF also has a role in coordinating the ER Program as it is implemented through the other Directorates-General	
Website	www.menlhk.go.id	
Main contact person	Dr. Bambang Hendroyono	
Title	Secretary General	
Address	Gedung Manggala Wanabhakti, Jl. Jenderal Gatot Subroto, Jakarta	
Telephone	+62 21 5730191	
Email	Banghen_11@yahoo.co.id	
Name of entity	Provincial Secretary of Jambi	
Type and description of organization	The Provincial Secretary is the Head of the Civil Service of the Province and has authority under the Governor and the DPRD (Regional House of	

Table 5. List of organizations responsible for managing/implementing the JERP

	Representation) to direct and coordinate the Agencies and Services within the Provincial Government.
Organizational or contractual relationship between the organization and the ISFL ER Program Entity identified above	The Provincial Secretary heads the administrative arm of the Provincial Government. A MoU between the MoEF and the Governor will be used to define the cooperative relationship between the national and the sub-national entities engaged in implementing the BioCF-ISFL ER Program
Website	PEMERINTAH PROVINSI JAMBI (jambiprov.go.id)
Main contact person	H. Sudirman, SH, MH
Title	Provincial Secretary of Jambi
Address	Jl. A. Yani No.1 Telanaipura Jambi 36128
Telephone	0741 – 60192
Email	<u>setda@jambiprov.go.id</u>

Name of entity	Indonesian Environment Fund/IEF (<i>Badan Pengelola Dana Lingkungan Hidup/BPDLH</i>)	
Type and description of organization	The Indonesian Environment Fund is a national agency under Ministry of Finance that has function to channel funds through a variety of instruments to specific projects and activities that support its overall objective to improve management and protection of the environment, support environmentally friendly economic activities and reduce GHG emissions	
Organizational or contractual relationship between the organization and the ISFL ER Program Entity identified above	The BPDLH is set to channel Result Based Payments from the BioCF ISFL to the Government of Indonesia through an Accredited Intermediary Agency (Lemtara) selected by the Government of Indonesia.	
Website	The Indonesian Environment Fund (BPDLH) – BPDLH	
Main contact person	Endah Tri Kurniawaty	
Title	Director of Fund Collection and Development:	
Address	JB Tower 30 th Floor Kebon Sirih Street, No.48-50, RT.11/RW.2, Gambir, DKI Jakarta, 10110	
Telephone	0816859685	
Email	contact.us@bpdlh.id	

2.2.3. Partner organizations involved in the JERP ER Program

Table 6. List of partner organizations involved in the JERP

Name of Partner	Contact name, telephone, and email	Core capacity and role in the
		ER Program
Secretariat General	Ir. Bambang Hendrovono. MM	To coordinate the
(MOEF)	+62215730191	implementation of tasks, and
	Banghen 11@yahoo.co.id	provide guidance and
		administrative support to all
		elements of the organization
		within MoEF; and also to
		represent the Minister for formal
		submission of the ERPD on
		behalf of the Gol to the WB
Directorate General of	Ir. Laksmi Dhewanthi, MA	To provide guidance to Jambi
Climate Change (MOEF)	+62 (21) 5730144	Provincial Government in
	Faksimili: + 62 (21) 5720194	addressing climate change
	Email: subditredd@gmail.com	particularly in the
		implementation of mitigation,
		monitoring, reporting and
		verification of climate change
		land fire control
Earostry and	Dr. Agus Justianto, MSc. (DG of EOERDIA):	To provide technical support to
Forestry and Environment Pesearch	±62 251 8623044	the Jambi Provincial Covernment
Development and	aiustianto@gmail.com	through research and innovation
Innovation Agency		in relation to the FR Program at
(FOFRDIA) c.g. Center		the Provincial Level.
for Research and		
Development on Socio-		
Economics, Policy and		
Climate Change		
(P3SEKPI) (MOEF)		
Directorate General of	Dr. Ir. Ruandha Agung Sugardiman, M.Sc	To oversee forestry planning,
Forestry Planning and	(Acting DG of Planning and Environmental	development of FMUs, and the
Environmental	Management)	provision of areas for the use of
Management (MOEF)	Telephone	communities residing next to the
	ra.sugardiman@gmail.com	forest.
National Development	Dr. Nur Hygiawati Rahayu, ST, MSc Director of	To formulate and synergize the
Planning Agency	Forestry and Water Resources	proposed budget for
(Bappenas)	+6221 392 6254 ext. 2209	development of Forestry
	ningsin@bappenas.go.id	Management Units (FMU) at the
Directorate Ceneral of	Luky Alfirman	To provide direction with regard
Financing and Rick	Gedung Frans Seda Lantai 6	to transfer of ERPA funding
Management (MOF)	Il Wahidin Baya No. 1	
	Jakarta Indonesia 10710	
	Phone. (6221) 3459616	
Directorate General of	Drs. Astera Primanto Bhakti, M.Tax	To provide direction with regard
Fiscal Balance (MOF)	Jl. Wahidin Raya No. 1,	to the mechanism of financing of
, , ,	Jakarta Indonesia 10710	Emission Reductions activities
	Phone. (6221) 3459616	
Indonesian Environment	Joko Try Haryanto (Executive Director)	To carry out the management of
Fund	BLU BPDLH	the Environmental Fund

Name of Partner	Contact name, telephone, and email	Core capacity and role in the
		ER Program
	Wisma Antara lantai 12	particularly in the fields related
	Jalan medan merdeka selatan nomor 17,	to the environment
	Jakarta Pusat	
Secretary of Jambi	Sudirman, SH.MH	To coordinate development
Province	Secretary of Jambi Province	activities in Jambi Province,
		including efforts to reduce
		emissions
Development Planning	Ir. Agus Sunaryo, MSi	To coordinate daily development
Agency (BAPPEDA) of	(Head)	activities in Jambi Province,
Jampi Province	JI. R.W NUR Atmadibrata No.1, Telanaipura,	Including emorts to reduce
	Jambi Dhono : 162 741 62607 62404	emissions
	f_{10} +62 741 62507, 63494	
	amail : kantor@hannedajamhi	
	http://www.bappedajambi.go.id	
Forestry Office of Jambi	Akhmad Bestari, SH, MH : Head of Provincial	To oversee forestry programs at
Province	Forestry Service	the provincial level including the
Trovince	II. Arief Rahman Hakim No. 10. Telanaipura.	development of FMUs
	Jambi 36124	
	Phone : +62 741 62295	
	Fax : +62 741 65145	
	email : ibesakhmad@gmail.com	
	http://www.dishut.jambiprov.go.id	
Environment Agency of	Sri Hartati, SE.MM; Head of Provincial	To oversee forestry programs at
Jambi Province	Environment Office	the provincial level, including the
	Jl. H. Agus Salim No. 07, Kota Baru, Jambi 36129	development of FMUs
	Phone : +62 741 40777	
	fax : +62 741 445116, 40706	
	email : dlhprovinsijambi.taling@gmail.com	
Food Crop Service of	Ir. Akhmad Maushul, Head of Provincial Food	To provide support and
Jambi	Crops, Horticulture, and Animal Husbandry	monitoring for the development
	Service	of sustainable fishery activities
	JI. LINGKAT BATAL KIN. 12 NO. 78, KOLADATU, JAMDI	
	fay +62 741 7000200, 7000300	
	email : dtnhn iamhinroy@gmail.com	
	http://www.dtphp.jambiprov.go.id	
Plantation Office of	Ir. H. Agusrizal. MM: Head of Provincial Estate	To support ER activities related
Jambi Province	Crops Office	to estate crops
	Jl. M. Yusuf Singedekane, Telanaipura, Jambi	·
	36122	
	Phone : +62 741 63417, 63134, 62596, 60857	
	fax: +62 741 64585, 60561	
	email : agusrizal.rizal@yahoo.co.id	
	http : // www.disbun.jambiprov.go.id	
BAPPEDA of Merangin	Dr. Agus Zainuddin, S. Sos, MHum; Head of	To coordinate regional
	BAPPEDA Merangin	development activities, including
	Jl. Jenderal Sudirman No. 04, Kel Pematang	efforts to reduce emissions at
1	Kandis, Bangko	the district/city level

Name of Partner	Contact name, telephone, and email	Core capacity and role in the ER Program
	Phone : +62 746 212288	
	fax : +62 746 322506	
	email : agus.agus08@yahoo.co.id	
	http://www.bappeda.meranginkab.go.id	
BAPPEDA of Sarolangun	H. Lukman, S.Pd, M.Pd ; Head of BAPPEDA	To coordinate regional
	Sarolangun	development activities, including
	Kompleks Perkantoran Gunung Kembang No.	efforts to reduce emission at the
	01, Sarolangun	district/city level
	Phone : +62 745 91752	
	fax : +62 745 91752	
	email : <u>bappedakabsarolangun@gmail.com</u>	
	http://www.bappeda.sarolangunkab.go.id	
BAPPEDA of Bungo	Deddy Irawan, SE, MM ; Head of BAPPEDA	To coordinate regional
	Bungo	development activities, including
	Jl. R.M. Thaher No. 504, Muaro Bungo	efforts to reduce emission at the
	Phone : +62 747 21476	district/city level
	fax : +62 747 323368	
	http://www.bappeda.bungokab.go.id	
BAPPEDA of Tanjung	Ir. Firdaus, MM; Head of BAPPEDA Tanjung	To coordinate regional
Jabung Barat District	Jabung Barat;	development activities, including
	Jl. Prof Sri Soedewi Maschun Sofwan, Kuala	efforts to reduce emission at the
	Tungkal	district/city level
	Phone : +62 742 21131	
	fax : +62 742 21131	
	http://www.bappeda.tanjabbaratkab.go.id	

<u>Annex 12</u> shows complete profiles of 7 local partners with their institutional capacities and experiences. Their institutional capacities will become invaluable assets for the project's successful planning and implementation.

2.2.4. Description of coordination between entities involved in JERP

Coordination at the national level is conducted under Indonesia UNFCCC Focal Point (MoEF), that is through DGCC, while at the provincial level, program implementation is led by the Provincial Secretary, with the daily activity is undertaken by Head of Provincial Development Planning Agency/BAPPEDA Jambi. Coordination with other sectors at the national level is carried out by MoEF, through the DGCC, and at the provincial and district/city levels, coordination is carried out by the Provincial Secretary, through Bappeda. Stakeholders (private, NGOs, academics, community groups, and development partners) are coordinated by the Sub National Project Implementation Unit (SNPMU). Key coordination meetings to date are listed in <u>Annex 13</u>.

Section 3: JERP Program Design

3.1 Planned Actions and Interventions in the Program Area, Including Financing

3.1.1 Drivers of AFOLU emissions and removals

According to Jambi REDD+ action plan (SRAP, 2013), emissions from peatlands and LULUCF sectors in Jambi province contribute to more than 85% of total emissions of the province. While emissions from deforestation, forest degradation and land cover change contribute to about 40% (RAD GRK, 2012).¹⁰ In addition, the GHG inventory program conducted in this analysis for the AFOLU sector during the period of 2006 – 2018 suggested that the absolute level of historical emissions from land use change, peat soil disturbance and agriculture were 71.8%, 25.7% and 2.5%, respectively. The largest subcategories that contribute to the emissions and removals were **deforestation**, **vegetation degradation** and **vegetation growth** with annual emissions of 17.8 MtCO₂, 10.7 MtCO₂, and -9.4 MtCO₂ respectively (Table 7). The absolute contribution of the emission from peat decomposition and peat fires were in the fourth and fifth place after vegetation growth with annual emission of 9.1 MtCO2 (14.6%) and 6.9 MtCO2 (11.1%), respectively. Vegetation growth was the largest source of removal, which represents the biomass growth occurring in non-forest classes. The second largest removal was from enhancement of forest carbon stock, which included replanting of forest plantation, with annual sequestration of -5.8 MtCO2.

Categories	Sub-Categories	Emission / Removal 2006-2018	Annual Emission / Removal	Absolute contribution	% Net Emissions
	Total FOLU	171,856,510	14,321,376	71.8%	45.0%
	Deforestation	213,935,822	17,827,985	28.7%	
FOUL	Forest degradation	11,259,626	938,302	1.5%	
FOLO	Enhancement of forest carbon stocks	(69,416,495)	(5,784,708)	9.3%	
	Vegetation degradation	128,469,862	10,705,822	17.2%	
	Vegetation growth	(112,392,305)	(9,366,025)	15.1%	
	Total Soil Degradation	191,584,777	15,965,398	25.7%	50.1%
Organic Soils	Peat Decomposition	108,712,894	9,059,408	14.6%	
	Peat Fires	82,871,883	6,905,990	11.1%	
	Total Agriculture	18,675,050	1,556,254	2.5%	4.9%
Agulaultura	Biomass burning	887,740	73,978	0.1%	
Agriculture	Livestock	4,117,470	343,123	0.6%	
	Managed soils	13,669,840	1,139,153	1.8%	

TABLE 7. Historical emissions from land use change from 2006 to 2016

The analysis of the historical forest and cover changes showed that natural forests in Jambi province are decreasing from about 39% in 2006 to about 21% of total province area in 2018. In contrast estate crops and degraded lands are increasing from about 7% to 31% and 8% to 31%, respectively. Timber plantation increases slightly from 2% to 5.4% only. Surprisingly, agricultural lands are decreasing from 42% to 8% (see Table 8).

¹⁰ <u>5503PergubNo.36Th2012 final (123dok.com)</u>

%	2006	2009	2011	2012	2013	2014	2015	2016
Estate crops	7,4%	8,9%	9,1%	9,1%	9,1%	13,4%	13,6%	20,0%
Agriculture and aquaculture	41,5%	44,2%	44,8%	44,8%	44,9%	41,0%	41,4%	30,6%
Built up Areas	1,9%	1,7%	1,7%	1,7%	1,7%	1,6%	1,7%	2,6%
Degraded lands	7,9%	12,5%	12,4%	13,7%	15,5%	15,1%	14,7%	17,9%
Timber plantation	1,7%	3,6%	4,2%	3,5%	3,5%	4,2%	4,3%	6,5%
Water body	0,9%	0,9%	0,9%	0,9%	0,9%	0,9%	0,9%	0,3%
Natural forests	38,7%	28,1%	26,9%	26,2%	24,3%	23,8%	23,4%	22,2%

 TABLE 8. Percentage of land cover change from 2006 to 2016

Note:

* Built up Areas: Airports/Ports, Settlements, Mining, and Transmigration Areas

+ Degraded Lands: Grasslands, Barelands, Shrubs, Swamp, Swamp shrubs.

** Natural Forests: Primary mangrove forest, Primary swamp forest, Secondary dryland forest, Secondary mangrove forest, Secondary swamp forest

Since estate crops is the land-based activity that contributes to land use change, such activity involves clearing land, including forests, to make way for cultivation. This can result in the loss of natural habitats, biodiversity, and carbon sinks. It leads to contribution of GHG emissions. Table 8 shows that the percentage of land cover change due to estate crops from 2006 to 2018 sharply increased (from 7.4% to 30.7%). In addition, the causes of degraded lands in Jambi are vary, but some commons are as follows: deforestation, unsustainable land-use practices, illegal logging, and mining activities. The conversion of forests for agriculture, including palm oil plantations, can lead to land degradation in Jambi. Deforestation reduces the protective cover of vegetation, leading to soil erosion and nutrient depletion. The oil palm plantation area in Jambi has increased by 70% from 2001 to 2010 from 301.879ha to 513.595ha¹¹. Unsuitable farming methods, such as excessive use of chemical fertilizers and pesticides, improper irrigation, and overgrazing, can degrade the land over time. These practices can lead to soil erosion, nutrient imbalance, and loss of soil fertility. Illegal logging activities contribute to deforestation and degradation of forested areas in Jambi. This not only affects the forest ecosystem but also leads to soil erosion and loss of biodiversity. Unregulated or poorly managed mining operations can cause land degradation in Jambi. Mining activities can disrupt the natural landscape, contaminate soil and water sources, and result in the loss of vegetation cover. Addressing these causes requires implementing sustainable land-use practices, promoting responsible forestry and agricultural practices, enforcing regulations against illegal activities, and promoting reforestation and land rehabilitation efforts.

Based on the historical trends of forest and land cover changes, linear models were also developed to predict future trends of forest and land cover change for the next 10 years in Jambi province. The business-as-usual scenario will lead to a further depletion of forest cover in Jambi to about 0.7 million hectares and 0.4 million hectares in 2025 and 2030, or equal to 13.4% and 9.1% of total lands, respectively. In contrast, estate crops will increase from 0.9 million hectares in 2025 to 1.3 million hectares in 2030. Similarly, degraded lands will increase from 1.0 million hectares to 1.4 million hectares. Forest plantation will slightly increase from 0.3 million hectares to 0.4 million hectares in 2030 (see Figure **4**).

journal.unja.ac.id%2FJES%2Farticle%2Fdownload%2F3855%2F6288%2F27847&usg=AOvVaw3yKJ2m4QLKJMFjQZKh_UJd&opi=89978449

¹¹<u>https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiZsLLt37eCAxXb1DgGHVI0CBIQFnoE</u> <u>CAkQAQ&url=https%3A%2F%2Fonline-</u>



Figure 4. Linear model for 10 years projection of forest and land cover change in jambi

Therefore, it is crucial to protect the remaining natural forests to reduce emissions from the largest source of emissions. The remaining forests in 2016 amounted to 1.4 million hectares, resided in conservation areas (53.4 %), forest management units (40.9 %) and other non-forest uses (5.6%). The historical deforestation occurred in primary and secondary forests with a percentage of 13% and 87%, respectively. The largest historical deforestation occurred in production forest and protection forests managed under FMUs, with an average of 54.0 thousand hectares annually. Table **9** shows land cover change that degraded lands occurred in FMUs were high (407,600ha) or 29% out of total size of all FMUs due to deforestation from 2006 to 2018.

KPH_NAME	Agricultural Land	Degraded Land	Forested Land	(Outside WPK)	Total Area
KPHP Batanghari	13,024	46,286	23,319	102,203	184,831
KPHP Bungo	76	9,101	63,006	42,861	115,044
KPHP Hilir Sarolangun	844	66,395	12,756	27,523	107,519
KPHP Kerinci	2,771	24,656	6,741	81	34,250
KPHP Limau Unit Vii Hulu Sarolangun	76	20,084	92,045	3,802	116,007
KPHP Merangin	2,825	64,935	96,897	15,533	180,191
KPHP Muaro Jambi		41,395	31,439	25,528	98,363
KPHP Tanjung Jabung Barat	7,155	43,135	39,968	143,731	233,989
KPHP Tanjung Jabung Timur	709	27,708	12,587	45,065	86,070
KPHP Tebo Barat	82,221	32,021	11,554	20,497	146,293
KPHP Tebo Timur	17,092	31,883	21,895	34,622	105,492
Total Area	126,793	407,600	412,209	461,447	1,408,049

Table 9. Jambi FMU's Land Cover conditions as of 2018

3.1.2 Description and justification of the JERP ER Program's planned actions and interventions

As mentioned earlier, the JERP is a part of the wider GGP vision to create an inclusive and low emission economic growth across the jurisdiction of Jambi Province 2019-2045. Jambi has developed and facilitated a number of natural resource management community projects, including facilitation of indigenous people supported by CSOs and the private sector. The provincial government has encouraged development partners and private sector actors to refer

their actions to the GGP's main strategies.¹² The Government of Jambi Province confirmed that at least 7 CSOs are actively implementing over 33 projects that are directly complementary to the objectives of the JERP. A list of these projects is contained in <u>Annex 12</u>.

In addition, two existing Ecosystem Restoration Licenses in Jambi, namely a) PT. REKI (Forest Hope/Hutan Harapan) founded by Burung Indonesia, Birdlife International and the Royal Society for the Protection of Birds), and b) PT Alam Bukit Tigapuluh, a joint activity between the WWF, Frankfurt Zoological Society (FZS) and The Orangutan Project (TOP) have actively to restore forest biodiversity inside the Jambi area. Up to now, there is no ER transaction so far from these two Ecosystem Restoration licenses. In addition, both PT REKI and PT Alam Bukit Tigapuluh are participating in wildlife conservation.¹³

Interventions addressing deforestation

The JERP's program planned actions are aimed to address drivers that cause deforestation in the Jambi landscape. Based on the forest cover change analysis from 2006-2018, there are six (6) major land cover types dominating the post-deforestation classes, i.e. shrubs and bare lands (unproductive lands), timber plantation, estate crops, agriculture, mining and settlement. The condition of land cover types in 2018 such as swamp shrubs, shrubs, bare lands, grasslands were the most dominant vegetation types. These were likely caused by illegal logging, unlicensed land clearing, overlogging, and encroachment since 2006. The other land cover types such as timber plantation, estate crops, and agriculture remained the same from 2006 until 2018 (see Table **10**).

The degraded lands were found in conservation areas, protection forest, other land use (APL), convertible production forest, and production limited forest areas. On the other hand, encroachment and development of timber plantation were the most likely drivers causing deforestation in production forest areas, whereas estate crops, agriculture, and unlicensed land clearing were drivers of deforestation in other land use areas (APL). In addition, illegal logging causing degraded lands occurred in both conservation areas and protection forests, whereas overlogging occurred in production forest areas (see Table **11**).

In summary, the largest driver of deforestation was timber plantation followed by estate crops, agriculture, encroachment, unlicensed land clearing, over logging, and illegal logging. Other drivers, mining and settlement are significant, but the size of deforested area is very small (see Table **10** and Table **11** below).

No	Land Use/Land Cover Condition (in 2018)	Ha	Likely Drivers
1.	Degraded lands in land/forest designation (365,721ha)		
	Conservation areas, Protection Forest	57,757	Illegal logging
	 Other Land Use (APL) and Convertible Prod. Forest 	86,873	Unlicensed land clearing
	Production Forest	80,562	Overlogging
	 Production Forest and Production Limited Forest 	140,528	Encroachment
2.	Timber plantation (HTI)	162,744	Timber Plantation
3.	Estate crops (rubbers and oil palms)	162,386	Estate Crops
4.	Agriculture (cultivation)	155,653	Agriculture
5.	Mining (open mining/coal)	1,324	Mining
6.	Settlement	278	Settlement
	TOTAL	848,107	

Table 10. Land Cover Conditions in 2018 due to Deforestation by Drivers

¹² <u>Pemprov Jambi Ajukan Ranperda Tentang Rencana Pertumbuhan Ekonomi Hijau Untuk Diharmonisasi (kemenkumham.go.id)</u>

¹³ top annualreport201920.pdf (internationaltigerproject.org)

No	Drivers	На	%	Land/Forest Designation
1.	Timber plantation (HTI)	162,744	19.2%	Production Forest
2.	Estate crops	162,386	19.1%	Other Land Use (APL)
3.	Agriculture	155,653	18.4%	Other Land Use (APL)
				Production Forest and Production
4.	Encroachment	140,528	16.6%	Limited Forest
				Other Land Use (APL) and Convertible
5.	Unlicensed land clearing	86,873	10.2%	Prod. Forest
6.	Overlogging	80,562	9.5%	Production Forest
7.	Illegal logging	57,757	6.8%	Conservation areas, Protection Forest
				Other Land Use (APL) and Production
8.	Mining (open mining/coal)	1,324	0.2%	Forest
9.	Settlement	278	0.0%	Other Land Use (APL)
	TOTAL	848,105	100%	

Table 11. Estimated share of deforestation by drivers

In order to address these drivers, it is then necessary to understand their underlying causes as follows: a) low incentives or financial support for government officers to protect remaining natural forests in both State and Non-State forest areas, b) lack of government capacity in terms of facilities, infrastructure, and human resources in forest monitoring and law enforcement, c) lack of incentives and capacity for implementing sustainable management practices, d) poor coordination causing unaligned land use plans and targets between Central, Province and District level, e) poor spatial planning and week its implementation, and f) limited access right to forest by community for generating their incomes (see Figure **5** below).

The underlying causes are closely related to forest and land governance and its policy adoption to the implementation. The interventions will then mainly address a) land and forest governance through improvement of policy and institutions, and b) improve implementation of sustainable land and forest management practices. Addressing the governance will be done by improving policies and regulation in relation to ER programs such as acceleration of provincial one map policy implementation, improvement of KLHS document for spatial planning of the province and ten districts, enhancement of implementation of peat moratorium policies, improvement of regulatory framework for fire management, development of legal framework of private sectors' roles in reduction emission, acceleration of GGP adoption to Province Long Term Development Plan, and enhancement of indigenous people's recognition.

Addressing sustainable land and forest management practices will be done through promotion of sustainable forest management, conservation, forest restoration, including incentives for implementation of sustainable estate crops and climate smart agriculture practices. Incentives or awards will be given for the community in preventing forests from encroachment, illegal logging, poaching, and fires. It includes support and facilitation in the social forestry program. The program will also support the implementation of agroforestry systems in both State and non-State Forest areas, and empower community through partnership conservation between community and national parks.

DRIVER	UNDERLYING CAUSES	PROGRAM COMPONENT	SUB-COMPONENT	
Timber Plantation	less incentives to support protecting natural forests in concessions and non-State forest (APL)	 Strengthening Institution and Policy to improve land/forest governance 	 Improving policies and regulations to support implementation of ER Program 	
Estate Crops	 lack of government capacity to supervise forest areas (monitoring, law enforcement) including funding, human resources, and infrastructure. 		 Promoting Sustainable Forest Management, Conservation, and Restoration 	
Agriculture Encroachment	 Lack of incentives and capacity for sustainable management practices (sustainable forest management, sustainable estate crops, climate smart agriculture) 	 Improving Sustainable Land and Forest management 	 Promoting Sustainable estate crops Promoting Climate Smart Agriculture Providing alternative livelihoods for generating incomes of communities 	
Unlicensed Land Clearing Overlogging	 Unaligned land use plans and targets between Central, Province, and District Level. poor spatial planning and weak its 	 Program Management and Coordination 	 Ensuring implementation of Safeguards in place Ensuring implementation of MAR in place 	
Illegal logging	 implementation Limited access right to forests by community for generating their incomes 		 Ensuring Benefits disbursed and channeled to beneficiaries Knowledge Sharing Management 	

Figure 5. JERP Emission Reduction (ER) Program Strategy

3.1.2.1. Description of the ER Program's Interventions

The ER program's interventions will be implemented in the entire Jambi area. It covers all FMUs (17 FMUs), thirteen (13) conservation areas (National Park, Nature Reserve Areas, Nature Park/TWA), and buffer zones of these areas for estate crops and small holders' activities.

The ER program will support a combination of enabling conditions and promotion of sustainable management practices that will directly address the underlying drivers of emissions resulting from sectoral activities including, timber plantations, estate crops, subsistence agriculture, and unsustainable logging practices. The program design considers the distribution of remaining forests, the threats to those forests, and the key stakeholders involved in the respective areas.

The ER program aimed to address the drivers and the underlying causes of the deforestation, peat decomposition and vegetation degradation. The Program is organized into two main strategies as follow:

1: STRENGTHENING POLICY AND INSTITUTIONS

This component will address issues concerning the lack of institutional capacity to ensure good forest and land-use governance and is aimed at improving the regulatory and institutional frameworks in AFOLU as well as strengthening the institutions and instruments for enforcing such policies. Component 1 is expected to resolve underlying causes related to policies and institutions to improve forest and land governance, establishing the enabling environment for the ER program such as Monitoring, Analysis, and Reporting and Benefit Sharing mechanism and institution, so as to prevent deforestation, forest degradation, and peat decomposition, through and improve the collaborative work between stakeholders. This component is also expected to support the preparation of long-term policies such as midterm and long-term development plans of Jambi Province to address the issues and to ensure that the ER Program will be managed continuously and become the main issues in the future development of Jambi Province.

1.1: Improving policies and regulations to support implementation of ER Program

Strong institutional and coordinating mechanisms are important in ensuring the achievement of emission reduction programs. The Jambi Provincial Government has formed a Joint Secretariat, which will be strengthened as a REDD+ Implementing Agency at the sub-national level. In addition, coordination mechanisms between sectors and between

government levels (national, provincial, district/city), as well as private, communities and other organizations (NGOs and academics), must be agreed between stakeholders. Institutional strengthening is also accompanied by capacity building within and between institutions as coordinators and implementers of the program, including to strengthen the capacity to integrate emission reduction programs into regional development planning, spatial plans, and activity at the site level including at village and community group level. This sub-component is also aimed at supporting the implementation of the Green Growth Plan (GGP) of Jambi province which has been approved the governor to be the roadmap for Jambi Long Term Development Plan, where the Emission Reduction will become the main objective for the year of 2020 -2045. Specifically, institutional strengthening will mainly target forestry, plantation and agriculture sectors as these sectors are associated with drivers of deforestation from AFOLU in Jambi.

Institutional strengthening will also encourage clear institutional mechanisms to allow and improve collaboration among government, private sector, and civil societies including capacity building for non-carbon benefits. Collaborations will also be strengthened between Forest Management Units, national parks authorities and the surrounding communities to promote sustainable forest and land management in order to generate the Provincial ER targets.

This component also will address the continuation of support to the Indigenous people in Jambi. The ER program will facilitate recognition of indigenous people's area (*wilayah adat*) and their customary institution (*kelembagaan adat*) so that it will strengthen and legalize the role of indigenous people to protect and restore their customary forests (*Hutan Adat*). Up to 2022, two indigenous people (MHA) have been recognized through local regulations, nine MHAs are in progress, whereas the other 18 MHAs are yet to be facilitated to obtain the recognition from local governments.

This Sub-component is designed to assist the sub-national government in establishing new policies and regulations to ensure effective implementation of the ER Program in Jambi. Such policies will include improvement of the regulation framework of fire management in Jambi. The stakeholder consultation process has identified that timber plantations, plantation, and peatland fires contribute to the deforestation from AFOLU. Evaluation of the moratorium for new timber plantation licenses will be done to define the contribution of this policy towards protection of the remaining natural forest and peatlands. Evaluation will also be done to identify socio-political implications of this moratorium. At least 600,000ha of peatlands need to be restored.

Evaluation of policy and regulation will also be done in the context of supporting multi-stakeholder collaboration on sustainable forest management systems. Additional context will include evaluation of policies and regulations to ensure institutional capacity to support biodiversity protection as non-carbon benefits, and enhancing private sector participation in generating ER benefits.

Under the jurisdictional Jambi ER Program, this Sub-component will facilitate and accelerate the harmonization of current sub-national policies and regulations into Jambi's Green Growth Plan Objectives. The current policies and regulations include the development of Provincial Forestry Master Plan (RKTP 2022 – 2041), the establishment of one map policy and low carbon development (Green Growth Plan), the next Jambi midterm Development Plan (RPJM) 2021 – 2024 and Jambi Long Term Development Plan 2026-2050. Review and improve the Environment Strategic Study (KLHS) and Jambi Next Spatial Plan (2021 – 2031).

The expected results under this Sub-component are as follows:

- At least four current regulations/policy reforms in forest and land use are harmonized and accelerated into Jambi's GGP objectives (such as RKTP 2022 – 2041, RPJM 2021 – 2024, RPJP 2026 – 2050, KLHS Province and 10 District KLHS, and Jambi Spatial Plan (2021 – 2031))
- b) Social conflicts between different stakeholders are settled. Sixteen (16) conflict cases are resolved by utilizing harmonized maps

- c) At least 18 groups of indigenous people will be facilitated for their recognition by local governments
- d) Peatland moratorium policy to restore at least 600,000ha is issued

2: IMPLEMENTING SUSTAINABLE LAND MANAGEMENT

Component 2 addresses the lack of sustainable practices in land management, fire and tenurial conflict; that issue was raised during stakeholder consultation. This issue is relevant with the drivers of deforestation and degradation from both AFOLU and peatland. The approach in this component is implementation at the field level, both by FMU, the private sector, and by the community. Promotion for sustainable land management practice will be carried out. The development of landscape-based management models, which combine various sectors, actors and commodities, is expected to have a long-term impact on sustainability.

2.1: Promoting Sustainable Forest Management, Conservation, and Restoration

Promotion of Sustainable Forest Management, Conservation, and Restoration practices is carried out through an integrated approach between sectors and actors, including Government, FMU, forestry companies, and community groups (including indigenous peoples and smallholders).

The proposed activities will include as follows:

- a) Facilitation and monitoring implementation of sustainable forest management in active forest concessions. The facilitation and monitoring will cover two active forest concessions (56,064ha), twenty timber plantation concessions (598,663ha), and two ecosystem restoration concessions (85,050ha).
- b) Supporting implementation of ASAP GITAL Program to prevent Forest and Land fire. The ASAP GITAL was initiated by the Forest and Land Fire Prevention Task Force (SATGAS KAHUTLA) which proved to effectively reduce Forest and fire incidents during 2020.
- c) Facilitating 11 KPHPs (covering 17 units) in completing and implementing Long-Term Management Plan (RPHJP) and Business Plan.
- d) Identifying remaining natural forests and peatlands inside 17 forest management units. It is expected that at least 70% out of 1,038,981ha forested areas will be restored as high carbon stock (natural forests).
- e) Facilitating capacity building and tools for government staff in forest protection and fire management.
- f) Increasing awareness on clearing Forest without burning through providing seedlings, tools, and supporting replanting.
- g) increasing community awareness on the risk of fires in dry seasons on peatlands and forests¹⁴.
- h) Strengthening law enforcement, patrolling, and facilitating conflict resolution. The patrols will be increased by 500%. The number of conflicts settled will be increased by 600%¹⁵.
- i) Facilitating market and financial access for farmers to increase the sale of timber and non-timber forest products.
- j) Supporting and facilitating communities (including indigenous people and smallholders) in conservation areas through conservation partnerships, in production and protected forest areas, through social forestry

 $^{^{14}}$ In 2019, there was 56,593ha of burned land. It is expected that 80% of the land will not burn in the next five years.

¹⁵ It is expected that 67 conflicts will be resolved by 2025. The patrolling will be conducted 232 times for five years.

programs. Currently 415 of social forestry licenses have been issued by MoEF. It is expected that there will be more demand for social forestry licenses to be facilitated under this program.

The expected outputs for this Sub-component are as follows:

- a) The burned area (56,593ha in 2019) will be reduced by 80%
- b) All forest concessionaires (natural forests and timber plantations) are ensured to implement full SFM principles (PHPL certificates) by 2025
- c) Seventeen FMUs have completed RPHJP and Business Plans in 2025
- d) Seventy percent of forested areas is restored (70% out of 1,038,981ha)
- e) A hundred of SF licenses will be facilitated and issued by MoEF by 2025

2.2: Promoting sustainable estate crops

This Sub-component focuses on efforts to promote implementation of sustainable estate crops in Jambi by a) protecting remaining natural forests and peatlands, including from fires inside the concessions, and b) promoting sustainable value chain of estate crop products.

By 2019, figures suggest that remaining natural forest in Jambi was about 900.713 ha or 17% out of total size of Jambi province (5 million ha). There was forest loss of 246.667ha from 2015 to 2019 due to mostly fires¹⁶. Protecting the remaining forests and peatlands from fires or other activities that cause forest loss is then necessary, particularly inside estate crops concessions. The proposed activities are as follows:

- a) Identifying remaining natural forests and peatlands inside estate crops concession areas.
- b) Seeking private sector entities to engage with RSPO/ISPO principles into business practices by facilitating and supporting RSPO/ISPO certification processes. Currently there are 186 licenses of oil palm issued, whereas 49 of those licenses have been certified ISPO. The number of certified private sectors certified ISPO will be increased by 300% over five years.
- c) Facilitating smallholders to obtain ISPO certification. Currently there are 12 farmer groups that have been facilitated for ISPO certificates. It is expected that by 2025, sixty farmer groups will be facilitated in order to obtain ISPO certificates.
- d) Facilitating market and financial access for farmers to increase the sale of estate crops products.
- e) Identifying potential post-harvest products in order to increase value added income for communities.

The expected results from this Sub-component are as follows:

- a) Area under compliance with relevant sustainability guidelines by smallholders (ha) from 1514 ha in 2019 to 2314 ha in 2025
- b) Area of remaining natural forests and peatland inside estate crops concession area identified and reserved 2.098.535 ha in 2025.
- c) Number of smallholders obtaining ISPO certificate increased from 12 to 60 farmer groups in 2025.

¹⁶ Wilayah Hutan di Jambi Tinggal 17 Persen, Turun 20.000 Ha 2 Tahun - Tekno Tempo.co

- d) Number of estate crop companies implementing principles of sustainable estate crops (ISP/RSPO) including HCVF management and land fires prevention increased from 49 to at least 150 companies through facilitating the process of ISPO certification to those companies.
- e) At least four commercial contracts (MoU) between farmers and entrepreneurs such as Hypermart, Unilever, and Indofood will be facilitated and provided in order to increase market and financial access for the sale of estate crop products.

2.3: Promoting Climate Smart Agriculture and alternative livelihoods for generating incomes of communities

Improve the implementation of productivity-enhancing technology and farming practices. This approach is aimed to promote intensification that would reduce the demands for land expansion. In parallel, sustainable investment and partnership mechanisms will be introduced to encourage green development. This Sub-component will benefit from good governance (Component 1), as it will provide clear information on land use policy, licensing process, and clear demarcation for subsequent GHG inventory. This will also be strengthened through value chain coordination, multi-stakeholder dialogue, and capacity building to encourage sustainable climate smart agriculture practices. The proposed activities under this sub-component are as follows:

- a) Capacity building for governments in identifying potential boost of agricultural productivity and incomes of smallholders¹⁷.
- b) Capacity building for farmers in implementation of climate smart agricultural practices.
- c) Facilitating market and financial access for farmers to increase the sale of agricultural products.
- d) Identifying potential post-harvest products in order to increase value added incomes for communities.
- e) Promoting agricultural products generated with less emissions through sustainable agroforestry and intercropping in order to increase productivity by avoiding forest encroachment.

The expected results under this sub-component are as follows:

- a) At least sixty-five farmers groups will be improved through training on enhancing their agricultural products for both domestic and international markets by 2024.
- b) At least 1,300 farmers will be trained on climate agriculture practices by 2024.
- c) At least four commercial contracts (MoU) between farmers and entrepreneurs such as Hypermart, Unilever, and Indofood will be facilitated and provided in order to increase market and financial access for the sale of agricultural products

2.4: Providing alternative livelihoods for generating incomes of communities

Under this sub-component, the proposed main activities will be improvement of communities' incomes through providing alternative livelihoods with less pressure to natural forests and peatlands. The proposed activities are as follows:

a) Promoting agroforestry in peatland such as alley cropping, trees along the border, and mix trees and agricultural plants (seasonal trees). The Paludiculture technique in peatlands will be introduced.

¹⁷Currently there are seven farmer groups that have been facilitated by the provincial government to enhance their products for domestic and international markets

Demonstration plots will be provided in Muara Jambi, Tanjung Jabung Barat, and Tanjung Jabung Timur districts. The defined number of plots will be consulted with the district agriculture services.

- b) Supporting Agroforestry system (social forestry program) in State and non-state forests.
- c) Empowering community through partnership conservation between community and national parks (such as eco-tourism, agriculture, handicrafts, non-timber forest products).
- d) Encouraging farmers for clearing Forest without Burning through providing seedlings, tools, and supporting replanting, etc.

The expected results under this sub-component are as follows:

- a) At least in three districts (Muara Jambi, Tanjung Jabung Barat, and Tanjung Jabung Timur) the paludiculture technique with a number of demonstration plots will be introduced. Determination of number of plots will be consulted to those districts within quarter 1 to 2 in 2023.
- b) Twenty field schools on agroforestry in the State Forest area and twenty-four field schools on agroforestry in non-State Forest areas will be established by 2025.
- c) At least four MoUs of conservation partnerships between community and national parks in either ecotourism, agriculture, handicrafts, or non-timber forest products.
- d) The target area for clearing forest without burning gradually increased. In 2023, the target area will be 100 hectares, 150 hectares in 2024, 150 hectares in 2025, and 200 hectares in 2026.

3: PROGRAM MANAGEMENT AND COORDINATION

This component envisages overall management of the ER implementation, including tools for implementing REDD+, such as measurement, analyzing and reporting (MAR), environmental and social safeguards (ESMF, IPPF), and benefit sharing mechanisms (BSM) including non-carbon benefits. The institutional arrangements for MAR, Safeguards and BSM will be developed and strengthened in the second year of implementation.

3.a: Ensuring implementation of Safeguards in place

In order to ensure the ER program will not produce negative social and environmental impacts, the implementation of safeguards need to be in place. Thus, proper management, monitoring, and evaluation on safeguards implementation for ER activities need to be carried out by relevant stakeholders. Capacity building, SOPs, and relevant policies related to safeguards need to be improved and strengthened.

The proposed activities to make efficient and effective safeguards implementation are as follows:

- a) Conducting capacity building for safeguards implementation. It is expected that 60 trainings for the safeguards will be conducted in 9 districts and 1 city.
- b) Finalizing safeguard document enhancement (Strategic Environmental and Social Assessment/SESA, Environmental and Social Management Framework/ESMF, Feedback Grievance Redress Mechanism/FGRM, Stakeholder Engagement Plan/SEP, Indigenous People Planning Framework/IPPF including preparation and implementation of Environmental Social Committment Plan/ESCP).
- c) Establishing and operationalizing FGRM (Policy, instrument, institutional arrangements, SOP)
- d) Monitoring and developing the Safeguards Implementation Report.
e) Conducting studies related to carbon and non-carbon benefits (such as habitat conservation, ecosystem services, good governance, Indigenous Peoples, etc.).

3.b: Ensuring implementation of MAR in place

Program management and subsequent monitoring, evaluation, and reporting will refer to how the ERP addresses the drivers of deforestation through program implementation. In respecting good governance principles, the monitoring and evaluation system needs to be transparent and accessible to all stakeholders. The proposed activities for MAR are as follows:

- a) Establishing institutional arrangements for the MAR system for the province. It is expected that by 2025 the arrangements on data collections for implementation of ER programs at every level (village, sub-district, and district) are in place. The MAR system of Jambi will be based on the MAR system from the Central Government (MoEF). The arrangements and procedures from the Central system will be replicated and adjusted so that the establishment of the arrangements will be effective and efficient.
- b) Strengthening capacity of responsible personnel, infrastructure and institution for analysis and reporting carbon accounting.
- c) Developing ERMR1 in end 2023 and ERMR2 in mid 2026 prepared by provincial government personnel. The timing and period of monitoring will be based on Indonesian System monitoring cycle and is subject to ERPA negotiation.

3.c: Ensuring Benefits disbursed and channeled to beneficiaries

It is important to ensure that benefits from result-based payments are received and used by beneficiaries in order to support implementation of ER programs. The use of benefits needs to be reported to the fund manager/intermediary agency and copied to the sub-national project management unit in Jambi for transparency and accountability purposes. Therefore, capacity building for beneficiaries is required. The proposed activities under this sub-component are as follows:

- a) Conducting capacity building for beneficiaries particularly on developing proposals and reporting for the use of benefits. It is expected that 130 trainings will be conducted within 9 districts and 1 city.
- b) Conducting capacity building for governments/agencies at sub-national level that are not responsible for the project implementation and are in charge for monitoring and evaluation on the use of the benefits. It is expected that 30 trainings for government officials will be conducted within 9 districts and 1 city.
- c) Strengthening Institutional arrangements for BSP at village, district, and provincial level. Facilitation for strengthening institutions will cover 133 sub-districts.
- d) Developing Benefit Sharing Plan Annual Report.
- e) Strengthening and supporting the role of local intermediary agency to disseminate the benefits to the local beneficiaries within the province.
- f) Implementing annual BSP Monitoring, Verification, and Reporting.

3.d: Knowledge Sharing and Management

Lessons learning from Jambi in reducing emissions will be important for other provinces to duplicate the efforts. Experiences on facing challenges and solving problems will be useful to share with other users not only domestically but also to international audiences. The proposed activities under sub-component will include a) disseminating

Jambi ER lessons learned to relevant stakeholders and available online for the public, and b) attending BioCF and other relevant domestic and international events.

3.1.3 Financing plan for implementing the planned actions and interventions of the ISFL ER Program

The ER Program Financing Plan was developed based on the program and activities which are planned and intended to address the emission drivers in Jambi.

THE JERR PROGRAM WILL TARGET A REDUCTION OF 19 MTCO₂E. THE COSTS OF IMPLEMENTING THE PROPOSED PROGRAM ACTIONS AND INTERVENTIONS ARE ESTIMATED TO REACH USD 40.9 MILLION. THE PROGRAM HAS SECURED FINANCING FROM THE BIOCF-ISLF, IN THE FORM OF A USD13.5MILLION PRE-INVESTMENT GRANT FOR PLANNED ACTIONS AND INTERVENTIONS. THE REMAINING COSTS OF USD 27.4 MILLION WILL BE FINANCED FROM GOVERNMENT BUDGET (ABPN, PROVINCIAL BUDGET, DISTRICT BUDGETS). THESE INCLUDE BUDGET ALLOCATION FROM THE PROVINCIAL SERVICE (USD 15.9 MILLION), WOMEN'S EMPOWERMENT, CHILD PROTECTION AND POPULATION CONTROL SERVICE (USD 12.1 MILLION), AND REGIONAL PLANNING AGENCY (USD 4.6 MILLION)¹⁸ (SEE Table 12 AND Up to December 2022, budget spent from Provincial Service reached IDR 330.7 billion or USD 23.6 million (86% from total allocated budget from RPJMD 2021-2026) (Table 16)

Table **14**).

	Component Program	Financing	Finance	Source of Funding	Surplus
		Required	Identified/		
		(USD)	Secured (USD)		
1.	Strengthening Institution			BioCF ISFL Pre –	
	and Policy to improve	1,561,071	2,000,000	Investment grant	438,929
	land/forest governance				
2	Improving Sustainable	35,746,229	15,000,000	Provincial Forestry	
	Land and Forest			Service Budget under	
	management			APBD 2022 – 2026*	
			12,100,000	Provincial Women's	
				Empowerment, Child	2,853,771
				Protection and	
				Population Control	
				Service Budget under	
				APBD 2022 – 2026*	
			11,500,000	BioCF ISFL Pre –	
				Investment grant	
3	Program Management	3,639,947	4,600,000	Provincial Regional	960,053
	and Coordination			Planning Agency Budget	
				under APBD 2022 –	
				2026)*	
TO	TAL	40.947.247	45,200,000		4,252,753

Table 12. Summary of JERP program financial plan and possible contribution funds

¹⁸<u>https://docs.google.com/spreadsheets/d/1BYq7L6mwLILjitnCNz0jpl0Ws7dso9OO?rtpof=true&authuser=stepibuy%40gmail.c</u> om&usp=drive fs

• Government Budget for 2022 – 2026 under Five Year Development Plan/RPJMD 2021 – 2026

The upfront financing for the JERP is secured due to contribution from government budget allocation for 2022 – 2026 and pre-investment BioCF-ISLF. In addition, it is expected that the JERP will leverage up to **USD 70 million** from ER payments (result-based payments). A portion of these payments could be used to offset the government expenditures for JERP, in accordance with the final agreed BSP.

Based on the list of international donor projects registered to Bureau of Foreign Cooperation/ MoEF¹⁹, there are **10** ongoing multilateral and bilateral donor projects allocated for Jambi related to climate change with the total estimate of funding committed in the amount of **USD 42.4 million** (with the exclusion of the BioCF ISFL preinvestment the grant and the funds that have been delivered to local CSOs). In addition, the total ongoing CSOs' projects funded by other international organizations are expected to reach **USD 17 million (including projects supported by bilateral or multilateral projects)**. Therefore, the additional secure financial sources from international projects to support JERP are expected to reach **59.4 million** (see Table 13).

Addit	Additional secure fundings outside Government Budgets and BioCF-IFSL to Jambi ER Funds (USD million)				
Progr	Program				
No	Bilateral and Multilateral Project:				
1	Restoration of Burnt Peatland in Jambi (Korea)				
2	Tropical Forest Conservation Act (TFCA) Sumatera Program (USA)				
3	Enhancing the Sustainable Management of Solid Waste and Resource Towards				
	Circular and Low-Carbon Economy (The Netherlands)				
4	Project Strategic Sector Cooperation in Circular Economy and Solid Waste				
	Management (SSC) (Denmark)				
5	Forest Programme II (REDD+) – Biodiversity and Watershed Development				
	Component Jambi (German)				
6	Promoting Sustainable Community Based Natural Resources Management and				
	Institutional Development Project (Proyek FIP II)				
7	Integrated Management of Peatland Landscapes in Indonesia (IMPLI project) – GEF				
8	Implementing the Strategic Action Programme for the South China Sea – GEF	42.4*			
9	Market Transformation through Design and Implementation of Appropriate				
	Mitigation Actions in the Energy Sector (MTRE3)				
10	Strengthening Forest and Ecosystem Connectivity in Riau, Jambi and Sumatera Barat				
	Landscape of Central Sumatera through investing in natural capital, biodiversity				
	conservation and land-based emission reduction (RIMBA)				
No	Ongoing CSOs' Project supported by International Organizations ²⁰				
1	Perkupulan Alam Hijau (supported by Sinar Mas Forestry, IFM Fund, WRI, SNV,				
	Lestari Capital)				
2	Mitra Aksi Jambi (supported by Caterfillar, WRI, Kitabisa.com, SKK Migas, Petrochina				
	Jabung Ltd, P4F, PT REKI, Adaptation Fund, TFCA-Sumatera)				

TABLE 13. SUMMARY OF ONGOING INTERNATIONAL DONOR PROJECTS IN JAMBI

¹⁹<u>https://docs.google.com/spreadsheets/d/1wbLf1FPhHF_oZ0rUBntfTjUrbqiU4i5D?rtpof=true&authuser=stepibuy%40gmail.co</u> m&usp=drive_fs

²⁰<u>https://docs.google.com/document/d/1B3vBpm6UGfxnviFXXGzgHJLrHoouizZn?rtpof=true&authuser=stepibuy%40gmail.com</u> <u>&usp=drive_fs</u>

3	Pundi Sumatra (supported by Baznas, Kemitraan – Estungkara, TFCA – Sumatera)	
4	Setara Jambi (supported by Misereor, UNDP, Kehati, RSPO, FONAP)	
5	Walestra (supported by RRI, UNDP Indonesia/Tiger Project, ICCTF, FFI)	
6	WALHI (supported by FPP, Mighty Earth, Rainforest Action Network)	17.0
7	KKI WARSI (supported by FAO, CLUA, Ford Foundation, Rainforest Foundation	
	Norway, Caritas German, P4F, TFCA, NIFCI-WRI)	
	TOTAL	59.4
1		

* A small portion of around USD 1.1 million of USD 43.5 million from the bilateral/multilateral projects has been delivered to local CSOs. For example, Walestra has received around USD 95,000 from Tiger Project and Forest Programme. The TFCA-Sumatra has delivered the funds of USD 1,025,000 to CSOs (Mitra Aksi, Pundi Sumatra, and KKI WARSI).

Up to December 2022, budget spent from Provincial Service reached IDR 330.7 billion or USD 23.6 million (86% from total allocated budget from RPJMD 2021-2026) (Table 16)

Table 14. Allocated Budget from 2022 – 2026 for Government Agencies related to Forestry, Agriculture, Environment, Estate Crops, Village, and Development Plan (RPJMD 2021 – 2026)

No	Government Agency	Progam	Total (IDR billion)	Total (USD million)
1	Estate Crop Service	Agrcultural Disaster Management Program		
		Agriculture Infrastructure Proviision and Development Program	1	
		Agriculture Extension Program	146,38	10,5
		Agriculture Business License Program	-	
2	Environmental Service	Program for Development and Supervision of Environmental permits and Environmental Protection and Management Permits (PPLH)	12,06	0,9
		Environmental Complaints handling Program	1	
3	Forestry Service	Program for recoginzing the Existence of indigeneous law communities (MHA), local Wisdom, and MHA's rights related to PPLH		
		Biodiversity Management Program (KEHATI)		
		Pollution and/or Environment Damage and Control Program		
		Environmental Awards program for community		
		Program for improving environmental education, training, and explantation for community	221,9	15,9
		Environment Planning Program		
		Biological Resource and Ecosystem Conservation Program		
		Program for Educatio and Training, Explanation and Community Empowerment in Forestry		
		Watershed Management Program		
		Forest Management Program		
4	Women's Empowerment, Child Protection and Population Control Service	s rment, Child n and Program for Community Institutions, Indigeneous People and IP's laws on Control		12,1
		Village Administration Program		
		Village Governance (Institution) Program		
5	Regional Planning Agency	Coordination and Syncronization of Development Plan		4,6
		Program fpr Planning, Monitor, and Evaluation of Regional Development		
6	Secreatry Province	Economy and Development Program	14,2	1,0
		TOTAL	629,22	44,9

The additional financial sources for existing international donor projects in Jambi will increase the secure financial funds to support the implementation of JERP in Jambi with a surplus of USD 61.6 million.

Table 15. Total summary of JERP program financial plan and possible contribution funds (BioCF ISFL Preinvestment grant, allocated budget Provincial Government 2022-2026, and international donor projects operated in jambi)

Component Program		Financing	Finance	Source of Funding	Surplus
		Required	Identified/		
		(USD)	Secured (USD)		
1.	Strengthening Institution and Policy			BioCF ISFL Pre – Investment	
	to improve land/forest governance	1,561,071	2,000,000	grant	438,929

2	Improving Sustainable Land and	35,746,229	11,500,000	BioCF ISFL Pre – Investment	
	Forest management			grant	
			27,100,000	Budget under APBD 2022 – 2026	
			42,400,000	Bilateral and Multilateral Project	
				(Table 11)	
			17,000,000	Ongoin CSOs rojects operated in	62,253,771
				Jambi (Table 11)	
3	Program Management and	3,639,947	4,600,000	Provincial Regional Planning	960,053
	Coordination			Agency Budget under APBD 2022	
				- 2026	
TOTAL		40.947.247	102,600,000		61,652,753

Table 16. Summary of Provincial Government Budget spent from 2021 - 2022 related to mitigation and adaptation Climate Change in Jambi

No	Brovincial Services of Jambi	Year (IDR)			
NU		2021	2022	2021 - 2022	
1	Regional Development Planning, Research and Development Agency	468.505.000	3.391.085.000	3.859.590.000	
2	Forestry Service	7.403.002.319	14.637.737.761	22.040.740.080	
3	Plantation (Estate Crops) Department	10.053.313.856	13.534.062.651	23.587.376.507	
4	Food Crops, Horticulture and Livestock Service	12.415.743.645	4.267.192.962	16.682.936.607	
5	Energy and Mineral Resources Service	4.218.345.135	6.631.038.133	10.849.383.268	
6	Transportation Service	5.057.026.257	5.718.855.488	10.775.881.745	
7	Environmental Services	2.079.327.610	5.538.479.944	7.617.807.554	
8	Industry and Commerce Service	5.270.582.055	2.176.746.764	7.447.328.819	
9	Public Health Office	1.360.437.748	1.542.743.916	2.903.181.664	
10	Public Works and Public Housing Service	59.642.957.409	136.750.124.658	196.393.082.067	
11	Maritime Affairs and Fisheries Service	11.079.770.484	6.379.000.000	17.458.770.484	
12	Social Affairs, Population and Civil Registration Service	233.086.143	985.196.020	1.218.282.163	
13	Regional Disaster Management Agency	3.899.686.086	5.995.299.939	9.894.986.025	
	Total	123.181.783.747	207.547.563.236	330.729.346.983	

3.1.4 Analysis of laws, statutes, and other regulatory frameworks

In the context of law and regulation at the national and local levels, they are consistently linked to the plan of intervention of the JERP in Jambi. Indonesia has ratified international treaties on climate change (Law no. 6/1994 (UNFCC), Law no. 17/2004 (Kyoto Protocol), Law No. 16/2016 (Paris Agreement). In implementing the development of land-based sectors, there is Forestry Law no. 41/1999 jo 19/2004, Plantation Law no. 39/2014, National Development Planning Law no. 25/2004, and the Long-term Development Plan Law no. 17/2007, and the National Spatial Planning Law no. 26/2007.

ER activities are also regulated by Presidential Regulation no. 61/2011 on National Action Plan to Reduce GHG and Presidential Regulation No. 71/2011 concerning Inventory of National GHG. Currently Presidential Regulation No.98/2021 on the Economic Value of Carbon and subsequently the MoEF Decree No. 21/2022 on Arrangement for the implementation of Economic of Carbon have been issued. Other MoEF decrees that are related to the implementation of REDD+ in Indonesia are as follows:

- MoEF Regulation No. P.70/Menlhk/Setjen/Kum.1/12/2017 on REDD+ Procedures;
- MoEF Regulation No. P.71/Menlhk/Setjen/Kum.1/12/2017 on the National Registry System;
- MoEF Regulation No. P.72/Menlhk/Setjen/Kum.1/12/2017 on MRV Implementation Guidelines; and
- MoEF Regulation No. P.73/Menlhk/Setjen/Kum.1/12/2017 on Guidelines on Inventory and Reporting on GHG Emissions.
- Presdient Regulation No.98/2021 regarding Economic Value of Carbon
- MoEF Regulation No.21/2022 regarding implementation of the Economic Value of Carbon
- MoEF Decree No.7/2023 on procedures of carbon trade in forestry sector

In terms of safeguards, the MoEF has issued Law No. 32/2009 concerning Environmental Management and Protection. For the government executing agency (national and regional level), this law mandates that provinces and districts develop a strategic environmental assessment that will guide the regional spatial planning for development. This law also obligates any development program in the private sector to implement proper environmental and social considerations, including an environmental assessment, a management plan and a monitoring plan. In addition to this, the government also issued Government Regulation (PP) No. 27/2012 concerning Environmental Permit and Regulation and the Minister of Environment Decree No. 16/2012 concerning Guidelines for Preparing Environmental Documents (AMDAL, UKL/UPL, and SPPL).

There are also regulations to support the implementation of JERP actions related to forest management including, Ministry of Environment and Forestry Regulation No. 83 /2016 concerning Social Forestry; Ministry of Environment and Forestry Regulations No. 31/2015 regarding private forests which provides the procedure for recognition of customary forests by MoEF; Presidential Regulation No. 88/2017 concerning Resolution of Land Conflict within Forest Area (PPTKH); Ministry of Environment and Forestry No. 32/2016 regarding control and prevention of land and forest fire, and Regulation from DG Conservation of Natural Resources and Ecosystem (KSDAE) No. 6/2018 regarding conservation partnership with local communities.

Regulation	Related to planned action and intervention
Ministry of Environment and Forestry Regulation No. 83 /2016 concerning Social Forestry	 Activity 2.1. Promoting Sustainable Forest Management, Conservation, and Restoration Supporting and facilitating communities (including indigenous people and smallholders) in conservation areas through conservation partnerships, in production and protected forest areas, through social forestry programs.
Ministry of Environment and Forestry Regulations No. 31/2015 regarding private forests which provides the procedure for recognition of customary forests by MoEF	 Activity 1.1: Improving policies and regulations to support implementation of ER Program 18 groups of indigenous people will be facilitated their recognition by local governments
Presidential Regulation No. 88/2017 concerning Resolution of Land Conflict within Forest Area	Activity 2.1: Promoting Sustainable Forest Management, Conservation, and Restoration
	Strengthening law enforcement, patrolling, and facilitating conflict resolution. The patrols will be increased by 500%. The number of conflicts settled will be increased by 600% (with the target 67 conflicts solved by 2025)
Ministry of Environment and Forestry No. 32/2016 regarding control and prevention of land and forest fire	Activity 2.1: Promoting Sustainable Forest Management, Conservation, and Restoration
	 Supporting implementation of ASAP GITAL Program to prevent Forest and Land fire Facilitating capacity building and tools for government staff in forest protection and fire management Increasing awareness on clearing Forest without burning through providing seedlings, tools, and supporting replanting increasing community awareness on the risk of fires in dry seasons on peatlands and forests
Regulation from DG Conservation of Natural Resources and Ecosystem (KSDAE) No. 6/2018 regarding conservation partnership with local	Activity 2.1: Promoting Sustainable Forest Management, Conservation, and Restoration
communities	Supporting and facilitating communities (including indigenous people and smallholders) in conservation areas through conservation partnerships, in production and protected forest areas, through social forestry programs.
	2.4: Providing alternative livelihoods for generating incomes of communities
	Empowering community through partnership conservation between community and national parks (such as eco-tourism, agriculture, handicrafts, non-timber forest products).

TABLE 17. KEY	REGULATIONS RELATE	D TO THE PROPOSED	PROGRAM ACTIVITIES

Consistent with the above law and regulation, Province Government has issued Provincial Regulation No. 7/2016 concerning Medium Term Development for Jambi Province 2016-2021, Provincial Regulation No. 6/2009 regarding Long-Term Regional Development, Provincial Regulation No.10/2013 regarding Provincial Spatial Plan, Governor of Jambi Decree No. 352/2013 concerning Strategy and Action Plan for REDD+ 2012-2032, and Provincial Regulation No. 2/2016 on Prevention and Controlling of Forest and Land Fire.

All of the above laws and regulations have provided a strong legal basis for the implementation of REDD+ in Jambi. However, there are some regulation gaps that need to be bridged, including on legal arrangement for plantation inside the forest area, legal arrangement of mining in Non-Forest Area (IPL), legal arrangement for NTFP, regulation on the obligation to set aside HCV and HCS areas and also on the requirement for RSPO for plantation companies, although there is already Ministry of Agriculture Regulation No.11/2015 regarding ISPO; regulation on the settling up conflicts in forestry and mining, integration of conflict settlement between sectors, and regulation on Benefit Sharing Mechanism for emission reduction program. The regulation gaps will be addressed through consultations with stakeholders including with relevant inline ministries such as MoEF, MoA, and National Land Agency (BPN) in the second quarter of 2023. The results of consultations will come up with Ministries' Regulations or Decrees. At provincial level, these decrees will then be brought into provincial government and consulted with provincial assembly in order to produce provincial regulations.

Arrangements for plantations that have been planted and claimed by community in forest areas referring to the UUCK will be granted a permit for legalization. Meanwhile, the regulation of NTFPs refers to P.77/2019 and the regulation for implementing HCS and HCV will be encouraged voluntarily prior to the issuance of a provincial level regulation to require HCS and HCV. RSPO requirements will follow existing regulations.

Recent ratification of the Omnibus Law (No 11/2020) on Job Creation aimed at the simplification of business licensing and land acquisition may affect many forestry and environmental regulations. Several core articles contained in Law no. 41/1999 on Forestry and Law no. 32/2009 on Environmental Protection and Management were amended. Some possible implications: 1) easier licensing for forest area utilization; 2) increase exposures of protected forest areas for business interests, and; 3) more proposals to change the designation and function and use of forest areas. The Jambi provincial government shall anticipate these potentials and seek resolution to reduce implications for increased emissions. The newly adopted Green Growth Plan and several policies related to sustainable management of forest and land should be capitalized to support ER Program in Jambi, especially to also respond to the Omnibus Law mentioned above.

Since President Regulation No.98/2021 and MoEF Regulation No.21/2022 regarding the implementation of the Economic Value of Carbon have been issued, the carbon rights are owned and regulated by the National Government through Ministry of Environment and Forestry (MoEF). It includes carbon management at national level such as registration, monitoring, verification, and validation. It implies that any carbon projects in the fields have to be registered, monitored, verified, and validated through <u>national system</u>. The JERP's emission reduction units will be registered to the national system. Monitoring, verification, and validation will be conducted by the selected <u>third parties</u> that have been accredited by <u>National Accredited Body</u> (KAN). In addition, since JERP is categorized as a result-based payment project, thus its ER units could be tradeable for both national and international markets as long as the demand for NDC has been met by National Government and the ER units endorsed by Minister (Article 4, MoEF No.21/2022).

3.1.5 Risk for Displacement

DRIVERS OF DEFORESTATION AND FOREST	RISK OF DISPLACEMENT ²¹	EXPLANATION/JUSTIFICATION OF RISK ASSESSMENT	DISPLACEMENT MITIGATION MEASURES
DEGRADATION			
AND FOREST DEGRADATION Conversion of forest to estate crops and timber plantation	Medium for Estate crops and Low for timber plantation	The JERP program aims to reduce deforestation from conversion of forest to oil palm plantations and timber plantation by preventing further allocation of forested land to agricultural purposes and forest plantation. Although this can create demand for new plantation concessions and estate crops elsewhere, if the national and provincial regulations on preventing further estate crops and timber plantation permits in forested lands are enforced in the neighboring provinces, the chance for further deforestation will be minimal. However, the focus of the ER program is on province-wide governance so that the risk of displacement only occurs along the province border. This will be limited sources of carbon emission , mainly from smallholder expansions to neighboring provinces. The dynamic of deforestation (source) and reforestation (sink) will take place inside the timber plantation concession in Jambi where the forest will be converted (deforestation) into plantation forest, while during the process of	 Both central government and Jambi local government are consistent in protecting the conversion of the remaining forest into plantation and state crops: MoEF and Provincial Jambi agree that allocation lands for new plantation concessions and estate crops are limited. The limited expansion lands are also enforced in neighboring provinces. The remaining forest outside the state forest land are protected by both province and district governments. Besides monitoring the deforestation in neighboring provinces by using a sophisticated satellite monitoring system established at the national level, law enforcement both in Jambi and other provinces to stop illegal activities that lead to deforestation and displacement is strengthened.
		take place (from grassland or bare	dealing with this driver is to
		net emissions will take place during	to communities such as

TABLE 18. Risk of displacement category

²¹ Risk category Definition as follows:

•

High:The potential of emission displacement to other locations due to ER activities is high or certain **Medium:**The potential of emission displacement to other locations due to ER activities is limited or likely **Low:**The potential of emission displacement to other locations due to ER activities is low or unlikely

DRIVERS OF DEFORESTATION AND FOREST DEGRADATION	RISK OF DISPLACEMENT ²¹	EXPLANATION/JUSTIFICATION OF RISK ASSESSMENT	DISPLACEMENT MITIGATION MEASURES
		this process. With no further forest land allocated for timber plantations outside the existing ones, likely, the process will also move to neighboring provinces in the absence of a policy for halting forest conversion. Both of the above processes (forest	agroforestry, harvesting non- timber forest products, and social forestry. Although this solution might decrease the benefit in the short term but will have livelihood security in the long term.
		timber plantation permits outside the existing ones) are considered medium and low displacement risks , respectively.	
Encroachment by locals and migrants	Low	Encroachment by the locals and migrants in the state forest land and in the forested areas outside the state forest land is a common phenomenon in Indonesia. They converted forests into plantations or mixed agriculture. This is happening due to weak governance and law enforcement effort in the field. Due to project intervention, especially in strengthening the institutions involved in forest governance and law enforcement, namely Forest management Unit (FMUs), National Park Authorities, and BKSDA, it is expected that some encroachment will stop and move to neighboring provinces where forested areas are much open. Ongoing conflicts between local and migrant at a limited scale also the strict law enforcement applied to migrant opening forested land (deforestation) in Jambi jurisdictional areas will force some of them to either return home or move to other regions outside Jambi.	National-wide policies to stop forest encroachment are promoted and applied evenly at the neighboring provinces. Simultaneously, livelihood activities away from the forest are deemed important both in Jambi jurisdictional areas and the neighboring provinces.
Illegal mining (PETI)	Low-Medium	Illegal mining activities in several locations use both community- owned land and state forest land and land for other uses. However, except in some limited cases, the activities are usually exclusive and not yet widespread. However, restrictions due to law enforcement for illegal mining inside the forested areas may trigger threats from alternative livelihood by opening the forest	 There are two ways in dealing in this issue: 1. Prevent any illegal mining in the new location while it is still under control by the government. This has been the standard approach nationally to limit illegal mining in the state forest land, although some activities are still happening

DRIVERS OF DEFORESTATION AND FOREST	RISK OF DISPLACEMENT ²¹	EXPLANATION/JUSTIFICATION OF RISK ASSESSMENT	DISPLACEMENT MITIGATION MEASURES
DEGRADATION			
		causing further carbon emission. However, this is considered a low risk of displacement due to a limited number of people involved in these activities. However, it is fair to say that as long as the national governance framework on mining in forested areas remains weak, the risk of displacement is high.	 here and there due to weak law enforcement in these locations. Improve land governance in the existing illegal mining area by using the existing law, for example, by supporting legal community mining. By doing so, it will bring illegal mining activities under government purview.
Illegal logging	Low	Although the Government of Indonesia has reported the slowdown of illegal logging activities across Indonesia in recent years, some illegal loggings causing forest degradation (source of emission) are still reported in Jambi in 2020, especially in Muaro Jambi District. This district has been targeted by the Law Enforcement Operation Unit under the Ministry of Environment and Forestry in collaboration with the army and Berbak Sembilang National Park Authority. This kind of operation may reduce or stop illegal logging activities in Jambi with the possible risk of displacement to neighboring provinces. However, since the anti-illegal logging operation is applied commonly to other provinces as well, the Risk of Displacement is considered Low.	The Government of Indonesia under the KLHK is very serious in tackling illegal logging activities not only in Jambi but also in the neighboring province.
Forest fires and fires in peatlands	Low	Underlying causes of fires tend to be localized, and fires will be addressed mainly through fire prevention and control. There is no apparent risk of these activities leading to increased emissions elsewhere. This is to say that the possible source of emission in the form of forest degradation or deforestation in other places is Low .	Fire prevention by using Information technology and involving local communities the primary strategy for dealing with forest fires in the mineral and peat soils.

3.2 Description of stakeholder consultation process

The consultation processes were done through Focus Group Discussions/FGDs, interviews and presentation of ideas and concepts. At the national level, participants included representatives from Ministries (MoEF, Ministry of Home Affairs (MoHA), Ministry of Agriculture (MoA)), Universities (University of Jambi, University of Lampung, and IPB University), Donors (such as GIZ, USAID, UKAid, AUSAid), and international research agencies (CIFOR/ICRAF). At the sub-national level, participants mostly included those from provincial and district government agencies, villages and

communities, local NGOs, local Universities, and the private sector (mostly from forestry and timber plantation companies and oil palm companies operating in Jambi).

The FGD process supported the dissemination of ideas, and the process was done to encourage clarifications, questions and in-depth discussions to support the analysis of key issues. Brainstorming sessions within the consultation process allowed concerns from participants (representing each of the stakeholders) to be compiled as key issues, and were considered under the ERP. Consultation to-date is sufficient to consolidate ideas, develop program design and agree on the environmental and social risks. The benefit sharing mechanism to beneficiaries were also introduced and consulted to relevant stakeholders including the communities in 170 villages during the FPIC process from June to November 2022.

According to the FPIC Report issued in January 2023,²² there are 168 villages providing their consent to participate in the JERP, whereas 2 villages refused to take part in the JERP. One village refused to participate due to the uncertainty of carbon trade and the benefits to them. The other village was not able to give their consent due to the election for the new village head at the time during the visit of the FPIC team. When the FPIC team sought confirmation to the village, the answer was still the same, declining to join the JERP.

Annex 14 provides further details on the stakeholder engagement process. Until the end of December 2022 there were 16 FGDs in the Greater Jakarta area, 36 FGDs in Jambi, and 3 FGDs at the District level in Jambi. Between January to June 2021, there were 17 FGD in Greater Jakarta area, and 7 FGDs in Jambi, of which half were undertaken through a virtual or hybrid setting due to the Covid-19 pandemic. In 2021, the FPIC process included 100 FGDs covering 100 villages, whereas in 2022 there were 170 FGDs covering 170 villages and 10 districts/cities, and 1 training for field FPIC facilitators. The total participants attending the second FPIC process in 2022 amounted to 8469 people (5991 males and 2478 females).

In the discussion on improving the ERPD document, several issues were raised, including: the factors causing deforestation and degradation, the work area of the activity, the level of stakeholder involvement and the type or model of intervention activities to be carried out in the pre-investment and RBP phases. Several issues of agreement or understanding have been formulated and included in the ERPD document.

Meanwhile, in the discussion on the preparation of the Benefit Sharing Plan (BSP), several issues were raised, including: the calculation model, the types of benefits to be provided, the categories of parties who become beneficiaries, as well as the reporting period and distribution of funds to the beneficiaries. Some of these issues have been written in the BSP document.

During the discussion on the preparation of the Safeguards document, several issues were raised, including: the criteria and types of safeguards documents, the laws and regulations that form the legal basis, the mechanism for compiling the document, and the stakeholders who are responsible for the preparation and monitoring of the safeguards implementation. Some of these issues have been written in the safeguards document. The ongoing stakeholder consultation and engagement plan will be completed before the ERPA is signed (scheduled in Q2 2023).

²²<u>https://docs.google.com/document/d/1Bkicn9Efhl5bzLoBRHeorRMIPVnSSkz1?rtpof=true&authuser=stepibuy%40gmail.com&usp=drive_fs</u>

3.3 Non-Carbon Benefits

Non-carbon benefits are any benefits produced by or in relation to the implementation and operation of an ER Program, other than monetary and non-monetary benefits (e.g., ecosystem services, improved land-based sector governance which will lead to reduced conflict and improved investment climate, alternative livelihood options for forest-fringe communities, etc.).

The expected non-carbon benefits and relevant ER programs of JERP in Jambi are presented as follows:

Type of Non-Carbon Benefits	Beneficiaries	Explanation	Relevant ER Activities
Ecosystem services and Biodiversity conservation including protection of essential ecosystem	 Forest Management Unit (TN, KPH) Local government Forest Company Community Villages 	By protecting remaining forests, the ER Program will contribute significantly to both national and global efforts to protect biodiversity. This includes the protection of habitat for key species such as Sumatran Tiger.	All ER activities under Component 1 (strengthening institution and policy) and 2 (sustainable land and forest management).
Improvement/enhanceme nt of local livelihoods	 Community Villages Indigenous people Group 	Social forestry and livelihood programs will protect and enhance livelihood opportunities for participating communities.	 Facilitating market and financial access for farmers to increase the sale of timber and non-timber forest products Supporting and facilitating communities (including indigenous people and smallholders) in conservation areas through conservation partnerships, in production and protected forest areas, through social forestry programs
Improved land and forest governance	 Local governments Forest holders (forest company) Community forestry 	Improving policies and regulation in relation to ER programs will strengthen the implementation of forest good governance.	 acceleration of provincial one map policy implementation, improvement of KLHS document for spatial planning of the province and ten districts, enhancement of implementation of peat moratorium policies,

Type of Non-Carbon Benefits	Beneficiaries	Explanation	Relevant ER Activities
			 improvement of regulatory framework for fire management,
			 development of legal framework of private sectors' roles in reduction emission,
			 acceleration of GGP adoption to Province Long Term Development Plan, and
			 enhancement of indigenous people's recognition
clarified land tenure arrangement	 Forest Management Unit (TN, KPH) Local government Forest Company Community Villages 	Clear land tenure will minimize the risks of unclear demarcation and open access forest areas.	 Clarify the status of ownership of land and natural resources of indigenous peoples through the issuance of regulations Building the capacity of FMUs (KPH) to carry out social inventories, conflict tenure mapping, and boundary delineation in order to encourage important steps related to promoting sustainable forest management and recognition of land and natural resource rights claims owned by indigenous peoples and local communities Supporting village-level spatial planning and development, and Supporting tenure conflict resolution mechanisms

3.4 Description of the Feedback and Grievance Redress Mechanism (FGRM)

A Feedback and Grievance Redress Mechanism (FGRM) is a mechanism to collect and address feedback or concerns as a response to the implementation of project activities. The feedback/concern consists of queries, suggestions/comments, and complaints (including conflicts over resource use and project management) caused by uncertainties, shortcomings, and objections to project activities. FGRM is based on reciprocal communication between the stakeholders/beneficiaries (including inquirers and complainants) and the project management. Due to such a relationship, it is duly expected that each query, suggestion/comment, and complaint shall be responded to and/or resolved immediately, except for those outside the authorities of the project implementers. FGRM is intended to "be accessible, collaborative, expeditious, and effective in resolving concerns through dialogue, joint fact-finding, negotiation, and problem-solving." FGRM can also be considered a critical tool for promoting transparency and accountability of the project.

An FGRM for JERP will be set up to provide a clear set of procedures to enable affected and interested stakeholders to raise their concerns and suggestions regarding the ERP and how those concerns and recommendations will be acted upon. For that purpose, the program will both employ the existing mechanisms or platforms at the national and sub-national levels and develop a system and assign staff at the site level to receive, evaluate, handle, and record queries, suggestions/comments/aspirations, and complaints from all aspects directly related to JERP implementation from involved stakeholders and the broader public who may have concerns and interest in the program activities. as well as the process of addressing and resolving problems and inputs provided by the JERP program implementers. In the JERP program, the FGRM system is under the safeguard committe''s coordination, communication, and responsibility.

The JERP FGRM system was established to facilitate and provide space for individuals, community groups, legal entities, or government agencies who wish to submit questions, suggestions/comments, and complaints regarding the project and its implementation. The design of the FGRM ERP has been consulted with relevant stakeholders at the local level. Stakeholders include local communities, private companies, local governments such as Local Government Organisations (OPDs), non-governmental organizations, and other development partners.

Queries, suggestions/comments, and c omplaints within the scope of the project FRGM include submitting information either orally or in writing from inquirers and the complainant to the responsible agency. These can be regarding general information on and inputs to the program as well as the alleged occurrence of violations, potential, and/or impacts in the environmental and/or forestry sector from the business and/or activities in the planning, implementation and/or post-implementation of the program.

In this project, the principles and management of FGRM are adopted from the applicable regulations on grievance handling and resolution of social and land tenure conflicts. These regulations include:

- 1. Government Regulation No. 2/2015 on Technical Guidelines for Social Conflict Resolution allows the local wisdom system to prevent conflict.
- 2. Presidential Regulation Number 88 of 2017 concerning Land Tenure Settlement in Forest Areas
- 3. Ministry of Environment and Forestry Regulation No.P.84/2015 concerning Tenure Conflict Resolution (Handling Tenurial Conflicts in Forest Areas).
- 4. Joint Regulation of the Ministry of Home Affairs (Kemendagri), KLHK, Ministry of Public Works, and the National Land Agency (ATR/BPN) no.79/2014, No.3 of 2014, No.1 of 2014, and No. 8 of 2018 concerning Procedures for Settlement of Tenure in Forest Areas.
- 5. Ministry of Environment and Forestry Regulation No. P.83/MenLHK/SEKRETARIS-KUM.1/7/2018 concerning Regulations for the Implementation of Law Enforcement Related to Environment and Forestry at the Regional Level.
- 6. Minister of Environment and Forestry Regulation No.P.22/MenLHK/SETJEN/SET.1/2017, concerning procedures for managing alleged pollution and/or environmental and/or forest destruction complaints.

The FGRM for the ERP is based on principles detailed in Regulation of the Minister of Environment and Forestry No P.22 of 2017, which states that complaints are defined as "verbal or written communication from complainants to the respective institution(s) in charge, on matters related to infringements of the laws, potential impacts on the environment and/or forests as a result of planning, implementation, and post-implementation of commercial

activities." Grievance redress is the management of complaints, consisting of grievance receipt, investigation, verification, reporting, and follow-ups. Grievance categories under the law include:

- a. Environmental Pollution: the introduction of organisms, substances, energy, and/or other components into the environment through human activities, causing the exceedance of environmental threshold standards;
- Environmental destruction: human actions that cause direct and/or indirect changes to the physical, chemical, and/or biological elements of the environment leading to the exceedance of the environmental threshold standards;
- c. Forest destruction: the process, means, or actions that destroy the forest through illegal logging, unauthorized use of forests, or inappropriate use of a license in a forest concession area that has been granted, assigned, or in the process of giving.

The Project's Feedback Grievance Redress Mechanisms (FGRM) is a four-tier system covering the village, district/city, provincial and national levels. FGRM at the lower level may hierarchically relate to the higher levels (and vice versa), depending on the nature of the queries, suggestions/comments, complaints, and follow-up actions. Inquirers and complainants or aspirations could submit their queries, suggestions/comments, and complaints directly to the authorized agency (OPD) at each level or may be facilitated, particularly at the site level, by a dedicated function/PIC to be established by JERP. The dedicated function/PIC will ensure that queries, suggestions/comments, and complaints reach relevant authorized agencies for appropriate handling and responses.

At the national level, the MoEF's Directorate General on Climate Change (DGCC) will serve as the main host of the FGRM related to the ER Program covering all provinces. A newly established unit for ERP-FGRM under the DGCC will be responsible for the day-to-day management of FGRM and maintain the Safeguards Information System (SIS). The unit will coordinate with the Directorate General of Law Enforcement on Environment & Forestry (Ditjen PHLHK or also known as Ditjen GAKKUM) and the Directorate General of Social Forestry and Environmental Partnership (Perhutanan Sosial dan Kemitraan Lingkungan/Ditjen PSKL) to extract the submissions of queries, suggestions/comments/aspirations, and complaints through their websites. The MoEF complaint information system can be accessed through the following website: https://pengaduan.menlhk.go.id/.

At the sub-national level, the Provincial Environmental Service (DLH) will deal with, report, and coordinate complaints. They will be under the responsibility of the coordinator of the safeguard team that carries out daily activities. The safeguard committee coordinates the parties involved in the JERP and includes members who receive complaints, aspirations, inputs, and recommendations related to the environment daily. The function of the safeguard committee is to run the FGRM system that has been agreed to by all stakeholders, to be informed and followed up, and to record the processes that have taken place by assigning its members, both at the subnational level, district level and at the project level.

The safeguard committee will assign individuals at each level (National, Subnational, district, and Project level (online system)) to record all complaints, aspirations, comments, and recommendations for incoming programs. The person will also record and report on the processes underway on the follow-ups, aspirations, comments, and recommendations submitted to the program.

The extension of complaints is made by synchronizing the Biocf-ISFL complaint system with the internet-based national complaint system (website) with the National Public Service Complaint Management System (SP4N)—Community Aspirations and Online Complaint Services (LAPOR!), hereinafter referred to as SP4N-LAPOR! is a service for conveying all aspirations and complaints from the public that is nationally integrated with a website access page https://biocf.jambiprov.go.id/ or <a href="https://bioc

LAPOR! has been designated the National Public Service Complaint Management System (SP4N) based on Presidential Regulation 76 of 2013 and Minister of State Apparatus Empowerment and Bureaucratic Reform (Kemenpan-RB) Regulation Number 3 of 2015. SP4N— LAPOR! was formed to realize the ""wrong door policy"" which guarantees the rights of the public so that complaints from anywhere and of any type will be channeled to public service providers authorized to handle them. The objectives of SP4N are: 1. Organizers can manage public complaints in a simple, fast, accurate, complete and well-coordinated manner; 2. The administrator provides access to public participation in submitting complaints; and 3. Improving the quality of public services.

Services for submitting all public aspirations and complaints online which are integrated into managing online complaints in stages at every public service provider. Since 27-10-2020, it has been established as a general application in handling public service complaints based on Kemenpan-RB no. 680 of 2020. Furthermore, with the enactment of SP4N-REPORT! as an available application, all agencies must use the SP4N-LAPOR! in managing public service complaints.

At the district/city level, the overall implementation of FGRM will be supervised by the National Park, KPHP/FMU, and City/Regency DLH, and in coordination with the Provincial Environmental Service (DLH). The district-level implementing agencies will be responsible for managing Input, Recommendations, Aspirations, and complaints that may arise from the project activities each of these agencies is implementing. Solving complex problems may require inter-agency coordination and high-level ministerial decisions. Under the coordination of the District DLH, the district safeguard committee will support the district SEKDA and/or district BAPPEDA in coordinating and monitoring the overall grievance management, including making recommendations to elevate grievances to a higher level. The safeguards committee will directly communicate with the JERP safeguards committee regarding the existing FGRM process at the district level.

Each agency will appoint personnel or a person in charge to coordinate handling complaints within their respective agencies. At the Program level, personnel assigned under the coordination of the Safeguards Field will be appointed to oversee the operations of the FGRM. During implementation, complaint handling will be consulted with stakeholders such as community representatives, Indigenous Peoples, local government agencies (OPD), and the BioCF ISFL SN-PMU.

At the project level, the process of FGRM includes a) receiving and recording submissions from external stakeholders; b) screening and categorizing into queries, suggestions/comments, and complaints; c) acknowledging receipt of the submissions and assessing them for follow-up actions; d) providing responses if the issues are within the authority of the project management; e) requesting the relevant agencies and/or ministries to respond if the issues are outside the scope of ER-Program or the authority of the project management; f) investigating grievances, which includes field visit for verifying and validating grievances; g) action/follow up and h) conclusion.

Within affected customary communities, the grievance mechanism shall follow existing customary law (if any) or any mechanism the local government provides based on community request. Communities can raise their grievances to MoEF based on Decree No. 24/Menhut-II/2015 on establishing a Team for Addressing Environmental and Forestry-Related Grievances.

On complaints/grievances related to business interruption in the plantation sector, particularly oil palm, the handling of complaints will be managed by the Provincial and District Integrated Team (TIMDU), headed by the Governor and District. Complaints submitted through other channels, such as the Human Rights Commission (KOMNASHAM), Ombudsman, Presiden''s Office or Ministry of Agriculture, will be consolidated and coordinated for resolution under the Tim Terpadu (TIMDU). Referring to the SOP of the Jambi provincial plantation office in the implementation of facilitation/mediation for resolving plantation business disturbances.



Figure 6. Indicative Institutional Chart for FGRM Implementation

Anonymous submission of complaints/feedback or responses to complaints/feedback that the Safeguard Committee has followed up can be submitted anonymously through a channel designed by the program through FGRM. In addition, stakeholders, including community members and the public, can submit their complaints through the following channels:

- Visit or letter to the Sekretariat Penanganan Pengaduan Kasus-Kasus Lingkungan Hidup dan Kehutanan, Gedung Manggala Wanabakti Blok 1 Lantai 1 Kementerian Lingkungan Hidup dan Kehutanan, Jl. Gatot Subroto No.2, RT.1/RW.3, Senayan, Kecamatan Tanah Abang, Kota Jakarta Pusat, Daerah Khusus Ibukota Jakarta 10270, 021-5733940 or <u>0811-1043-994</u>
- 2. Visit or send a letter to Sub-National PMU BioCF ISFL, Address: Jl. Rm Noor Admadibrata No.1, Telanaipura, Jambi City, Jambi.
- Visit or send a letter to the Jambi Provincial Environmental Agency as Head of the Safeguard Division. Telephone (0741) 40706, DLH Center WhatsAp''s (WA) DLH call center complaint Number: +62 82371912068, Email: blhd@jambiprov.go.id, and Letter or direct visit to Environmental Services office at Jl. H. Agus Salim No.7, Paal Lima, Kec. Kota Baru, Jambi City, Jambi 36129 Indonesia.

Visit or send a letter to the Jambi Provincial Plantation Office as a Member of Safeguard. Telephone (0741) 62596, Fax (0741) 60561, Email: disbun-prop@jambi.wasantara.net.id. Address: Jln. Yusuf Singedekane No. 01. Telanaipura, Jambi (36122) Post Office Box 11.

These channels received complaints/feedback before the JERP began implementation. Therefore, the administrator will provide a template format for submitting complaints/feedback, which can be filled in by the inquirer or the complainant. Details of the template format are explained in the FGRM and PIM Document.

3.5 Assessment of land and resource tenure in the Program Area

3.5.1. Description of land and resource tenure regimes in the Program Area

Land use in Jambi Province based on function is divided into: 1). Forest Area which covers an area of **2,123,550** Ha or equivalent to 43.3% of the total land area and 2) Other Use Area (APL) /non-Forest Area of **2,783,595** Ha or equivalent to 56.7%. Indonesian legal practice divides land into two categories, which are Forest Areas and non-Forest Area. The Forest Area was divided into Conservation Forests (National Parks, Nature Reserves, Wildlife Reserves, Natural Forest Parks, Forest Parks), Protection Forests, and Production Forests.

Most forest areas in Jambi Province have a function as conservation areas in the form of protected forests as well as national parks and nature reserves, covering an area of 702,525 Ha or equivalent to 33.1% of the total forest area in Jambi Province while the rest is a production forest area that can be used for direct economic development is an area of 1,233,476 Ha or equivalent to 58.88%. However, if you look at it in more detail, the actual area of production forest that can be optimized for utilization is an area of 974,249.97 ha while the remaining area of 259,226.03 cannot be optimally mandated because it functions as a Limited Production Forest (HPT).

The utilization of production forests in Jambi Province is dominated by permits for Industrial Plantation Forests (PBPH-HT). In total, there are 20 (twenty) PBPH-HT permits issued by the Ministry of Environment and Forestry (KLHK) RI in Jambi Province with a total permit area of 598,663 Ha, followed by permits for Social Forestry as many as 415 permits with a total area of 204,296.97 Ha. Furthermore, there are 2 (two) Ecosystem Restoration Permits (PBPH-RE) covering an area of 85,050 Ha and finally for Natural Forest Utilization Permits (PBPH-HA) as many as 2 permits with a total area of 56,045 Ha^[23]. Thus, the total production forest area that has been burdened with rights / permits in Jambi Province is an area of 944,054.97 Ha or equivalent to 77.4% of the total production forest area (HPT, HP and HPK) of 1,233,416 Ha. Based on Presidential Regulation 98/2021 and Ministry Decree 21/2022 stated that carbon rights from forest areas are owned and managed by the National Government. This means that the rights are allowed, but the trading of carbon needs to be approved and registered in the National Registry System (NRS or Sistem Registrasi Nasional, SRN).

Based on the land use plan, Jambi province is divided into 3 parts namely the west zone (conservation area), central zone (Natural resources optimization used area), and east zone (distribution area)²⁴, while the typology of land use of Jambi province based on spatial calculation results is still dominated by agriculture, rubber and palm oil plantations.

The majority of conflicts over tenure rights in the forestry sector until 2021 occurred in forest areas with the Production Forest function, which was 104 cases or around 90.43% compared to tenure conflicts that occurred in

²³. Compilation of Forestry permits in Jambi Province. Jambi's Forestry Office, 2022.

²⁴ Jambi's Regional Regulation No 10/ 2013 related to Jambi Province Spatial Plan 2013-2033

forest areas with conservation functions as many as 11 cases or around 9.57%. However, of the total 104 conflict cases that occurred in the Production Forest area, until the end of 2021 as many as 64 cases or around 64% of them have been successfully handled by the Jambi Provincial Forestry Service with various concepts of Social Forestry based on the Minister of Environment and Forestry Regulation No. 9 of 2021 with details as many as 50 cases have reached the KK Manuscript stage and 14 other cases have reached the Kulin KK stage. Meanwhile, as many as 9 or about 9% of cases are still in the process of mediation and as many as 31 or about 30% of other cases are still in the process of encouraging mediation and resolution.

3.5.2. Implications of land and resource tenure assessment for program design

According to Act No 41/ 1999 and Act No. 5/1967, Indonesia land use management is divided into Forest and Non-Forest Land. Forest land is to be managed by the MoEF, whereas Non-Forestry Land is to be managed by the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency (*ATR/BPN*). Under these laws, the type of forest land should have clear demarcation from the non-forest areas. Therefore, all forest managers, both managed by government and private/ community groups should have full demarcated mapping and agreed by all stakeholders including local communities around their areas. However, before 2018 there were only a few forest areas that had been demarcated, in particular the areas that overlapped with local communities. This situation created many tenure conflicts.

Meanwhile, after the 1998 economic crisis, many Forest companies collapsed and their concession permits returned to the central government. Those abandoned forest areas became open access areas and started to be occupied by local communities and migrants. These situations, both unclear demarcation and open access forest areas, created a lot of unclear forest tenure rights in the field. Unclear land tenure has contributed as a driver of the deforestation and forest degradation in Jambi, and become one of the major challenges to successful implementation of the BioCF-ISFL program. However, the implementation of the BioCF-ISFL program will contribute through tenure conflict resolution and improved land governance in Jambi province through a series of activities, as follows:

- a. Clarify the status of ownership of land and natural resources of indigenous peoples through the issuance of regulations relating to the recognition and protection of tenure rights of indigenous peoples in Jambi.
- b. Building the capacity of FMUs (KPH) to carry out social inventories, conflict tenure mapping, and boundary delineation in order to encourage important steps related to promoting sustainable forest management and recognition of land and natural resource rights claims owned by indigenous peoples and local communities.
- c. Supporting village-level spatial planning and development. This will improve sustainable villages land use planning and can be a tool in the development of local communities.
- d. Supporting tenure conflict resolution mechanisms. Tenure conflicts are a significant barrier factor in achieving sustainable forest management. Efforts to encourage the process of resolving tenurial conflicts will be able to help strengthen and clarify legitimacy related claims of land and other natural resources that currently occur in the Jambi province area.
- e. Strengthening licensing processes. The improvements of licensing processes are an important part to improve land and forest governance. Improving the licensing processes are expected to reduce overlapping and conflicting claims. The forest area moratorium policy needs to be implemented immediately for forest areas that have not yet been given licenses in order to reduce the negative impact on the remaining natural forest area in Jambi both for now and for the future.
- f. Consulting different stakeholders in order to gain inputs for improvement on land tenure assessments

The various program intervention above is expected to support the ongoing policy process related to improving land and forest area governance, as well as providing benefits to local and indigenous communities in reducing tenure conflicts, increasing recognition of community claims, and encouraging improvements in community living standards.

3.6 Benefit Sharing Arrangements

3.6.1. Summary of benefit sharing arrangements

The JERP aims to reduce emissions by a total of 19 million tons of CO2e during the project period between July ^{1s}t, 2020 and June 3^{0t}h, 2025. Through the Letter of Intent (LoI), the BioCF-ISFL and the government agreed that BioCF-ISFL would purchase a portion of the ERCs. The LoI stipulates a maximum contract value of 14 million tons of CO2e, equivalent to up to USD 70 million for verified emission reductions. The commitment to purchase will be signed under the Emission Reduction Purchase Agreement (ERPA) between BioCF ISFL and the Ministry of Environment and Forestry as the representative of the Government of Indonesia. The payments will be delivered to beneficiaries in Jambi.



Figure 7. Pre-investment and Emission Reduction Program in the context of JERP Program

Currently, stakeholders in Jambi Province are proposing that ER payments should occur twice during the five-year ERPA period: at the end of 2023 for the first reporting period (July 1, 2020 to June 30, 2022_, and in mid-2026 for the second reporting period (July 1, 2022 to June 30, 2025) (see FIGURE 7). The proposed ER Payment schedule will be discussed and negotiated in the Emission Reductions Purchase Agreement (ERPA) process between Gol and World Bank.

The Letter of Intent (LoI) stipulates a maximum contract value of 14 million tons of CO2e, equivalent to up to USD 70 million for verified emission reductions. Once the payment is received by GoI, the payment will be shared to beneficiaries, both at the national and subnational levels, particularly beneficiaries at the site level. The Benefit Sharing Plan (BSP) document for the Jambi ER Program was designed to elaborate the benefit-sharing mechanism for carbon benefits (monetary and non-monetary) of the emission reduction payments. The document was prepared as part of the consultative, transparent and participatory process for the ER Program under BioCF-ISFL project. The BSP is expected to reach a diverse group of beneficiaries, including four levels of government (national, provincial, district, and village), the private sector (palm oil, rubber and timber/forestry companies and smallholders), local Civil Society Organizations (CSOs) and research institutions/universities, and local communities that are often located in remote villages (see Table 18).

No	Group of Beneficiaries	Roles and Responsibilities
1	Government institutions (National, provincial, district and village, including Forest Management Unit (FMU), and Conservation Area Implementation Units)	Institutional set up of the program, funds flow mechanism, and program management and implementation at the national and subnational levels. Specific for Provincial Government, roles in enforcement and general development, coordination and planning.
2	Local communities, including customary communities (customary communities, farmer groups, social forestry groups etc)	Main beneficiary who lives inside or close to areas where ER program takes place and committed to using sustainable land use practices to lower deforestation and forest degradation, forest fire and create alternative livelihoods
3	Private sector (Beneficiaries can be from large companies to smallholders*, including agriculture plantations (i.e. palm oil, rubber), logging concession (PBPH-HA), timber plantation concession (PBPH-HT), restoration ecosystem concession (PBPH-RE), non-timber forest product concession (IUPHHBK), and ecosystem service concession (IUPJL)), and palm oil smallhodlers. Stakeholders agreed to place the palm oil smallholders as part of private sector.	Contribute to reducing emissions through specific activities such as High Conservation Value (HCV) and High Carbon Stock (HCS) protection, community development, forest fire prevention, etc. The private sector is required to contribute emission reductions by implementing activities beyond what is required by laws and regulations to properly manage their concessions
4	Civil Society Organizations (CSOs) and Universities (Local CSOs and local universities in Jambi)	CSOs can receive benefits for their contribution in facilitating local communities in emission reductions or directly conducting forest and land protection activities such as rehabilitation, forest monitoring etc. Research institutions or universities can also receive benefits for their role in supporting development of better policies related to climate change or emissions reduction issues.
No	Group of Beneficiaries	Roles and Responsibilities

TABLE 20 The types of benefits for each category of beneficiaries

No	Group of Beneficiaries	Roles and Responsibilities
1	Government institutions (National, provincial, district and village, including Forest Management Unit (FMU), and Conservation Area Implementation Units)	Institutional set up of the program, funds flow mechanism, and program management and implementation at the national and subnational levels. Specific for Provincial Government, roles in enforcement and general development, coordination and planning.
2	Local communities, including customary communities (customary communities, farmer groups, social forestry groups etc)	Main beneficiary who lives inside or close to areas where ER program takes place and committed to using sustainable land use practices to lower deforestation and forest degradation, forest fire and create alternative livelihoods
3	Private sector (Beneficiaries can be from large companies to smallholders*, including agriculture plantations (i.e. palm oil, rubber), logging concession (PBPH-HA), timber plantation concession (PBPH-HT), restoration ecosystem concession (PBPH-RE), non-timber forest product concession (PBPH-BK), and ecosystem service concession (PBPH-JL)), and palm oil smallhodlers. Stakeholders agreed to place the palm oil smallholders as part of private sector.	Contribute to reducing emissions through specific activities such as High Conservation Value (HCV) and High Carbon Stock (HCS) protection, community development, forest fire prevention, etc. The private sector is required to contribute emission reductions by implementing activities beyond what is required by laws and regulations to properly manage their concessions
4	Civil Society Organizations (CSOs) and Universities (Local CSOs and local universities in Jambi)	CSOs can receive benefits for their contribution in facilitating local communities in emission reductions or directly conducting forest and land protection activities such as rehabilitation, forest monitoring etc. Research institutions or universities can also receive benefits for their role in supporting development of better policies related to climate change or emissions reduction issues.

The eligibility criteria for beneficiaries were designed to ensure all relevant contributors to emission reductions receive benefits from the program. Non-carbon benefits such as ecosystem services, improved forest and land governance, and alternative livelihoods will be mentioned in the document to provide a comprehensive description regarding the various benefits of the emission reduction program (see Table 21).

No	Group of Beneficiaries	Eligibility Criteria
1	Government institutions	
	- National Level	 ✓ Having duties and functions (mandate) related to climate change policies and implementing them at the national level. ✓ Contribution for direct or indirect emission reduction.
	- Province Level	\checkmark Having duties and functions (mandate) related to climate change

TABLE 21. ELIGIBILITY Criteria for diverse Beneficiaries

No	Group of Beneficiaries	Eligibility Criteria
		policies and implementing them at the subnational level.
		✓ Contribution for direct or indirect emission reduction.
	 District/ municipality government 	✓ Having duties and functions (mandate) related to land-based sector
		policies and implementing them at its territory.
		✓ Contribution for direct or indirect emission reduction.
	- Village government	 Having duties and functions (mandate) to administrate community groups and lands.
		✓ Contribution for direct or indirect emission reduction.
	- Forest Management Unit	 ✓ Having duties and functions (mandate) to supervise and implement climate change related activities in its management areas. ✓ Contribution for direct and indirect emission reduction
	- Conservation area unit	 ✓ Having duties and functions (mandate) to supervise and implement climate change related activities in its management areas. ✓ Contribution for direct and indirect emission reduction
2	Private Sector	
	Timber Plantation Concession (PBPH-HT) Natural Forest Concession (PBPH-	 ✓ Having role and contribution for direct and indirect emission reduction. ✓ Gaining a good performance evaluation (Point A) for five years.
	HA) - Plantation Concession - Restoration Concession	✓ Gaining certificates of Indonesia Sustainable Palm Oil (ISPO) or Roundtable on Sustainable Palm Oil (RSPO) for companies in the plantation sector, especially palm oil companies.
		✓ Gaining certificate of Sustainable Production Forest Management (PHPL) for five years (business units in production forest).
3	Community	
	 Local communities, including customary communities 	✓ Contribution for direct and indirect emission reduction
4	CSO & Universities	
	 Local Civil Society Organizations (CSOs) 	 ✓ Contribution for direct and indirect emission reduction ✓ Developing action plans for facilitating local communities in efforts of emission reduction. ✓ Facilitating local communities in addressing emission reduction issues.
	 Local Universities and research institutions 	 ✓ Contribution for direct and indirect emission reduction ✓ Developing research and studies regarding climate change mitigation and adaptation ✓ Facilitate local communities in facing climate issues.

There will be two types of benefits, monetary and non-monetary benefits. The monetary benefits will be in the form of cash to finance the programs or interventions proposed by beneficiaries. Non-monetary benefits will be in the form of goods and services for beneficiaries (such as capacity buildings, livelihoods support for community business, public facilities including health and education facilities, equipment and inputs/seeds and organic fertilizers to support sustainable agriculture practices) (see Table **22**).

Table 22. The types of benefits fo	or each category of beneficiaries
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Beneficiaries	Types of benefits	Rationale
Government institutions		

Beneficiaries	Types of benefits	Rationale
National Government	Non-monetary benefits for technical support (e.g., MAR, Safeguards, National Registry System) and administrative and financial management of the ER Program in addition to capacity building and in-kind receipt of goods or services (such as in financial management system for ER Program, strengthening institutions for ER project management, coordination across sectors and support for implementation of ER Program activities).	The non-monetary benefit is given as a support for activities to ensure the implementation of the ER Program at the national level. National Government, in this case MoEF as national focal point in UNFCCC and national-level REDD+ in charge (penanggung jawab), will supervise the JERP management and align the project with national REDD+ strategy, Indonesia's NDC, and Article 5 Paris Agreement.
National Park Agency/Conservation Management Unit	Non-monetary benefits to support on conflict identification and resolution, joint protection and fire prevention control in conservation areas ²⁵	The non-monetary benefit is given to support conservation management units in participating in reducing deforestation and forest degradation in the conservation areas to directly contribute for emission reduction in Jambi jurisdiction.
Jambi Government	Non-monetary benefits for strengthening policy and support for implementation of ER Program activities, strengthening law enforcement, patrolling, and facilitating conflict resolution in addition to capacity building and in-kind receipt of goods or services (such as for monitoring ER, improving forest data inventory through ground truthing, developing HCV monitoring system, training on SESA and ESMF).	The non-monetary benefit is given as support for activities to improve the ER Program management and implementation at the sub- national level. Jambi Government develops Subnational REDD+ Management Institution (Lembaga Pengelola REDD+ Sub-nasional) as a requirement mandated by Permen LHK P.70/2017 for implementing jurisdictional- based REDD+ at provincial level. The institution will ensure harmonization programs and activities proposed by beneficiaries and all REDD+'s devices can be well implemented and aligned with national standards. In addition, the procurement of goods and services will be managed by LP.
District Governments	Non-monetary benefits for strengthening policy and support for implementation of ER Program activities, strengthening law enforcement, patrolling, and facilitating conflict resolution in addition to capacity building and in-kind receipt of goods or services (such as for monitoring ER, improving forest data inventory through ground truthing, developing HCV monitoring system, training on SESA and ESMF).	The non-monetary benefit is given as a support for activities to ensure the implementation of the ER Program at the village level. District government has legally authority to supervise villages. Therefore. The involvement of district government via sub- district head (Camat) will be strategic approach to support site-level forest management units in facilitating villages or communities to develop programs and activities. In addition, the procurement of goods and services will be managed by LP.
Village Governments	Non-monetary benefits for strengthening policy and support for implementation of ER Program activities in addition to capacity development training in managing funding for community, supervising the ER Program implementation on village level.	The non-monetary benefit is given as support for activities to improve the capabilities in managing and implementing the ER Program on the ground at the village level. Village government has authority to supervise community groups in village. Therefore, the role of the village government will be strategic to facilitate community groups in

²⁵ While the National Park Agency/Conservation Management Unit are at the sub-national level, the operational cost will be separated with the sub-national and categorized as national government.

Beneficiaries	Types of benefits	Rationale
		developing their programs and activities as well as be aligned with the village mid-term development plans (Rencana Pembangunan Jangka Menengah Desa, RPJMDes). In addition, the procurement of goods and services will be managed by LP.
FMUs	Non-monetary benefits for supporting implementation of ER Program activities in addition to capacity building, including for facilitation with communities (e.g., awareness, conflict resolution, etc.); capacity building/training and equipment for SFM, RIL, HCV, forest and fire management, social forestry, and livelihoods opportunities for communities.	The non-monetary benefit is given as support for activities to improve the FMUs' capabilities in managing and implementing the ER Program regarding the collaboration with stakeholders on forest-land status. FMU has a central role in the site-level forest management, not only for bio-physic aspect, but also for social-economic aspect. Therefore, the benefit will be also used to support FMU in identifying and supervising villages or communities. In addition, the procurement of goods and services will be managed by LP.
Private Companies		
Estate crop concessions; Timber plantation concessions; Forest management concessions; restoration ecosystem licenses	Non-monetary benefits in the form of capacity building/training on sustainable plantations, HCV protection, certifications (e.g., FSC/PHPL, RSPO/ISPO), sustainable forest management (e.g., RIL), fire management, and tenure conflicts/public complaints; non-monetary benefits for equipment and inputs (e.g., planting stock) to support sustainable practices	The non-monetary benefit is given to improve the private companies' capabilities in managing their land for the achievement of the ER Program's objectives. Private sector activities will directly affect to forest and land protection. Therefore, the benefit should be directed to improve their practices in land and forest utilization. It will directly contribute to emission reduction. In addition, the procurement of goods and services will be managed by LP.
Local Communities Includir	ng Adat Communities	
Community groups, including Adat Communities	 Monetary benefits will be in the form of cash for the community for forest management activities such as wages for community patrols and monitoring. Under certain conditions ²⁶, communities may receive monetary benefits transferred under supervision of intermediary agency (LP) in collaboration with FMU and regency government. 	Community Groups might request non- monetary instead of monetary benefits to the intermediary agency (LP) for the purpose of cost efficiency and effectiveness ²⁷ . In this case, the procurement of goods and services will be managed by LP.

²⁷ibid.

²⁶If village/community wishes to receive monetary benefits, the fiduciary assessment to village/community proposal is required before the monetary funds are delivered by LP and approved by sub-national PMU (SN-PMU).

Beneficiaries	Types of benefits	Rationale
	Non-monetary benefits for forest and fire management, including equipment and capacity building/training; investment to provide long- term impact under the poverty alleviation and environmental sustainability framework such as seeds for farm, agroforestry, livestock, and similar investment which will incentives the village than individual community; Development projects (e.g., health, education, public facilities) that do not contribute to deforestation and forest degradation; Additional livelihood support for community businesses, including capacity building/training, equipment, market access, or agricultural inputs	The non-monetary benefit is given as support for activities to improve the communities' capabilities not only in implementing the ER Program, but also in improving livelihoods to avoid any potential reversal risk of deforestation and forest degradation.
Civil Society Organizations (CSOs)	Monetary benefits: Under certain conditions ²⁸ , CSOs may receive monetary benefits transferred under supervision of intermediary agency (LP) in collaboration with the regency government. Monetary benefits for development of action plans for facilitating local communities in efforts of emission reduction, including facilitation of local communities in addressing emission reduction issues Non-monetary benefits to support capacity building in developing action plans for facilitating local communities in efforts of emission reduction, and for facilitating local communities to address emission reduction issues.	The monetary or non-monetary benefit is given for CSO roles in facilitating and supervising local communities for developing emission reduction-related activities. The CSO will have a key role in guiding communities and improving their capacities to achieve the goal of emission reductions.
Local Universities and research institutions	 Monetary benefits: Under certain conditions ²⁹, universities may receive monetary benefits transferred under supervision of intermediary agency (LP) in collaboration with the district government. Monetary benefits for development of research and studies regarding climate change mitigation and adaptation Non-monetary benefits to support capacity building in research and studies related to climate change mitigation, and also to facilitate communities in addressing climate issues. 	The benefit is given for universities roles in supporting governments in conducting research and studies for producing emission reduction-related activities. The role of the university to provide science-based policy with robust and qualified research in formulating climate change-related better policies in Jambi province.

²⁸If a CSO wishes to receive monetary benefits, the fiduciary assessment of the CSO proposal is required before the monetary funds are delivered by LP and approved by sub-national PMU (SN-PMU).

²⁹If the University wishes to receive monetary benefits, the fiduciary assessment of the CSO proposal is required before the monetary funds are delivered by LP and approved by sub-national PMU (SN-PMU).

Up to December 2022, consultations on the mechanism of benefit sharing have been conducted from national to sub-national level including to the villages and community groups. For village and community groups, consultations were done through Free Prior Informed Consent (FPIC) for 170 out of 726 villages as potential recipients of ER payments.

Determination of benefit allocation proportion

The benefit allocation for beneficiaries will be determined by a) operational cost, b) performance, and c) socioeconomic compensation and supporting activities. Based on consultations with varied stakeholders in 2022, the agreed benefit allocations are divided into as follows: 14% for operational cost, 68% for performance, and 18% for social-economic compensation and supporting activities.



Figure 8. Components of Benefit Allocation and their proportion

The rationales for the allocations are presented in the following Table 23.

Allocation	Proportion	Rationale	Beneficiaries	Meaurement Unit
1. Operational Cost	14%	 Allocation for covering secretariat, program management, and supervision of ER program's devices such as MAR, safeguards, BSM, and Feedback and Grievance Redress Mechanism (FGRM). Allocation proportion is 14% considering the following 	National government, sub-national governments, BLU- BPDLH, and LP.	Program management components.

Table 23. Budget Allocations and their rationales

Allocation	Proportion	Rationale	Beneficiaries	Meaurement Unit
		 aspects: The IEF (BPLDH) takes 5% for ensuring a credible financial report and providing guidelines to the benefit manager (or the intermediary agency, LP)³⁰. Sub-national governments (province and districts) take 5% in order to supervise and facilitate the ER program at sub-national level National government takes 2% for supervising the implementation of ER supporting policies/guidelines and documents such as Safeguards, BSP, FGRM, and PIM. LP takes 2% as its operational cost in managing and chanelling benefits to beneficiaries. 		
2. Performance	68%	 The Benefit is allocated for incentivizing direct contributions of beneficiaries for emission reductions. The allocation proportion is 60% for beneficiaries that have proven contributing for emission reductions. However, the other 8% of allocation will be shared to beneficiaries that are not well performed or less contribution to emission reductions. 	Villages or local communities, (including customary communities and social forestry groups), FMUs, Conservation Units, and private sector actors (large companies – smallholders).	Management unit, Utilization unit and sub- district boundary.
3. Socio- economic compensation	10%	 The Benefit is allocated for compensating villages that contribute for emission reductions through efforts of socio-economic aspects. Allocated proportion is 10%. The benefits will be prioritized to: villages around the forest areas. Villages that have been conducted FPIC in which these villages meet with the criteria of granting social economic compensation developed by Safeguard 	Villages or communities.	Villages with criteria socio- economic*

 $^{\rm 30} The \ LP$ will get fee 2% from operational cost

Allocation	Proportion	Rationale	Beneficiaries	Meaurement Unit
		Team (see FPIC report of J- SLMP).		
4. Supporting activities	8%	 The Benefit is allocated for supporting facilitation and supervision of communities at site level and development of emission reductions-related studies (3%) The other 5% is allocated for policies development, capacity building implementation, as well as facilitation and supervision of communities. 	CSOs and universities or research institutions. Regency governments	Program and activities.

Further information on the BSP for JERP Jambi is elaborated in <u>Annex 4</u>.

3.6.2. Summary of the design process for benefit sharing arrangements

In designing benefit sharing arrangements, some consultations and discussions have already been carried out with stakeholders at the national and subnational levels. An initial workshop was held in 2019 until August 2022 in Jambi to discuss the initial concept of benefit sharing mechanism with stakeholders. This workshop included representatives from MoEF, Jambi Government, development partners, university of Jambi, and CSOs. Stakeholders proposed that the design of benefit sharing must be in line with all components of the project such as MAR system, E&S safeguard mechanism, investment plan and tenure conflict mediation.

Benefit sharing arrangements were discussed further at national level involving the Ministry of Home Affairs, Ministry of Finance, Ministry of Environment and Forestry, Universities and other donors on June, 13, 2019 and focus on mechanism for channeling benefits and monitoring system of benefit sharing mechanism. As mandated in Act No 32/2009 on Environmental Protection and Management, the Government should provide a policy for an environmental economic instrument. Referring to this mandate, the Government issued Government Regulation No. 46/2017 which regulates development planning and economic activities, environmental funding, and incentives/disincentives. As an umbrella regulation, PP 46/2017 regulates that the government applies the public service agency (BLU) to managing the environmental fund. Presidential Decree No. 77/2018 for the establishment of BLU-BPDLH, stipulated an on-budget on-treasury system, but with a number of provisions to reduce the bureaucracy associated with this process. Stakeholders at national level proposed that channeling of the benefit will use BLU mechanism.

To agree on the allocation of the operational cost, especially the BLU-BPDLH tariff, a follow-up FGD was held in Bogor on October 21st, 2021. This FGD was attended by the Executive Director of BLU-BPDLH, Director of MS2R, Head of REDD+ Sub-Directorate-MPI, Head of Bappeda Jambi, and Deputy Head of SPMU. In the FGD, all participants agreed that the BLU-BPDLH tariff is 5%.

Since the crucial aspects in the BSP were decided and the BSP draft was considered a final document while awaiting the results of FPIC, and a FGD involving the same stakeholders as the previous FGD was held in Bogor on October 22th, 2021. In this FGD, the follow-up actions for the implementation of the BSP document were discussed. The FGD agreed that Bappeda and SPMU would form a BSM unit at SPMU and prepare 10 personnel. In addition, SPMU expects that these personnel can be trained in advance about BSM. Currently, based on Jambi Governor Decree No. 150/Kep.Gub/Bappeda-4.1/2022 on Subnational REDD+ Management Agency in Jambi province, there are 9 persons

selected as BSM unit members.

In designing benefit sharing arrangements, some consultations and discussions have already been conducted with stakeholders at the national and subnational levels. Outputs from each activity (or discussion) with stakeholders can be seen in <u>Annex 5</u>.

Funds Flow of Benefits to Beneficiaries

The benefits, in this case, ER payment, will be received by Gol through the Public Service Agency – Indonesian Environment Fund (BLU-BPDLH) established under the Ministry of Finance (MoF). Government Regulation (PP) No. 46/ 2017 concerning Economic Instruments for the Environment and PP No 23/2005 regarding Financial Management of Public Service Agency stipulates that the funds for the environment, including emission reduction, will be managed under the Public Service Agency (BLU). The funds will be recorded as BLU Revenues as part of non-tax state revenues (PNBP) referring to Laws (UU) No. 17/2003 on State Financial and Laws No. 09/2018 on Non-Tax State Revenue.

The funds will be transferred to beneficiaries, both at the national and subnational levels by using an intermediary agency mechanism. Criteria of the intermediary agency, known as *Lembaga Perantara*/LP will refer to the BLU-BPDLH's newest regulation, namely: Executive Director Regulation (*Peraturan Direktur Utama*, Perdirut) No. 02/2022 on Guidelines for Environmental Fund Distribution. The regulation also contains an explanation regarding the selection and accreditation processes of the intermediary agency/Lembaga Perantara.

ER program's beneficiaries can be from multi-layer governments: national, province, district, and village; local communities; private sectors, educational institutions, and civil society organizations (CSOs) as stipulated by Environment and Forestry Ministerial Regulation (Permen LHK) No. 70 of 2017 on Procedures for Implementing REDD+ in Indonesia.

As the channeling mechanism will not use a provincial budget (APBD) mechanism, the nomenclature of ER payment to be recorded in APBD and implementation procedure of benefit utilization for anticipating discussions with local parliament (*Dewan Perwakilan Rakyat Daerah*, DPRD) will not be required. Such procedure, on the other hand, on disbursing funds to beneficiaries will be detail outlined in Project Implementation Manual (PIM). The funds flow is as follows:

- The Indonesian Environmental Fund (IEF or BLU-BPDLH) received the ER Payment from Carbon Fund based on the amount of verified emissions reduction.
- The IEF will transfer to selected intermediary agency (LP) as proposed by Provincial Government and DGCC, MoEF. The amount of funds transferred will be based on the work plan and budget plan proposed by both provincial government and national government. These plans need to be endorsed by MoEF.
- The LP will be selected by a committee (*Panitia Seleksi*, PANSEL) that consists of representatives of the DGCC-MoEF, PgoJ, and other relevant parties (i.e. experts, practitioners, academics). The selected LP will facilitate programs and activities. There are three options to facilitate program and activities for beneficiaries as follows:
 - The selected LP manages budget and facilitates programs and activities by its owned resources as one institution. The LP has to manage budget and facilitate programs and activities.
 - The selected LP establishes a consortium by involving local organizations in Jambi. The local organizations can be from CSOs, universities, provincial owned enterprises (*Badan Usaha Milik Daerah*, BUMD), village owned enterprises (*Badan Usaha Milik Desa*, BMUDes), etc. However, the

proposed local organization must fulfill the criteria of LP companion organizations as stipulated in Perdirut BLU-BPDLH No. 2 of 2022.

- The selected LP makes sub-contracts to other parties in supporting the LP in facilitating beneficiaries' programs and activities.
- The selected LP will make at least three main contracts as follows:
 - The LP as representative of beneficiaries at national and sub-national levels will make a contract with the IEF prior to fund disbursements.
 - The LP as a fund manager agency for ER program at national and sub-national level will make a contract with DGCC and Jambi province. The contract will consist of roles of responsibilities of the LP in managing the funds and facilitating program and activities including management and service fees.
 - As a fund manager, the selected LP will make a contract with the beneficiary on the use of funds as beneficiary's responsibilities in reporting their expenditures. Table **22**
- Most beneficiaries will receive non-monetary benefits (See Table 22). However, beneficiaries such community group, CSOs, and Universities can receive monetary (with certain conditions) and/or non-monetary benefits. See Figure 9.
- Fiduciary assessment will be required for beneficiaries (communities, CSOs, and Universities) that request monetary benefits. The assessment is required in order to ensure proper financial management is taken place. The fiduciary assessment will be conducted by the LP prior to fund disbursement. The monetary benefits will be granted if the assessment result meet with the minimum standard of financial management system developed by the LP, approved by SN-PMU, and agreed by DGCC-MoEF.
- In case monetary benefits managed by the LP, the procurement of goods and services will be based on the LP procurement procedures.
- Monitoring and Evalution on the use of benefits by beneficiaries will be conducted by a joint team that consists of representative members from MoEF, IEF, LP and SNPMU. The monitoring will be conducted every semester. Supervision on financial management will be provided to beneficiaries in parallel with the monitoring activity.



Figure 9. Funds Flow of ER Payment to Jambi

3.6.3. Description of the Legal Context of Benefit Sharing Arrangements

Key regulations related to the benefit sharing arrangements are as follows:

- Republic of Indonesia Constitution 1945, Article 33 Point 3 which constitutes that all natural resources should be managed by the country and will be used for the wellbeing of Indonesians. The benefit from this ER Program is also a subject to this constitution, thus should be managed by the government.
- Law No 41 year 1999 on Forestry Law. This law forms the basis for forestry schemes in Indonesia, regulates the distribution of state forest and non-state forest land, and describes the authority for the management of land which defines the ER Program actors and beneficiaries.
- Law No 17 year 2003 on State Finance. This law forms the country's financial procedures, regulations, terms, including the correlation between central, sub-national, and foreign institutions. The benefit sharing distribution from the national until the sub-national follows this law.
- Law No 32 year 2009 on the Protection and Management of the Environment which includes the mandates to establish the economic instrument, which ultimately creates the IEF that plays important roles in managing the benefit from this ER Program.
- Law No 12 year 2011 on the Establishment of Laws and Regulations including the procedures to establish the Governor and District regulations. This law forms the foundation for sub-national governments in developing policies that support the ER Program implementation.
- Law No 23 year 2014 on Local Government which shifts the authority for issuing mining and logging permits from districts to provincial government, thus any benefit sharing implementation to the mining industry will be regulated at the province level. This law also distinguishes the roles and responsibilities of sub-national government with the national government.

- Law No 6 year 2014 on Village Government including the village governance, village development, and community development. This law enables community to directly receive monetary transfer (benefit sharing) from the national government through the village government.
- Government Regulation No. 23 year 2005 on Public Finance Service (BLU) which regulates the establishment of the IEF that manages the ER payment at the national level.
- Government Regulation No 2 year 2012 on Regional Grant which regulates grants for and to regional governments including Governor, District Head, and local government organisations, including how to categorize the payment from this ER Program.
- Government Regulation No 74 year 2012 on the amendment of Government Regulation No. 23 year 2005 on BLU which regulates the establishment of the IEF that manages the ER payment at the national level.
- Government Regulation No 45 year 2013 on Implementation Procedure for Regional Revenue and Expenditure Budget including the budget arrangement for ER Program implementation at the regional level.
- Government Regulation No 46 year 2017 on Environmental Economic Instrument that support the establishment of IEF that manages the ER payment at the national level.
- Government Regulation No 28 year 2018 on Regional Cooperation which regulates the procedures in making agreements between regional governments and other parties.
- Government Regulation No. 12 year 2019 on Local Fund Management.
- Presidential Regulation No 16 year 2018 on Procurement of Goods and Services which regulates the procurement process and budget arrangement for ER Program implementation.
- Presidential Regulation No 77 year 2018 on Management of Environmental Funds that support the establishment of IEF that manages the ER payment at the national level.
- Minister of the National Development Planning/Head of Bappenas No 4 year 2011 on the Procedures for Planning, Proposal Submission, Assessment, Monitoring and Evaluation of activities financed by Foreign Loans and Grants which regulates the financial process in using ER payment.
- Minister of Finance Regulation No 191 year 2011 on the Procedure for Grant Management which provides more detailed procedures on managing foreign grants including the ER payment.
- Minister of Finance Regulation No 137 year 2019 on governance of IEF (*Badan Pengelolaan Dana Lingkungan Hidup*).
- Minister of Finance Regulation No. 182/PMK.05/2019 on Minimum Service Standard of BPDLH.
- Ministry of Finance Decree No 779 year 2019 on IEF as a work unit of BLU.
- Minister of Finance Regulation No. 124/PMK.05/2020 on Environmental Fund Management Procedures
- Minister of Finance Regulation No. 129/PMK.05/2020 on Management Guidance for Public Finance Service (BLU)
- Minister of Finance Regulation No. 133/PMK.05/2020 Service Rates for the Environmental Fund Management Agency at the Ministry of Finance
- Minister of Home Affairs Regulation No 39 year 2012 on the Guidelines for Grants and Social Aid from Regional Revenue and Expenditure Budget that regulates the financial arrangement from ER payment for beneficiaries at sub-national level.
- Minister of Home Affairs Regulation No 52 year 2014 on the Recognition and Protection of *Adat* Community. This regulation recognizes *adat* community and protects their land tenure rights which will enable them to participate in the program and receive the ER Program benefit legally.

- Minister of Home Affairs Regulation No 113 year 2014 on the Village Income which enables community to directly receive monetary transfer (benefit sharing) from the national government through the village government.
- Minister of Environment and Forestry Regulation No P.32 year 2015 on the State Forests which defines the procedures for local communities for registering land as a titled forest (*hutan adat*).
- Minister of Agraria and Spatial Planning Regulation No 10 year 2016 on Registration of Land Rights which regulates the registration of communal *adat* land rights on *adat* law community land within the state forest area.
- Minister of Finance Regulation No 224 year 2017 on the Grants from the National Government to the Regional Governments including the financial arrangement of the ER Payment from the national to sub-national governments.
- Minister of Environment and Forestry No P.70 year 2017 on the Procedure for REDD+ Financing which provides financing procedures for this ER Program.
- Minister of Home Affairs Regulation No 20 year 2018 on the amendment of Minister of Home Affairs No. 113 year 2014 on village financial management.
- President Director of IEF Regulation No 07/BPDLH/2020 on Guidance for REDD+ Fund Distribution.
- President Director of IEF Regulation No 18/BPDLH/2022 on Guidance for Environmental Fund Distribution.

3.7 JERP Program Transactions

3.7.1. Ability to transfer title to Ers

Based on the applicable laws and regulations in Indonesia, the ability to transfer title to Ers for Jambi Province will use the same process utilized by the East Kalimantan Province under the Forest Carbon Partnership Facility ER payments.³¹ In addition, President Regulation No.98/2021 (Article 1 Point 22) states that carbon rights are regulated and managed by the Central Government. In this regard, the MoEF is by law considered as the Program Entity as having ability to transfer the title of Ers resulting from the REDD+ program, that is conceptualized as "a national approach with sub-national implementation."

The MoEF also has an exclusive right to authorize the transfer of carbon rights internationally (MoEF Decree No.21/2022, Article 21 Point 2d).³² The MoEF decree also regulates the implementation of carbon trade including guidelines to conduct verification and validation at a national scale. In addition, Law of Republic of Indonesia Number 23 of 2014 concerning Sub National Governance (page 118) states that the Provincial Government has only the authority on "environmental services utilization with exception of carbon utilization, carbon storage and/or carbon sequestration". In other words, carbon utilization, its storage or sequestration is regulated and managed by the Central Government.

As the ERPA is considered an agreement under contract law, thus the MoEF as the Program Entity has the authority to sign the ERPA contract.

³¹³¹<u>https://drive.google.com/open?id=1x7DATKKQto7CtELndADq0DBbnDpDBJDO&authuser=stepibuy%40gmail.com&usp=drive</u> <u>fs</u>

³² https://mrv.kaltimprov.go.id/storage/guest/ERMR1/Regulation/permen-lhk-no.-21-tahun-2022-1.pdf
Name of Entity	Ministry of Environment and Forestry		
Main contact person	Dr. Bambang Hendroyono		
Title	Secretary General		
Address	Gedung Manggala Wanabakti, Jl. Jenderal Gatot Subroto, Jakarta (12070)		
Telephone	+62 21 5730191		
E-mail	Banghen_11@yahoo.co.id		
Website	http://menlhk.go.id		
Reference to the decree, law or other type of decision that identified this entity as the national authority on REDD+ that can approve ER Programs	 The position of the Program Entity as the national authority to sign ERPA is explained in several laws and regulations under Indonesian law, as follows: 1) The Law No. 41 of 1999 stipulates the position of Program Entity (PE) as the main authority on forestry, which has the mandate from the President to conduct legal actions as follows: a) regulate and manage any subject matter related to forest, forest area, and forest products; b) determine and define the legal status of forest area and non-forest area within the territory of Indonesia; c) have a right to regulate and define: the legal connection between any legal subject under Indonesian law and forest; and any legal act related to the management, utilization and preservation of forest. 2) The Decision of Constitutional Court No. 20/PUU- V/2007 implicates the opportunity of any relevant technical ministry (including Program Entity) to sign an agreement with a foreign party in so far as the nature and scope of the agreement is governed by private law; 3) The funding mechanism for the implementation of the National REDD+ Strategy in Indonesia will be mainly managed by the Environmental Fund Management Agency ("BLU-BPDLH"), a Public Service Agency, which was established specifically for environmental Regulation No. 77 of 2018 on BLU-BPDLH outlines some key authorities of the Program Entity including to provide technical support and supervision to the performance of the management board of BPDLH. 4) In line with the authorities of the Program Entity provided by the Article 10 of Presidential Regulation No. 77 of 2018 on BLU-BPDLH, Article 6 (1) letter (a) the Government Regulation No. 23 of 2005 on Public Service 		
	disbandment of BLU-BPDLH in case of a lack of technical performance. 5) Article 1 (36) of the Minister Environment and Forestry Decree No. 70 of		

Table 24. Program entity

 2017 on REDD+ Procedures determines that the Program Entity is the principal government agency which leads and oversees the development and implementation of REDD+ projects in Indonesia. 6) Presidential Regulation No.98/2021 regarding Economic Valuation on Carbon. The regulation stipulated carbon value and mechanism on carbon accounting and activities. This regulation clearly outlines that
carbon rights are managed by the national government, in this case the MoEF.
MoEF Decree No.31/2022 on the implementation of the Economic Value of Carbon.
8) MoEF Decree No.7/2023 on procedures of carbon trade in forestry sector

Legal context

As mentioned earlier in Chapter 3.5 on Benefit Sharing Arrangements, land managers in the program area include forestry concessions, social forestry licenses, estate crop permit holders, indigenous people and forest-fringe communities. Based on the typology of land ownership and management as well as license holders, there are at least four legal regimes which are relevant to the legal concept of Title to Ers: agrarian law, forestry law, regional autonomy law, and contract law. Under Indonesian law, any application of these regimes should conform with the statement of "the State Ownership on Natural Resources," which is incorporated in Article 33 of the 1945 Constitution.

Based on President Regulation No.98/2021 and MoEF Regulation No.31/2022 regarding the implementation of the Economic Value of Carbon attached to land or natural resources holders are managed and owned by national government (Ministry of Environment and Forestry).

In the context of forestry law, the Law No. 41 of 1999 on Forestry defines the authority of the Minister of Environment and Forestry (the Program Entity) to implement some legal actions as follows:

- Regulate and manage any subject matter related to forest, forest area, and forest products;
- Determine and define the legal status of forest area and non-forest area within the territory of Indonesia;
- Have a right to regulate and define: legal connection between any legal subject under Indonesian law and forest; and any legal act related to the management, utilization and preservation of forest under Indonesian law.

Previous Gol efforts relevant to the definition of Carbon Rights

In 2021, the new Presidential Regulation No.98/2021 on Economic Value of Carbon was released to confirm the carbon rights owned and regulated by the national government. MoEF Decree Number 31/2022 states that any carbon trade needs to be registered under the national registration system (NRS). The ownership of carbon is under national management regulated by the national government (under MoEF).

Title to Ers under the ER Program

From the current statutory legal perspective, a robust legal basis for carbon rights in Indonesia, which governs clear relationships between the generation of such right with the land tenure holdings (including customary land) and

natural resources licensing along with the authority of Program Entity to own and transfer such right, does not exist yet. The Program Entity is aware of this legal gap on Title to Ers under Indonesian Law. However, with the new Presidential Regulation No.98/2021, it is clearly stated that carbon rights are owned and managed by the national government.

In order to ensure the implementation of ER program at sub-national level, the combination of two legal bases can be used as follows: (1) sub-arrangements between the Program Entity and the Provincial Government of Jambi under the regional autonomy law; and (2) the incorporation of a clause on Title to ER transfer in the benefit sharing agreements under contract law.

From the perspective of regional autonomy law, Government Regulation No. 50 of 2007 (and its amendment No. 28 of 2018) on Regional Cooperation provides an opportunity for the Program Entity to create agreements with provincial and district governments on their cooperation to ensure an effective joint implementation of specific programs which are in line with their long-term development plans. These government regulations are further implemented through Environment and Forestry Minister Decree No. 78 of 2015 regarding Guidelines on the Cooperation of the Ministry of Environment and Forestry with Third Party. In the context of the ER Program, the Program Entity plans to consult with Government of Jambi on the agreements, especially to designate the Provincial Government of Jambi as, inter alia:

- the leading institution to conduct and ensure free, prior, informed consent (FPIC) processes related to the ER Program, including the issues of authorization of those stakeholders to Program Entity to own and transfer Ers title to the Carbon Fund.
- the leading institution to monitor and evaluate channeling benefits of ER programs to local beneficiaries through BLU-BPDLH as stakeholders proposed that the benefits will directly be transferred to each entity.

3.7.2. Participation under other greenhouse gas (GHG) initiatives

The Program Entity and stakeholders have currently discussed options for any excess tonnes of CO2e generated by the BioCF-ISFL Program. Up to now, Program Entity has not recommended transferring emission reduction from the BioCF-ISFL program (ER Program) to any other GHG Mitigation Initiative. However, if any initiatives are seeking to sell their Ers for the voluntary market, then the consultations between the proponent of the initiatives and the National and sub-National Governments need to be carried out to avoid double counting to Ers Units. The option to have a sub-agreement might be explored.

There are a few aspects that will be addressed in the next advance BSP document as follows:

- a. Any initiatives seeking to sell their ERs (e.g. VCS); or
- b. Any initatives contributing to REDD+/climate/ER goals but not seeking to account for and sell Ers.

The Bujang Raba project is an example of the community carbon initiative seeking to sell ERs. However, the Bujang Raba project started before the proposed ERPA. It sold its first eRs about 6,009 tonCO2e in 2018. Sale of the ERs occurred before the start of the JERP implementation and proposed crediting period. The nested approach through possible sub-agreement might apply for Bujang Raba. The Bujang Raba holds Plan Vivo certificate for <u>Avoided</u> <u>Deforestation (REDD+)</u>.

The PT. REKI and PT. Alam Bukit Tigapuluh are examples of private sector initiatives contributing to climate/ER goals from the activities being undertaken under an Ecosystem Restoration license, but these entities are not seeking to account for and sell eRs. No registry has been recorded under SRN for those private sectors.

Based on Article 16 (MoEF Regulation No. 7/2023), it stated that Performance Based Payments cannot be submitted under the Carbon Trading mechanism during the period of Performance Based Payment is being taken place. In addition, carbon trade cannot be conducted in which it already has an International Cooperation Agreement document or other equivalent written commitment regarding Performance Based Payments for emission reduction.

Any existing carbon project in Jambi that has been registered to NRS will be conducted further discussions and consultations between MoEF, Government of Jambi, and the carbon project proponents regarding carbon accounting and benefit sharing mechanism.

3.7.3. Data management and registry systems to avoid multiple claims to ERs

The Government of Indonesia has mandated the Ministry of Environment and Forestry (MoEF) as National Focal Point (NFP) for climate change. MoEF has developed the National Registry System (SRN-PPI), as part of the management of transparency framework of Article 13 of the Paris Agreement in the national context. MoEF has issued some regulations as follows: MoEF Regulation No. P.71/2017 on the Implementation of the National Registry System on Climate Change Control; MoEF Regulation No. P.73/2017 on Guidelines on the Implementation and Reporting of National Greenhouse Gas Inventories; and MoEF Regulations No. P.72/2017 on Guidelines for Implementation of Measurement, Reporting and Verification of Climate Change Action and Resources.

The SRN-PPI is a system for collecting data on actions and resources related to mitigation and adaptation of climate change in Indonesia. The SRN-PPI has developed the following rules of clarity, transparency and understanding (CTU). The SRN-PPI acknowledges the contribution made by stakeholders in their efforts to resolve climate change in Indonesia, and is designed to avoid duplication, overlapping, double reporting, and double counting of ER activities, while supporting the synchronization of actions and the support needed for those actions. The types of actions that are accommodated include adaptation actions, mitigation actions, joint adaptation and mitigation actions, and other support activities.

The SRN-PPI is an online system and it can be accessed via the URL <u>http://ditjenppi.menlhk.go.id/srn/</u>. The Director General of Climate Change appoints a Technical Team to administer the SRN-PPI. SRN-PPI's reporting is done twice a year, and the reports are made available to the public. SRN-PPI is also connected to the National MRV System, the National GHG Inventory System (SIGN-SMART), the Social and Environmental Safeguards Information System (SIS-REDD), and the National Forest Monitoring System (NFMS) to avoid double counting. At the national level, the system is managed by MoEF through the DGCC and by the Environment Office at the provincial level.

The SRN-PPI is designed as a web platform to accommodate all users and multi-platform devices that can be accessed by individuals or entities who want to register activities or search for information related to climate change. Information on the website is provided through graphics and tables as well as through detailed explanations of actions and support. The SRN-PPI will serve as an action and resource database; it will support the submission of reports for national and international needs. From the beginning, SRN-PPI was designed for a spatial approach, but there were problems in identifying the implementers of REDD+ since the Government did not have sufficient spatial data and geo-coordinate information. However, the National Registry System for REDD+ would be refined continuously. The ER transaction process is recorded and through MoEF approval, so the claim process can always be monitored by MoEF. Since the national transaction registry system has not been developed yet, the JERP agreed that the Jambi Ers will use the ISFL framework which utilizes a centralized registry (Carbon Assest Trading System). The system will be developed and managed by World Bank.

The SRN-PPI provides data management for: FREL/FRL, MRV reporting, implementation of Social and Environmental

Safeguards (integrated with the Safeguards Information System/SIS-REDD+), implementation costs and source of costs, supporting activities, and contribution to the NDC. The SRN manager is responsible for maintaining consistency between data and information on REDD+ implementation at the national and sub-national levels and avoidance of double counting. The SRN-PPI is implemented in stages: registration, technical data validation, and verification of actions and resources.

Types of the data required for registry into the system are as follows:

- a) General data information related to the actor. It can be a private or public entity.
- b) Technical data information related to the mitigation or adaptation conducted by the actor or stakeholder.
- c) Achievement information related to progress achieved by the actor in mitigation or adaptation.
- d) Data related to village climate change programs.
- e) Data related to financial progress (if the mitigation effort is funded by MoEF).

Implementing agencies of the ER Program, will register their activities with the SRN-PPI. After an activity is verified by an independent verifier, results of the verification are recorded in the SRN- PPI. Each registration includes information on the general data of the implementer, details of the activity, and technical implementation data. The Provincial Government of Jambi has appointed the Provincial Development and Planning Agency (BAPPEDA) as the focal point and administrator for the sub-national MRV and sub-national registry systems. BAPPEDA will register the ER activities under BioCF-ISFL Program to the SRN-PPI. In this context, Jambi Province is also developing a sub-national MRV System for ER program under BioCF-ISFL.

Section 4: GHG Reporting and Accounting

4.1 Program GHG Inventory

4.1.1. Short description of the Program GHG Inventory

In accordance with the BioCF methodological approach, the ISFL program is a landscape-based program that covers AFOLU sectors. Thus, the land areas covered in the program include forest and non-forest classes. For GHG inventory, the ISFL Jambi program accounts for all emissions and removals from the agriculture, forestry and land use sector, including from peatlands. The result of the GHG inventory will be managed by the MAR institution under Jambi's Planning Agency and will be reported and registered in the National Registration System (NRS), which is managed under the MoEF.

Method for estimating emissions from agriculture

Emissions from agriculture originate from various activities, including from livestock, fertilizers and liming and paddy fields and include CO2, N20 and CH4 emissions. To estimate the emissions from agriculture, we used the approach used in SIGN-SMART, a spreadsheet-based system developed by MoEF for national GHG inventory (<u>https://signsmart.menlhk.go.id</u>). The emission factors for estimating the emissions related to livestock (Table A6-4) and agriculture sector (Table A6-5) are derived from IPCC Guidelines and some Tier 2 data from the Ministry of Agriculture (Table A6-2).

Method for estimating emissions and removals from forestry and land use

Emissions from forestry, land use and land cover change were generated through spatial analysis in combination with a simple tabulation process to integrate emission factors into the calculation. The land cover change analysis involved data preparation to overlay with various maps, including peatland distribution and other administrative and management boundaries.

The activity data of forest and land cover change was derived from two monitoring point data, i.e. start and end year of the reference period, i.e. 2006/2009 and 2017/2018. The data from the national forest monitoring system (NFMS) was selected for generating activity data. Previously, we used all monitoring points in time which capture the dynamic of the forest cover change regularly, if not annually. However, to minimize the error due to misclassification in each monitoring year and to simplify the calculation, we changed the approach to only using the beginning and the ending points.

The NFMS data is the best available data for monitoring historical forest and land cover changes as far as 1990, which was based on visual interpretations of Landsat imageries. Due to limited availability of historical imageries, before 2011 the mapping was conducted every two to six years. Only after 2011, the mapping was conducted annually. For instance, for 2006, the forest and land cover map was delineated from the imageries acquired from 2006 to 2009 to ensure full coverage of satellite imageries for the whole land areas of the country. The imageries from the initial year were prioritized for selection, if cloud free imageries are not available for certain areas in the initial year, then the cloud-free imageries from the next year will be used. Therefore, we consider the naming of the monitoring period with 2006/2009 and consider the initial year as the reference year. Hence for the reference period of 2006/2009 to 2017/2018 was considered as 12 years, which comply with the approach used in the national reporting, e.g. FREL/FRL and BUR documents.

To generate the land cover change data, we used the MoEF forest and land cover maps that have 23 classes. The classes were grouped into the categories that align with the IPCC guidelines (Table 23). These include (1) forest land, (2) crop land, (3) grassland, (4) settlements, (5) wetlands and (6) other land (see Table A6- 6). Forest land category includes all forest classes, i.e. primary dryland forest, secondary dryland forest, primary mangrove forest, secondary

mangrove forest, primary swamp forest, secondary swamp forest and plantation forest. The definition of forest used in this document is aligned with the definition of forest used for national reporting, i.e. a land area of more than 0.25 hectares with trees higher than 5 meters at maturity and a canopy cover of more than 30 percent, or trees able to reach these thresholds in situ' (as per Indonesia's 2nd FRL). Section 3.1 of the modified 2nd FRL Indonesia stated that "Indonesia defines a forest as "a land area of more than 0.25 hectares with trees higher than 5 meters at maturity and a canopy cover of more than 30 percent, or trees able to reach these thresholds in situ" (MoFor, 2004). Therefore, the forest definition for this submission is aligned with the official Indonesian definition, and the FAO and IPCC definition, which is classified into seven classes by type and disturbance or level of succession, with only six classes classified as natural forests.

Similar to the FREL, we apply the working definition of forests and natural forests, which is slightly different from the formal definition of forest, particularly as regards the minimum area, which is 6.25 ha rather than 0.25 ha. The working definition of forest used in this submission is "a land area of more than 6.25 ha with trees higher than 5 meters at maturity and a canopy cover of more than 30 percent" (see SNI 8033:2014 on "Method for calculating forest cover change based on results of visual interpretation of optical satellite remote sensing image", and SNI 7645:2010 on "Land Cover Classification")".

Grassland category includes dry shrub, wet shrub, savanna, and grasses. Cropland category includes pure dryland agriculture, mixed dry agriculture, estate crop, and paddy field. Settlement category corresponds to settlement and transmigration areas. Wetland includes fishpond/aquaculture, open water and open swamps. Other land includes Bare ground, mining areas, port and harbour.

No	MoEF Classification	IPCC Categories	Description
	Forest Classes		
1	Primary dryland forest	Forest Lands	Natural tropical forests growing on non-wet habitat including lowland, upland, and montane forests. The class includes heath forest and forest on ultramafic and lime-stone, as well as coniferous, deciduous and mist or cloud forest, which is not (or low) influenced by human activities or logging.
2	Secondary dryland forest	Forest Lands	Natural tropical forest growing on non-wet habitat including lowland, upland, and montane forests that exhibit signs of logging activities indicated by patterns and spotting of logging (appearance of roads and logged-over patches). The class includes heath forest and forest on ultramafic and lime-stone, as well as coniferous, deciduous and mist or cloud forest.
3	Primary swamp forest	Forest Lands	Natural tropical forest growing on wet habitat in swamp form, including brackish swamp, marshes, sago and peat swamp, which is not

Table 25. DESCRIPTION OF MOEF CLASSIFICATION AND IPCC CATEGORIES

No	MoEF Classification	IPCC Categories	Description
			or low influenced by human activities or logging.
4	Secondary swamp forest	Forest Lands	Natural tropical forest growing on wet habitat in swamp form, including brackish swamp, marshes, sago and peat swamp that exhibit signs of logging activities indicated by patterns and patches of logging (appearance of roads and logged-over patches).
5	Primary mangrove forest	Forest Lands	Wetland forests in coastal areas such as plains that are still influenced by the tides, muddy and brackish water and dominated by species of mangrove and Nipa (<i>Nipa frutescens</i>), which is not or low influenced by human activities or logging.
6	Secondary mangrove forest	Forest Lands	Wetland forests in coastal areas such as plains that are still influenced by the tides, muddy and brackish water and dominated by species of mangrove and Nipa (<i>Nipa frutescens</i>), and exhibit signs of logging activities, indicated by patterns and patches of logging activities.
7	Plantation forest	Forest Lands	The appearance of the structural composition of the forest vegetation in large areas, dominated by homogeneous trees species, and planted for specific purposes. Planted forest include areas of reforestation, industrial plantation forest and community plantation forest.
	Non-Forest Classes		
8	Dry shrub	Grasslands	Highly degraded logged-over areas on non- wet habitat that are in an ongoing process of succession but have not yet reached a stable forest ecosystem, with naturally scattered trees or shrubs
9	Wet shrub	Grasslands	Highly degraded logged-over areas on wet habitat that are in an ongoing process of succession but have not yet reached a stable forest ecosystem, with naturally scattered trees or shrubs

No	MoEF Classification	IPCC Categories	Description
10	Savanna and Grasses	Grasslands	Areas with grasses and scattered natural trees and shrubs. This is typical of natural ecosystem and appearance on Sulawesi Tenggara, East Nusa Tenggara, and the southern part of Papua island. This type of cover could be in wet or non-wet habitat.
11	Pure dry agriculture	Croplands	All land covers are associated with agricultural activities on dry/non-wet land, such as tegalan (moor), mixed garden and ladang (agriculture fields).
12	Mixed dry agriculture	Croplands	All land covers associated with agricultural activities on dry/non-wet land mixed with shrubs, thickets, and logged-over forest. This type of cover often results from shifting cultivation and its rotation, including on karst.
13	Estate crop	Croplands	Estate areas that have been planted, mostly with perennials crops or other agricultural trees commodities. Oil palm plantations fall into this category.
14	Paddy field	Croplands	Agriculture areas on wet habitat, especially for paddy, typically exhibit dyke patterns. This cover type includes rain fed, seasonal paddy field, and irrigated paddy fields.
15	Transmigration areas	Settlements	Kind of unique settlement areas that exhibit association of houses and agroforestry and/or gardens in the surrounding.
16	Fish pond/aquaculture	Wetlands	Areas exhibit aquaculture activities including fish ponds, shrimp ponds or salt ponds.
17	Bare ground	Other Lands	Bare grounds and areas with no vegetation cover, including open exposure areas, craters, sandbanks, sediments, and areas post-fire areas that have not shown sign of regrowth.
18	Mining areas	Other Lands	Mining areas exhibit open mining activities such as open-pit mining including tailing ground.
19	Settlement areas	Settlements	Settlement areas include rural, urban, industrial and other built-up areas with typical appearance.

No	MoEF Classification	IPCC Categories	Description
20	Port and harbour	Other Lands	Sighting of port and harbor that is big enough
			to be delineated as independent object.
21	Open water	Wetlands	Water bodies including ocean, rivers, lakes,
			and ponds.
22	Open swamps	Wetlands	Wetland area with few vegetation.
23	Clouds and no-data	-	Clouds, cloud shadows or data gaps with a size
			of more than 4 cm ² at a 100.000 scale display.

For calculating emissions and removals from land use and land cover change, we used a stock difference approach. Activity data was derived from the results of land cover change analysis using annual land cover maps. The emission and removal factors were calculated based on the carbon stock difference of the associated forest and land cover changes. By doing this, we include the carbon stock from the post conversion classes. For instance, when a primary forest was deforested or converted into mixed agriculture, then the emission factor was the difference between the carbon stock in the primary forests and mixed agriculture. The opposite process is forest gain, which involves carbon removal which will consider transitional period to change into a stable condition. For instance, an old shrub was changed into a forest, then the removal factor was calculated as the difference between the forest and the old shrub carbon stocks multiplied by12 years of the baseline and divided by 20 years. Transitional change was applied for all conversion subcategories related to removal of CO2.

We used the EF for each original forest and land cover classes. Therefore, we are still differentiating the carbon stocks for different forest and non-forest classes. For example, we have seven forest classes that fall into Forest IPCC category, but we incorporated the carbon stocks of the seven forest classes for the calculation of emissions. Therefore, the carbon stock values of primary forests are different to the carbon stock value of plantation and secondary forests. Hence, in the forest land remaining forest land subcategories, the emissions still occur due to forest degradation or conversion to plantation forest.

The estimation of the emissions and removals from land cover change currently account for the aboveground biomass, belowground biomass, dead organic matters and soil organic carbon. The carbon stock values of aboveground biomass used in this analysis are compiled from Tier 2 data and have been used for generating the 2nd national FRL (Table A6-6). The carbon stock values of dead organic matter were derived from a study in South Sumatra (Table A6-8). The soil organic carbon stocks were derived from IPCC devault values (Table A6-7).

Non-CO2 emissions from biomass burning are estimated for all subcategories that are burned. The CO2 emissions from biomass burning are also estimated but only for the remaining subcategories, to avoid double counting with the CO2 emissions from land cover change. The activity data of biomass burning was derived from the annual burned area maps with the annual land cover maps. The fuel loads were derived from the the AGB and DOM of the previous land cover class before the fires. The emission factors for biomass burning however still use the default values of IPCC Guidelines (Table A6-11).

Emissions from peat decomposition and peat fires

CO₂ emissions from peat decomposition were estimated based on the land cover classes of the peatlands. It is assumed that degraded peat forests and lands are drained, and therefore emitting CO₂ gases. The activity data used for this analysis is the land cover change maps overlaid with peatland maps to select the area of interest for peat

decomposition estimation. The emission factor used the same emission factor used in the national approach (FREL, 2016), which used default values from IPCC guidelines (Table A6-9).

CO2 emissions from peat decomposition were estimated based on the land cover classes (national forest and land cover classes) of peatlands. It is assumed that degraded peat forests and lands are drained, and therefore emitting CO2 gases. So, the calculation is based on the land cover classes but reporting falls into wetlands category. The separation of reporting for peat decomposition is because peat emissions baseline considers inherited or legacy emissions.

The calculation method for peat decomposition in the ERPD is different to the 2nd FRL, because the 2nd FRL is focusing on the emissions due to forest-related emissions, i.e. deforestation, forest degradation and enhancement of forest carbon stock. The ISFL ERPD includes consideration of all changes between land cover class, not just forested land. However, our method is consistent with national GHG inventory and BUR, which involved GHG inventory of peat decomposition with legacy emissions. See SIGNSMART https://signsmart.menlhk.go.id/

Emission from peat fires includes only soil carbon pool and excludes aboveground biomass, because aboveground carbon pool has been included in the emission calculation from land cover change. The activity data of peat fires or burn areas are generated through visual digitization of Landsat satellite imageries combined with ground validation data. The burned areas are provided by the Directorate of Forest and Land Fires Control of MoEF. The emission factor used for estimating the emissions are derived from the 2nd national FRL document. In addition to the CO2 emission factor, we also included CH4 emission factor (Table A6-10).

The subcategory for peat decomposition and peat fire are classified into Wetlands remaining Wetlands subcategory, because peatland has characteristics similar to wetlands. However, the National GHG Inventory and BUR classified them into "3. Other" category, because they are not necessarily related to the biomass emissions from forest and land cover change. We used similar categorization to the national GHG Inventory, which separates peat decomposition emissions from land cover change emissions. Therefore, we will classify peat decomposition into "Others", not wetlands, to avoid confusion.

Peatland distribution was defined using the peat land map generated by Ministry of Agriculture based on soil organic distribution identified using satellite imageries and groug thruthing. Therefore, peatlands can be covered by various land cover, including forest, cropland, grassland, otherland, wetland or settelement.

Emissions from biomass burning

To estimate emissions from biomass burning, we follow the approach used in the 2nd FRL, which estimates not only CO2 emissions but also CH4 and N2O emissions. For CO2 emissions, only biomass burning from remaining subcategories are included in the calculation. While for N2O and CH4 emissions were calculated for all subcategories. We used the equation 2.27 of 2016 IPCC Guidelines, where the burned mass (Mb) was generated from the sums of AGB and DOM. For combustion factor (Cf), emission factor (Gef), and global warming potential (GWP) we used the values compiled from the national GHG inventory database, which refer to Table 2.5 Chapter 2 of 2006 IPCC Guidelines (Table A6-11).

4.1.2. Summary of the Program GHG Inventory

The results of the GHG inventory in Jambi Province is listed in Table 24. The table is shorted based on the relative contribution of the absolute level of the emissions and removals of AFOLU sector, including emissions in peatlands (peat decomposition and peat fires).

Table 26. Summary of the Program GHG Inventory from the reference period of $2006/2009 - 2017/20$						/
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	Table 20. Summar	/ UI LILE FIUgialii G			periou or 2000/2005	- 201//2010

Category	Subcategory	Net emissions and removals (t CO2eq)	Relative contribution to the absolute level of the total GHG emissions and removals in the Program GHG Inventory (%)	Associated carbon pools and gases
Cropland	Forest Land Converted to Cropland	104,823,389	23.35	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Grassland	Forest Land Converted to Grassland	80,184,568	17.86	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Other Land	Forest Land Converted to Other Land	76,075,832	16.94	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Other	Peat Fires	74,160,734	16.52	Soil; CO2, CH4
Forest Land	Forest Land Remaining Forest Land	27,773,391	6.19	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Cropland	Cropland Remaining to Cropland	-19,648,247	4.38	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Other	Peat Decomposition	18,442,218	4.11	Soil; CO2
Settlements	Cropland Converted to Settlements	10,337,260	2.30	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Managed soils	Rice Cultivation	7,861,808	1.75	Soil; CH4
Other Land	Cropland Converted to Other Land	4,675,102	1.04	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Managed soils	Direct N2O Managed Soils	2,735,492	0.61	Soil; N2O
Forest Land	Other Land Converted to Forest Land	-2,516,961	0.56	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Cropland	Grassland Converted to Cropland	-2,449,938	0.55	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Livestock	Enteric Fermentation	2,448,959	0.55	CO2
Grassland	Cropland Converted to Grassland	2,335,961	0.52	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Cropland	Other Land Converted to Cropland	-1,566,544	0.35	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Grassland	Other Land Converted to Grassland	-1,361,559	0.30	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Forest Land	Grassland Converted to Forest Land	-1,267,166	0.28	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Cropland	Settlements Converted to Cropland	-1,168,702	0.26	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Livestock	Direct N2O from Manure Management	980,461	0.22	N2O
Forest Land	Cropland Converted to Forest Land	-911,342	0.20	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Managed soils	Indirect N2O Managed Soils	695,560	0.15	Soil; N2O
Other Land	Grassland Converted to Other Land	668,784	0.15	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Biomass burning	Biomass Burning Grassland	486,408	0.11	AGB; CO2
Grassland	Grassland Remaining to Grassland	472,553	0.11	AGB,BGB,SOC,DOM; CO2, N2O and CH4

Wetlands	Cropland Converted to Wetlands	436,729	0.10	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Livestock	Indirect N2O Manure Management	418,676	0.09	N2O
Managed soils	Urea Fertilization	412,473	0.09	Soil; CO2
Cropland	Wetlands Converted to Cropland	-285,359	0.06	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Livestock	CH4 from Manure Management	269,366	0.06	CH4
Managed soils	Liming	264,065	0.06	Soil; CO2
Biomass burning	Biomass Burning Cropland	259,578	0.06	AGB; CO2
Wetlands	Forest Land Converted to Wetlands	226,633	0.05	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Settlements	Forest Land Converted to Settlements	180,615	0.04	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Settlements	Grassland Converted to Settlements	57,434	0.01	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Grassland	Settlements Converted to Grassland	-57,166	0.01	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Forest Land	Wetlands Converted to Forest Land	-32,247	0.01	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Forest Land	Settlements Converted to Forest Land	-22,777	0.01	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Grassland	Wetlands Converted to Grassland	-7,937	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Settlements	Settlements Remaining to Settlements	-5,919	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Settlements	Wetlands Converted to Settlements	-3,041	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Settlements	Other Land Converted to Settlements	-1,823	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Wetlands	Grassland Converted to Wetlands	1,367	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Other Land	Other Land Remaining to Other Land	-1,086	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Wetlands	Other Land Converted to Wetlands	170	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Wetlands	Settlements Converted to Wetlands	43	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Other Land	Settlements Converted to Other Land	0	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
Wetlands	Wetlands Remaining to Wetlands	0	0.00	AGB,BGB,SOC,DOM; CO2, N2O and CH4
	Total	448,993,440		

4.2 Identification of subcategories that are eligible for ISFL Accounting

4.2.1. Step 1: Initial selection of subcategories

Based on Table 24, we further selected and shorted subcategories involving conversion between land-use categories based on their relative absolute contribution, started from all subcategories involving conversion from and to forest land category, then followed by subcategories that involving conversion among non-forest land subcategories (Table 25). The Subcategory involving conversion between land use categories other than forest land that cumulatively amount to 90% of the absolute levels of the totals GHG emission and removals is highlighted in bold font (see Table A6- 12).

Category	Subcategory involving conversions between land-use categories	Net emissions and removals (t CO2eq)	Absolute net emissions and removals (t CO2eq)	Relative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Program GHG Inventory	Cumulative contribution to the total absolute GHG emissions and removals associated with all land use conversions in the Program GHG Inventory
Cropland	Forest Land Converted to Cropland	104,823,389.1	104,823,389	35.94	35.94
Grassland	Forest Land Converted to Grassland	80,184,567.8	80,184,568	27.49	63.43
Other Land	Forest Land Converted to Other Land	76,075,832.0	76,075,832	26.08	89.52
Forest Land	Other Land Converted to Forest Land	(2,516,961.0)	2,516,961	0.86	90.38
Forest Land	Grassland Converted to Forest Land	(1,267,165.8)	1,267,166	0.43	90.82
Forest Land	Cropland Converted to Forest Land	(911,342.0)	911,342	0.31	91.13
Wetlands	Forest Land Converted to Wetlands	226,632.7	226,633	0.08	91.21
Settlements	Forest Land Converted to Settlements	180,614.7	180,615	0.06	91.27
Forest Land	Wetlands Converted to Forest Land	(32,247.3)	32,247	0.01	91.28
Forest Land	Settlements Converted to Forest Land	(22,777.1)	22,777	0.01	91.29
Settlements	Cropland Converted to Settlements	10,337,259.6	10,337,260	3.54	94.83
Other Land	Cropland Converted to Other Land	4,675,102.3	4,675,102	1.60	96.43
Cropland	Grassland Converted to Cropland	(2,449,937.5)	2,449,938	0.84	97.27
Cropland	Other Land Converted to Cropland	(1,566,544.1)	1,566,544	0.54	97.81
Grassland	Cropland Converted to Grassland	2,335,961.5	2,335,961	0.80	98.61
Grassland	Other Land Converted to Grassland	(1,361,559.3)	1,361,559	0.47	99.08
Cropland	Settlements Converted to Cropland	(1,168,702.4)	1,168,702	0.40	99.48
Other Land	Grassland Converted to Other Land	668,784.4	668,784	0.23	99.71
Cropland	Wetlands Converted to Cropland	(285,359.5)	285,359	0.10	99.81
Wetlands	Cropland Converted to Wetlands	436,728.8	436,729	0.15	99.96
Grassland	Settlements Converted to Grassland	(57,165.6)	57,166	0.02	99.98
Settlements	Grassland Converted to Settlements	57,434.4	57,434	0.02	100.00

Table 27. Subcategories involving conversions between land use categories based on the contribution of
total GHG emissions and removals from 2006/2009 – 2017/2018

Grassland	Wetlands Converted to Grassland	(7,936.5)	7,937	0.00	100.00
Settlements	Wetlands Converted to Settlements	(3,040.9)	3,041	0.00	100.00
Settlements	Other Land Converted to Settlements	(1,822.8)	1,823	0.00	100.00
Wetlands	Grassland Converted to Wetlands	1,367.1	1,367	0.00	100.00
Wetlands	Other Land Converted to Wetlands	169.5	170	0.00	100.00
Wetlands	Settlements Converted to Wetlands	42.7	43	0.00	100.00
Other Land	Settlements Converted to Other Land	-	-	0.00	100.00
Other Land	Wetlands Converted to Other Land	-	-	0.00	100.00
	Total absolute GHG emissions and removals associated with all land use conversions in the Program GHG Inventory	291,656,448			

1. List of subcategories included in the initial selection

Based on Table 24 and Table 25, final selection of key category analysis is presented in Table 26. In addition to forest related subcategories and non-forest categories involving conversion that cumulatively amount to 90% of total GHG emissions and removals, emissions from peatlands are included due to the magnitude of the emission contribution. Emissions from peatlands included in the key category are peat decomposition and peat fires, not only because of the relatively large contribution but also to be aligned with national reporting, such as national GHG inventory, FREL/FRL and BUR.

In the ISFL program requirement para 4.1.4: "The Program GHG Inventory shall be comparable in its use of definitions, categories and subcategories with national processes such as the national GHG inventory, REDD+ and the Biannual Update Report". As the peat related emissions (peat fires and peat decomposition) are included in all national reports to UNFCCC, namely NDC, BUR, GHG Inventroy report and FREL REDD+, it is therefore important for Jambi JSLMP to include the peat fire emissions. Moreover, Page *et al*, 2002 stated that the peat and vegetation fires in 2015 alone was equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels (https://www.nature.com/articles/nature01131). This suggests the importance of peat fires to be included in the national GHG inventory and REDD+ FRL. In Jambi, peatland area is 12% of total province land, which mostly already degraded and susceptible to fires.

No	Category	Subcategory	Justification for initial selection	
1	Other Land	Forest Land Converted to Other Land	Deforestation (subcategories involving	
2	Grassland	Forest Land Converted to Grassland		
3	Cropland	Forest Land Converted to Cropland		
4	Wetlands	Forest Land Converted to Wetlands		
5	Settlements	Forest Land Converted to Settlements		
6	Forest Land	Other Land Converted to Forest Land	Enhancement forest carbon (subcategories	
7	Forest Land	Grassland Converted to Forest Land	involving conversions to forest lands)	
8	Forest Land	Cropland Converted to Forest Land		

TABLE 28. List of categories included in the initial selection, including non-forest related subcategories

No	Category	Subcategory	Justification for initial selection
9	Forest Land	Wetlands Converted to Forest Land	
10	Forest Land	Settlements Converted to Forest Land	
11	Forest Land	Forest Land Remaining Forest Land	Forest land remaining forest land
12	Other	Peat decomposition	The largest of the remaining subcategories based on the relative magnitude of contribution
13	Other	Peat fires	Other non-forest subcategories that is relevant to the Jambi emission reduction program

4.2.2.Step 2: Summary of the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

Table 29. Summary of the review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

Subcategory	Forest Land Converted to Other Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ³³ The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors. Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.

³³ <u>https://sigap.menlhk.go.id/sigap-trial/files/download/petunjuk-teknis-penafsiran-citra-satelit-resolusi-sedang.pdf</u>

Subcategory	Forest Land Converted to Other Land
determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ³⁴ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from study in South Sumatra region, close to Jambi Province. The 2 nd FRL document used study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words or less) of assessment if the data used for the subcategory allow for Approach 3 in land representation of land-use categories and land-use conversions	The activity data used for this sub-category are generated from satellite imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at national level.

Subcategory	Forest Land Converted to Grassland
Summary (150 words	The activity data used for this analysis were derived from the forest and land cover maps.
time series (including	interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ³⁵
start and end date) and data sources available for activity data needed to	The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5
	agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural

³⁴ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

³⁵. <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

	forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ³⁶ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words	The emission and removal factors used for this sub-category are compiled from NFI data
if the data used for	considered as Tier 2 data. However, SOC values are still using IPCC default values,
the subcategory are compliant with IPCC	following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Tier 2 methods and data	
Summary (150 words or less) of assessment	The activity data used for this sub-category are generated from Landsat imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at
if the data used for	national level.
allow for Approach 3	
in land representation of	
land-use categories	
and land-use	

³⁶ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

Subcategory	Forest Land Converted to Cropland
Summary (150 words or less) of the historic time series (including start and end date)	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ³⁷
and data sources available for activity data needed to calculate the baseline	The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ³⁸ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words or less) of assessment if the data used for the subcategory	The activity data used for this sub-category are generated from Landsat imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at national level.

³⁷ https://dbgis.menlhk.go.id/server/rest/services/Time_Series/

³⁸ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

allow for Approach 3	
in land	
representation of	
land-use categories	
and land-use	
conversions	

Subcategory	Forest Land Converted to Wetlands
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha ³⁹ . The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value. Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁴⁰ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.

³⁹ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

⁴⁰ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

Tier 2 methods and	
data	
Current (150 mards	The estivity data used for this sub estadem, and estadem to be low low data increasion. The
Summary (150 words	The activity data used for this sub-category are generated from Landsat imagenes. The
or less) of assessment	land cover maps were produced using visual classification for wall-to-wall mapping at
if the data used for	national level.
the subcategory	
allow for Approach 3	
in land	
representation of	
land-use categories	
and land-use	
conversions	

Subcategory	Forest Land Converted to Settlements
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ⁴¹ The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors. Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value. Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁴² (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FRL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan,

⁴¹ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

⁴² <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

	which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words	The activity data used for this sub-category are generated from Landsat imageries. The
if the data used for	national level.
the subcategory	
allow for Approach 3	
in land	
land-use categories	
and land-use	
conversions	

Subcategory	Other Land Converted to Forest Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha ⁴³ . The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.

⁴³ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁴⁴ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words	The emission and removal factors used for this sub-category are compiled from NFI data
or less) of assessment	and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are
if the data used for	considered as Tier 2 data. However, SOC values are still using IPCC default values,
the subcategory are	following the national GHG inventory. Similarly, biomass burning emission factors are also
compliant with IPCC	using IPCC default values.
Tier 2 methods and	
data	
Summary (150 words	The activity data used for this sub-category are generated from Landsat imageries. The
or less) of assessment	land cover maps were produced using visual classification for wall-to-wall mapping at
if the data used for	national level.
the subcategory	
allow for Approach 3	
in land	
representation of	
land-use categories	
and land-use	
conversions	

Subcategory	Grassland Converted to Forest Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha ⁴⁵ . The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.

⁴⁴ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

⁴⁵ https://dbgis.menlhk.go.id/server/rest/services/Time_Series/

	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁴⁶ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words or less) of assessment if the data used for the subcategory allow for Approach 3 in land representation of land-use categories and land-use	The activity data used for this sub-category are generated from Landsat imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at national level.
conversions	

Subcategory	Cropland Converted to Forest Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha ⁴⁷ . The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012;

⁴⁶ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

⁴⁷ https://dbgis.menlhk.go.id/server/rest/services/Time_Series/

data needed to calculate the baseline	2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁴⁸ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words or less) of assessment if the data used for the subcategory allow for Approach 3 in land representation of land-use categories and land-use conversions	The activity data used for this sub-category are generated from Landsat imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at national level.

Subcategory

Wetlands Converted to Forest Land

⁴⁸ <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha ⁴⁹ .
	The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
determining emission or removal factors	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁵⁰ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.
Summary (150 words or less) of assessment if the data used for the subcategory allow for Approach 3 in land	The activity data used for this sub-category are generated from Landsat imageries. The land cover maps were produced using visual classification for wall-to-wall mapping at national level.
representation of	

⁴⁹ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

⁵⁰ https://redd.unfccc.int/files/modified 2nd frl indonesia 20220529 clean.pdf

land-use categories	ind-use categories
and land-use	nd land-use
conversions	onversions

Subcategory	Settlements Converted to Forest Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ⁵¹ The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value. Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁵² (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FRL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from NFI data and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are considered as Tier 2 data. However, SOC values are still using IPCC default values, following the national GHG inventory. Similarly, biomass burning emission factors are also using IPCC default values.

⁵¹ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

⁵² <u>https://redd.unfccc.int/files/modified_2nd_frl_indonesia_20220529_clean.pdf</u>

Summary (150 words	The activity data used for this sub-category are generated from Landsat imageries. The
or less) of assessment	land cover maps were produced using visual classification for wall-to-wall mapping at
if the data used for	national level.
the subcategory	
allow for Approach 3	
in land	
representation of	
land-use categories	
and land-use	
conversions	

Subcategory	Forest Land Remaining Forest Land
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data used for this analysis were derived from the forest and land cover maps. MoEF Land cover maps are generated using on-screen digitation based on visual interpretation of Landsat imageries, with minimum area of delineation of 6.25 ha. ⁵³ The MoEF datasets are available since 1990 but only available annually since year 2011. The forest and land cover maps for the period of 2006/2009; 2009/2011; 2011/2012; 2012/2013; 2013/2014; 2014/105; 2015/2016; 2016/2017 and 2017/2018 are available. There are 23 land cover classes, including 7 forest classes, 2 plantation classes, 5 agricultural areas, 5 degraded lands, 2 built-up areas, 1 mining area and other classes such as water body and cloud. For the analysis using IPCC categories, we reclassed 6 natural forests and 1 forest plantation into forest IPCC category. The other land IPCC category include bare lands, mining areas, ports and harbors.
	Annual burned area maps are available for national coverage since 2000, generated by MoEF using visual interpretation of Landsat imageries in combination with low resolution and high resolution as auxilary data.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Emission and removal factors for land cover change emission estimates are derived from deducting the carbon stock from the previous class with the carbon stock of the post conversion class. Emission factor is positive value and removal factor is negative value.
	Aboveground carbon stock values for natural forest classes are derived from the 2 nd FRL documents ⁵⁴ (MoEF, 2022). The belowground biomass was estimated using root shoot ratios used in the 2 nd FRL. Carbon stock values for non-forest classes are derived from the 2 nd FREL, which were compiled from Tier 2 data. The SOC values are derived from IPCC default values. The DOM values are derived from a study in the South Sumatra region, close to Jambi Province. The 2 nd FRL document used a study from Central Kalimantan, which is a different island. Emission factors for biomass burning are derived from partly national data (dry matter) and IPCC default values especially for the Gef emission factors.

⁵³ <u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u>

⁵⁴ https://redd.unfccc.int/files/modified 2nd frl indonesia 20220529 clean.pdf

Summary (150 words	The emission and removal factors used for this sub-category are compiled from NFI data
or less) of assessment	and research conducted in Indonesia, therefore still considered as Tier 2. DOM values are
if the data used for	considered as Tier 2 data. However, SOC values are still using IPCC default values,
the subcategory are	following the national GHG inventory. Similarly, biomass burning emission factors are also
compliant with IPCC	using IPCC default values.
Tier 2 methods and	
data	
Summary (150 words	The activity data used for this sub-category are generated from Landsat imageries. The
or less) of assessment	land cover maps were produced using visual classification for wall-to-wall mapping at
if the data used for	national level.
the subcategory	
allow for Approach 3	
in land	
representation of	
land-use categories	
and land-use	
conversions	

Subcategory	Other (Peat decomposition)
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	Two main datasets are used for this analysis, the peatland map produced by the Ministry of Agriculture (MoA) and the MoEF land cover maps. Peatland distribution map is also available, generated by the Ministry of Agriculture based on delineation of satellite imageries and ground measurement of peat depth. The map is not updated annually. The map was recently updated in 2019, after the last update in 2011-2014. For this analysis, we used the same land cover datasets used for the land cover change analysis from the beginning and the end of baseline period, i.e. 2006/2009, and 2017/2018.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Following the IPCC guideline on Wetland Supplement, emissions from peat decomposition were estimated using the proxy data on water level through land cover classes. Emission factors for peat decomposition are derived from various studies in Indonesia, which was compiled in Novita et al, 2021. The emission factors have been used for the 2nd FRL document.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from various research conducted in Indonesia, therefore could be considered as Tier 2.

Summary (150 words	The land cover maps used for activity data for this sub-category are generated through a
or less) of	visual classification using Landsat imageries for wall-to-wall mapping at national level.
assessment if the	The peat distribution map was generated for the national coverage with scale of 1:
data used for the	250.000.
subcategory allow	
for Approach 3 in	
land representation	
of land-use	
categories and land-	
use conversions	

Subcategory	Other (Peat fires)
Summary (150 words or less) of the historic time series (including start and end date) and data sources available for activity data needed to calculate the baseline	The activity data for peat fires includes annual burnt areas overlaid with peatland data. A peatland distribution map is available, generated by the Ministry of Agriculture based on a delineation of satellite imageries and ground measurement of peat depth. The map is not updated annually. The map was recently updated in 2019, after the last update in 2011-2014. The annual burn scar areas are generated through visual classification of Landsat imageries combined with ground validation points and low resolution and high resolution satellite imageries as auxilary data. The burn area maps are provided by PKHL and IPSDH, which have been available annually since 2000.
Summary (150 words or less) of the main sources of data for determining emission or removal factors	Emission factor for peat fires comprises various parameters, including peat depth, peat bulk density and emissions factor of peat combustion. This GHG emission estimation uses the emission factors from the 2 nd FREL, which are compiled from various studies in Indonesia.
Summary (150 words or less) of assessment if the data used for the subcategory are compliant with IPCC Tier 2 methods and data	The emission and removal factors used for this sub-category are compiled from various research conducted in Indonesia, therefore could be considered as Tier 2.
Summary (150 words or less) of assessment if the data used for the subcategory allow for Approach 3 in	The annual burn scar maps used for activity data for this sub-category are generated through a visual classification using Landsat imageries for wall-to-wall mapping at national level. The peat distribution map was generated for the national coverage with a scale of 1: 250.000.

land representation of land-use		
categories and land- use conversions		

4.2.3. Step 3: Final selection of the subcategories eligible for ISFL Accounting

Subcategory from step 1	Emissions Baseline setting requirement(s) met? (Yes/No)	Methods and data requirement(s) met? (Yes/No)	Spatial information requirement(s) met? (Yes/No)	Eligible for ISFL Accounting? (Yes/No)
Forest Land Converted to Other Land	Yes	Yes	Yes	Yes
Forest Land Converted to Grassland	Yes	Yes	Yes	Yes
Forest Land Converted to Cropland	Yes	Yes	Yes	Yes
Forest Land Converted to Wetlands	Yes	Yes	Yes	Yes
Forest Land Converted to Settlements	Yes	Yes	Yes	Yes
Other Land Converted to Forest Land	Yes	Yes	Yes	Yes
Grassland Converted to Forest Land	Yes	Yes	Yes	Yes
Cropland Converted to Forest Land	Yes	Yes	Yes	Yes
Wetlands Converted to Forest Land	Yes	Yes	Yes	Yes
Settlements Converted to Forest Land	Yes	Yes	Yes	Yes
Forest Land Remaining Forest Land	Yes	Yes	Yes	Yes
Peat decomposition	Yes	Yes	Yes	Yes
Peat fires	Yes	Yes	Yes	Yes

Table 30. Final selection of the subcategories eligible for ISFL Accounting

4.3 Summary of time bound plan to increase the completeness of the scope of accounting and improve data and methods for the subsequent ERPA Phases during the ERPA Term

The Jambi ISFL Program is aiming for emission reductions of at least 14 million tCO2 for 1 ERPA term with implementation from 2020/2021 to 2024/2025. However, improvement of data quality and completeness could be done in the middle of the ERPA phase, i.e. after the 1st emission reduction monitoring report in 2023. Refinement of the baselines will require new emission factors. The refinement of the baseline will require recalculation of the historical emissions, which include all subcategories that were not eligible during the first baseline. However, new emission factors may not be available during the 1st ERPA. Baseline refinement should be done after the 1st ERPA phase, i.e. in 2026.

Most of the data used for the current analysis were at least Tier 2 and Approach 2. However further improvement of the activity data and emission factors are still required to reduce uncertainties. The 2nd national forest reference level (FRL) has been modified following the finding from the technical assessment from the UNFCCC secretariat in June 2022. The modified 2nd FRL document was submitted by the end of May 2022 and reviewed and published in the UNFCCC REDD+ website in December 2022, which use new emission factors incorporating more data from new studies. The Jambi ERPD GHG section adopts the emission factors used in the modified 2nd FRL.

improvement of emission factors, in particular for AGB, peat decompositiona and peat fires, will be less urgent during the 1st ERPA term. Other emission factors such as soil organic carbon and dead organic matter remain insignificant.

Improvement of emission factor from forest and land cover change will be possible once the new inventory data is available. Currently MoEF is preparing a new design for the national forest inventory (NFI). The NFI datasets were used to generate the carbon stock values for forest cover classes. The new method of NFI will be available by the end of 2024 and will be tested in 2025. With the new design, The NFI is expected to be finalized in 5 years to cover the whole Indonesia, i.e. by 2029. However, Jambi Province could make use of the new method to be implemented in the province for improving the accuracy of the AGB stock estimates through NFI plot intensification. The NFI measurement at Jambi Provinve should take place between 2025 to 2030, to align with the national agenda to complete the new NFI enumeration in 2030.

Improvement of activity data is the most crucial, because of the high uncertainty of the activity data. The least accurate of the activity data are from non-forest related subcategories. Indonesia should improve the accuracy of the non-forest subcategories through involvement of new technology and robust methods.

Several steps have been identified to improve the mapping accuracy of the national land cover maps, which include:

- Technical correction based on the results from uncertainty analysis of activity data, in particular for the subcategories that have the highest uncertainty. Technical correction will also make use of available high-resolution imageries. Additional high resolution remote sensing data is required to improve the estimates of the activity data, such as airborne lidar, orthophoto, drone or high-resolution satellite imageries. These high-resolution data at least could be used for the double sampling approach in combination with the current wall-to-wall approach based on sample-based area estimation. The improvement of the activity data should be done gradually every time new data is available. Improvement of capacity of mapping operators is also identified to ensure the accuracy improvement is take place. The technical correction will be implemented in 2024 and will involve not only the MAR team but also mapping operators at BPKHTL (regional office of IPSH) and IPSDH as the data custodian.
- improvement of future land cover change mapping will involve automatic change detection based on 3monthly Landsat data and MODIS/VIIRS data. The change detection data will provide information on pixel changes that will serve as initial information during the land cover classification process. This hybrid method which involves visual interpretation and automatic classification will be a continuous process and become a standard procedure for land cover mapping by IPSDH. The process is expected to commence in 2024.
- Improvement of activity data for monitoring tree planting is being developed by MoEF in cooperation with BRIN (National Research and Innovation Agency), which is expected to be finalized by 2025.
- Intensive capacity development through training for operators on interpretation and supervisors for QA procedures. Currently, related training is conducted 1-2 times a year with only 1 representative from each BPKHTL. More frequent training, at least 3 times in a year, for the operators and supervisors should commence in 2024.
- Develop standardization procedures for QA/QC in 2024.

Overall, all of subcategories selected in the key category analysis meet the requirements and are eligible to be included in. In addition, we already included all carbon pools and gases in the calculation.

4.4 Emissions Baseline for ISFL Accounting

4.4.1. Approach for estimating Emissions Baseline

To assess the performance of emission reduction for the BioCF ISFL program, a baseline or reference level generated from historical emissions and removals is required for each subcategory. The reference level will be the benchmark for annual emissions to assess the performance of the emission reductions program. To achieve emission reductions, the actual emissions should be lower than the reference level. Annual emissions greater than the reference level suggests that there is no performance of emission reductions.

The analysis of the selected of the subcategories to be included in the ISFL accounting was carried out through key category analysis in Section 4.2.3. The key category analysis suggests that the eligible subcategories in Jambi Province are 5 subcategories from forest land to non-forest categories, 5 non-forest categories to forest land, 1 forest land remaining forest land subcategory and 2 subcategories of peatland disturbances. The carbon pools included in the baseline are AGB, BGB, DOM and soil organic carbon of peatlands.

The selection of the reference period was defined based on the criteria provided in the ISFL ER Program Requirement (BioCF, 2021), ToR GCF Pilot REDD+⁵⁵ and availability of activity data. A stock-difference method was used for estimating both emissions and removals from forest converted to land and land converted to forests. This is aligned with the method used in the National GHG inventory Report, BUR and the 2nd FREL. For practicability in applying transition period, we use data from two monitoring points, i.e. beginning and end of reference period, instead of annual data (i.e. from monitoring period of 2006/2009 and 2017/2018). We consider gradual transition for estimating removals from forest and land cover change, as well as emissions and removals from SOC and DOM.

The ISFL ER Program requirement, in paragraph 4.2.6, suggested that the baseline should be the average of the historical emissions and removals over a 10-year period. Similarly, the ToR of the GCF Pilot for REDD+, suggested that the reference period between 10 to 15 years has the highest score of two. While reference period of 5 to 9 years or 16 to 20 years have score of one. Otherwise, it will be scored as fail. Therefore, for this program based on the criteria and the availability of the historical data, we used 2006/2007 - 2017/2018 (12 years) as the base period for estimating the baseline. The baseline is expressed in ton CO₂e per year.

Category / Subcategory	Baseline period	Baseline setting	Activity data used	EF Used
 Forest Land Remaining Forest Land Cropland Converted to Forest Land Grassland Converted to Forest Land Other Land Converted to Forest Land Settlements Converted to Forest Land Wetlands Converted to Forest Land Forest Land Converted to Cropland Forest Land Converted to Grassland Forest Land Converted to Other Land 	12 years; 2006/2007- 2017/2018	Average emission	Approach 3, wall- to-wall national mapping using remote sensing satellite imageries	Tier 2, national data for the AGB, BGB and DOM values. But Tier 1 for SOC values and biomass burning

TABLE 31. SUMMARY OF METHODS USED FOR BASELINE ESTIMATION

⁵⁵ <u>https://www.greenclimate.fund/sites/default/files/document/terms-reference-pilot-programme-redd-results-</u> <u>based-payments.pdf</u>

Category / Subcategory	Baseline period	Baseline setting	Activity data used	EF Used
Forest Land Converted to SettlementsForest Land Converted to Wetlands				emission factors
Peat decomposition	12 years; 2006/2007- 2017/2018	Average increased emission	Approach 3, wall- to-wall national mapping using remote sensing satellite imageries	Tier 2 data values. derived from studies in Indonesia
Peat fire	12 years; 2006/2007- 2017/2018	Average emission	Approach 3, wall- to-wall national mapping using remote sensing satellite imageries	Tier 2, national data

To generate the baseline for emissions and removals from forest and land cover change, and peat fires, we used an averaging approach from historical emissions and removals, which is in line with the national approach. The baseline for peat decomposition was generated by incorporating the legacy emissions from the previous year activities. Therefore, the business-as-usual emissions are expected to increase each year. We used the BioCF Guidance Note on accounting of legacy emissions/removals for developing the baseline of peat decomposition, which is generated based on the average increase of the annual emission. Therefore, to achieve emission reduction from peat decomposition will be accomplished through the reduction of the annual increase rate of emissions.

Subcategories included in the baseline estimations are following the key category analysis conducted in Section 4.2. However not all carbon pools are included in the baseline, due to insignificancy of the pool and the level of data, i.e. Tier 1 data. The soil organic carbon of mineral soil is excluded in the baseline estimation, which is less than 9% of total absolute emissions from land cover change and uses default values from IPCC guidelines (Table A6-7). Biomass burning is alse excluded from the baseline, because the emission factors used are Tier 1, although the dry matter values are Tier 2. The DOM is included from the baseline estimation, because it uses Tier 2 data. (see Table A6-8). The DOM is included since it used Tier 2 data. (see Table A6-8).

Subcategories	Total Emissions 2006/2009 -2017/2018	Annual Emissions and Removals ⁵⁶
Cropland converted to Forest Land	-	-
Forest Land converted to Cropland	122.182.412	10.181.868
Forest Land converted to Grassland	56.960.580	4.746.715
Forest Land converted to Other Land	16.122.143	1.343.512
Forest Land converted to Settlements	30.138	2.512
Forest Land converted to Wetlands	6.009.676	500.806
Forest Land remaining Forest Land	30.490.110	2.540.843

TABLE **32.** EX-ANTE ESTIMATES OF LAND COVER CHANGE-RELATED EMISSIONS USED FOR DEVELOPING THE BASELINE OF LAND COVER CHANGE EMISSIONS BASED ON THE AVERAGE OF HISTORICAL EMISSIONS

⁵⁶ Based on the Monte Carlo Simulation

Subcategories	Total Emissions 2006/2009 -2017/2018	Annual Emissions and Removals ⁵⁶
Grassland converted to Forest Land	-489.367	-40.781
Other Land converted to Forest Land	-952.350	-79.362
Settlements converted to Forest Land	-	-
Wetlands converted to Forest Land	-2.223.974	-185.331
Land cover change	228.129.369	19.010.781
Peat decomposition (annual increase)	18.949.991	1.579.166
Peat fires	74.094.496	6.174.541
Total	321.173.855	26.764.488

Uncertainty levels of emission factor data are identified and reported in Annex 6, which were reported in the data sources. For example, the uncertainty level of emission factor for peat decomposition were compiled from the 2014 IPCC Guidelines, from which the mean estimates of the emission factors were derived. The uncertainty level of the data is equivalent to the standard error of the mean.

The uncertainty for burned areas has been assessed for the burned area maps from 2009 and 2014, with overall accuracy of 96.5% and 96.2%, respectively (MoEF, 2021)⁵⁷. The uncertainty of peatland map is not reported in the resource document (Ritung etal, 2011). However, the 2016 FREL for national REDD+ stated that the uncertainty level of the peatland decomposition activity data was 20%.

To estimate the uncertainty of activity data for emissions and removals from land cover changes, we performed an uncertainty analysis of the change categories of land cover change, following the methods applied in FCPF (Olofsson etal, 2014; Tosiani etal, 2020) based on the IPCC subcategories. Based on the key category analysis, we identified 13 subcategories that are significant to BioCF emission reduction and removal enhancement (Annex 9).

Baseline was further estimated using the adjusted area of activity data based on the sample-based area estimation. We used Monte Carlo Simulation spreadsheet to estimate the baseline and its uncertainty (see Annex 9). The recalculated baselines for land cover change, peat decomposition and peat fires were 25.954 MtCO2e, 1.167 MtCO2e and 6.191 MtCO2e, respectively. The total annual baseline emissions for Jambi province for 2020/2021 to 2024/2025 reporting period is 33.314 MtCO2e (Table 31). More detail description of baseline estimation and their uncertainty analysis is provided in Annex 9.

⁵⁷ KLHK, 2021. Dua Dasawarsa Indonesia Memantau Kebakaran Hutan dan Lahan: Penghitungan Luas Kebakaran Hutan dan Lahan Tahun 2000 – 2020. Direktorat Jenderal Penanggulangan Perubahan Iklim. KLHK

4.4.2. Emissions Baseline estimate

ERPA Phase	Land Cover Change	Peat Decomposition (include legacy emissions)	Peat Fire	Total Emissions Baseline (tCO₂e)
2020/2021	19.010.781	24.896.358	6.174.541	50.081.680
2021/2022	19.010.781	26.475.524	6.174.541	51.660.846
2022/2023	19.010.781	28.054.689	6.174.541	53.240.011
2023/2024	19.010.781	29.633.855	6.174.541	54.819.177
2024/2025	19.010.781	31.213.021	6.174.541	56.398.343

Table 33. Emissions Baseline estimate

4.5 Monitoring and determination of emission reductions for ISFL Accounting

4.5.1. Description of the monitoring approach

The monitoring approach for emission reduction using the same approach for estimating the emissions and removals. Emissions and removals (E/R) calculated using below generic equation:

$E/R = AD \times E/RF$

Where AD is activity data and E/RF is an emission or removal factor. Detailed emission factors or carbon stock values are presented in Annex 6. The activity data for forest and land cover change category are derived from the annual land cover maps produced by the NFMS of IPSDH Directorate. The maps are used for generating activity data of national GHG inventory and FREL of national REDD+. The emission or removal factors for forest and land cover change category are derived from the difference of carbon stock from both land cover classes, before and after the conversion. There are 23 land cover classes generated in the maps, including cloud and no data class. Each forest and land cover class has an associated carbon stock value.

Uncertainty analysis of the activity data of the selected key subcategories will be conducted every year to determine the uncertainty level and define the adjusted areas of each subcategory. The adjusted areas of each subcategory will be used as the activity data for estimating the actual emission.

Carbon stock value for each forest and land cover class was derived from the FREL document used for the baseline of national REDD+. The emissions from peat decomposition were calculated using the same equations, whereas the activity data is the hectares of degraded peatlands derived from the overlaid forest and land cover maps and peat distribution maps. The emission factors for peat decomposition are derived from the 2nd FRL document.

The activity data of peat fires were generated from visual classification of satellite imageries produced by the IPSDH Directorate and PKHL Directorate every year. Burned areas in peatlands were selected by overlaying peat distribution maps with burned maps to be used for further calculation of emissions from peat fires. The emission factors used for estimating peat fires are compiled from various research in Indonesia (see Annex 6).

DActivity d
ata for land cover change, peat fires and peat decomposition will be collected each year and multiplied with the emission factors used for estimating the historical emissions. Therefore, for the next ER reporting, only AD will be monitored.

Data to be monitored	Method	Data sources	Parameters	Responsible institutions
Annual forest and land cover maps for monitoring the land cover changes subcategories, including : (1) Forest Land Remaining Forest Land, (2) Cropland Converted to Forest Land (3) Grassland Converted to Forest Land, (4) Other Land Converted to Forest Land, (5) Settlements Converted to Forest Land, (6) Wetlands Converted to Forest Land, (7) Forest Land Converted to Cropland, (8) Forest Land Converted to Grassland, (9) Forest Land Converted to Other Land, (10), Forest Land Converted to Settlements, (11) Forest Land Converted to Wetlands	Visual classification of Landsat imageries by trained operators based on developed key interpretation. The classification is done annually.	Landsat imageries	23 classes of forest and land cover	IPSDH – MoEF
Annual burned areas in peatland	Two steps delineation of burned areas based on Landsat and Sentinel imageries, with additional data of hotspot data and normalized burned area for initial identification. Then the initial burned area maps were validated using ground truthing data. The delineation was done monthly and summarized annually.	Landsat and Sentinel imageries; ground truthing data	Hectares of burned peatland	IPSDH and PKHL – MoEF

Table 34. The Monitoring of Activity Data

Data to be monitored	Method	Data sources	Parameters	Responsible institutions
Degraded peatlands	Delineation of peat lands was performed based on visual interpretation based on satellite imageries, which mostly Landsat, and ground measurement data based on soil coring. Degraded peatlands were defined by overlaying peatland distribution map with degraded and deforested areas. However the map is not updated regularly.	Landsat imageries and ground measurement S	Hectares of peatlands	BBSDLP – Ministry of Agriculture

The monitoring and emission reduction (ER) calculation will be done annually, based on the deduction of the baseline or reference level (RL_i) with actual net emissions (AE_i), using the below equation.

$$ER = \sum_{i=1}^{N} RL_i - AE_i$$

Where ER is the total net emission reduction, (RL_i is the reference level of the *i* subcategory and AE_i is the actual emission of the *i* subcategory.

The reference level values of each subcategory derived from the Monte Carlo Simulation will be used for calculating the emission reduction by comparing with the actual emissions. The actual emission will be estimated using the same approach as in the estimation of the reference level.

4.5.2. Organizational structure for monitoring and reporting

The monitoring, analysis and reporting (MAR) for BioCF ISFL Jambi, will be linked to the national MRV system and builds on many systems of MRV, safeguards and other REDD+ procedures developed by the national level. It is crucial that the MR of BioCF ISFL is aligned with the national MRV process. A national registry system (Sistem Registry Nasional -SRN) and Safeguards Information System (SIS) have been developed by the Directorate General of Climate Change to facilitate the reporting of sub-national mitigation actions, resources and safeguards related to REDD+. The SRN system is also potential to monitor double counting of interventions of programs within Jambi Province.

The MAR system for Jambi province will include the forest and land monitoring system that will be able to provide estimations on emissions and removals from AFOLU sector. The safeguards information system should be part of the provincial monitoring system. The analysis will require development of the reference emissions level and performance assessment of management units for emission reductions. Later, reporting of annual emissions reduction should be carried out by the province as part of the MAR system (Figure below).

Most activity data is generated through the National Forest Monitoring System (NFMS), which is managed under the Directorate of Forest Monitoring and Inventory of MoEF. The NFMS provides forest and land cover maps and peat fire data. In addition, the Ministry of Agriculture (MoA) provides data on peatland distribution maps and other agricultural activity data.



Figure 10. Concept of monitoring, analysis and reporting (MAR) system in Jambi



Figure 11. Institutional arrangement on MAR tasks and responsibility for BioCF Jambi

At the provincial level, institutional arrangement for managing MAR-related tasks is being initiated. A working group has been established to strengthen capacity through various capacity development initiatives related to the MAR tasks. For measurement tasks, forestry service and FMUs will lead the component, because of their management responsibilities of forest areas. Dinas Kehutanan or Bappeda (or an integrated team responsible for MRV system) is

expected to support data analysis, including spatial analysis for data integration of MoEF land cover maps, burned area maps and peatland maps.

Estate Crops Service, Agriculture Service are expected to have roles in measuring carbon stock in non-forest areas, in particular the agricultural areas. Forestry Service, Environment Service, or Bappeda or an integrated team responsible for MRV system will be able to do data analysis. Overall, these tasks will be the responsibility of the newly established MAR Section under the Provincial Project Management Unit. The MAR Section consists of representatives from local government. A technical team consisting of skillfull personnels has been established to support the MAR Team.

4.5.3. Uncertainty

Uncertainty levels of emission factor data are identified and reported in Annex 6, which were reported in the data sources. For example, the uncertainty level of emission factor for peat decomposition were compiled from the 2014 IPCC Guidelines, from which the mean estimates of the emission factors were derived. The uncertainty level of the data is equivalent to the standard error of the mean.

The uncertainty for burned areas has been assessed for the burned area maps from 2009 and 2014, with overall accuracy of 96.5% and 96.2%, respectively (MoEF, 2021)⁵⁸. The uncertainty of peatland map is not reported in the resource document (Ritung etal, 2011). However, the 2016 FREL for national REDD+ stated that the uncertainty level of the peatland decomposition activity data was 20%.

To estimate the uncertainty of the baseline, we conducted sample-based area estimation for the activity data of land cover changes. We performed an uncertainty analysis of the change categories of land cover change, following the methods applied in FCPF (Olofsson etal, 2014; Tosiani etal, 2020) based on the IPCC subcategories. Based on the key category analysis, we identified 11 subcategories that are significant to BioCF emission reduction and removal enhancement (see sub section 4.2).

In order to manage the uncertainty of the baseline estimates to the lower level, it is crucial to address the uncertainty of activity data, in particular on forest and land cover change data. Based on Monte Carlo simulation, improvement of accuracy of some subcategories from the land use change category, need to be carried out through the improvement the accuracy of the data. Several subcategories that need attention for the improvement include Forest Land remaining Forest Land, Grassland converted to Forestland, and Cropland converted to Grassland.

Accuracy improvement of the activity data of the land cover change maps could be done annually, in parallel to map production and the accuracy assessment. Improved capacity building for the operators is crucial to ensure the standardized approach of image classification. The training needs to involve operators from BPKH who conduct the image interpretation. Implementation of QC and QA processes is also important to ensure the quality of the mapping, involving IPSDH and Jambi MAR team. The improvement of land cover mapping accuracy is a continuous effort from IPSDH to ensure the credibility of the national forest monitoring system.

Improvement of carbon stock values is part of the national plan, i.e IPSDH-MoEF, to redesign the NFI methodology. The current NFI approach is too expensive to be implemented at national scale, therefore the accuracy of some land cover classes are very low due to limited number of plots. The new design will allow plot measurements throughout Indonesia within 5 years, which expected to be commenced in 2024. The design allows the measurement of plots

⁵⁸ KLHK, 2021. Dua Dasawarsa Indonesia Memantau Kebakaran Hutan dan Lahan: Penghitungan Luas Kebakaran Hutan dan Lahan Tahun 2000 – 2020. Direktorat Jenderal Penanggulangan Perubahan Iklim. KLHK

covering the whole country with expected lower accuracy in the first year, then continue every year until achieving expected accuracy. Therefore, improvement of emission factor can be commenced since 2025.

Data	Identification of sources of uncertainty	Process for managing and reducing uncertainty	Timeline
Annual forest and land cover changes	The main source of uncertainties is misinterpretation of land and forest classes due to: - cloud existence in the satellite imageries, - in availability of clear satellite imageries	 Training of visual interpretation for the operators Cloud-free image composites Additional sources of satellite imageries, e.g. sentinel or high-resolution images 	Continuous improvement through regular training and coordination events and updated remote sensing technology
Burned areas in peatlands	 Misinterpretation of burned areas Unavailability of clear satellite imageries 	 Training for operators on interpreting satellite imageries using the protocol. Additional remote sensing data, such as high resolution imageries from satellites of drone 	 Continuous improvement through regular training and coordination events and updated remote sensing technology
Peatland distribution map	 Misinterpretation of satellite imageries Limited ground validation in certain areas 	 Validation of the maps using Jambi province data Develop local model specific for Jambi 	- Every 5 to 10 years
C Stock of forest cover class	 Sampling design (Number of plots, plot size, minimum diameter measured, etc) allometric equations used for converting field measurement data into biomass values 	 Appropriate sampling design for Jambi forest and land cover classes. An intensification of the new NFI should be used as sampling design at province leve;. Which later could be integrated for developing national statistics Appropriate allometric equations for Jambi forest and land cover C stock value for each new land cover classes need to be compiled from c stock measurement in Jambi province, which required 	- Every 5 to 10 years

Table 35. Identified source of uncertainties and procedure for improvement

		intensive and laborious	
		field campaign.	
		- Integration with	
		compilation of other similar	
		studies conducted in the	
		province will be required to	
		ensure representativeness	
		of the land cover	
C Stock of non-	- Sampling design (Number	- Appropriate sampling	- Every 5 to 10 years
forest cover class	of plots plot size	design for Jambi forest and	
iorest cover class	minimum diamotor	land cover classes	
	manuficult diameter	land cover classes	
	allemetric equations used	 A redesign of NFI is 	
	- anometric equations used	underway, the new NFI	
		design will allow more	
		simple field implementation	
	biomass values	but sufficient to achieve	
	- Uncertainties for some	expected accuracy at	
	land cover classes are	national level. Furthermore,	
	relatively high	the new NFI will allow the	
		detailing of accuracy at sub	
		national level, through	
		intensification of plot	
		network.	
		- Appropriate allometric	
		equations for Jambi forest	
		and land cover	
		 C stock value for each new 	
		land cover classes need to	
		be compiled from c stock	
		measurement in Jambi	
		province, which required	
		intensive and laborious field	
		campaign.	
		- Integration with compilation	
		of other similar studies	
		conducted in the province	
		will be required to ensure	
		representativeness of the	
		land cover	
Emission factor	- Sampling design (Number	- Increase number of	- Every 5 to 10 years
for peat	of studies,	measurements	, -,
decomposition	- measurement methods	representing all forest and	
	(Separation of emission	land cover classes.	
	whether including		
	autotrophic respiration or		
	autori opinic respiration of		

	just heterotrophic emission)	 Compile measurement results from existing studies 	
Emission factor for peat fires	 Sampling design (number of samples, representation of peat soil types and extreme years) measurement methods (laboratory analysis, data collection etc.) Burned peat depth 	 Increase number of measurements representing all peat soil types and burned depth. Compile measurement results from existing studies 	- Every 5 to 10 years
Emission factors	measurementLimited studies available	- Conduct studies on	-
for biomass burning	for biomass burning in Indonesia	biomass burning for CO2 and non CO2 gases	

Improvement of other emission factors, such as peat decomposition and peat fires are on the list of improvement plan in the 2nd FRL (MoEF, 2022), which will involve various studies relevant to peatland emissions. Therefore involvement of various research agencies, such as universities and national research and innovation agency (BRIN) is crucial to speed up the improvement plan. Further improvement plan has been identified in Tabel 33 and Annex 10.

4.6 Estimation of the Emission Reductions

The ex-ante estimation of emission reductions under BioCF ISFL Jambi program is provided in the table below. We assumed that the emission reduction will be affected by the program design which addressing the drivers of emissions and removals. Therefore, financing plan for the program design will play roles in the emission reduction impact. We identified the financing categories based on the enabling program and mitigation action funds. However, we consider both categories have the same weight to the emission reduction impact. To estimate the percentage of annual financing impact (%AFI), the annual fund allocated was divided by total funds during the ERPA phase (for 5 years from 2021 to 2025).

In addition, a strong El Nino year is expected to occur during the ERPA period, which lead to a prolonged dry season and high risk of peat fires. We added assumed El Nino Impact (ENI) for each year during the ERPA phase. Normal El Nino will have an impact score of 1, while strong El Nino, weak El Nino and La Nina will have impact score of -1, -0.5 and 1.5, respectively. The value of one will have normal impact to the expected emission reduction, while negative value will have impact to reduce the emission reduction potential.

FRPA vear t	Financing Plan (Millio	Assumed El Nino Level	
ERFA year t	Enabling Program	Mitigation Action	
2020/2021	0.57	5.79	La Nina
2021/2022	0.84	7.98	Normal
2022/2023	1.4	6.6	Weak El Nino

Table 36. Financing Plan based on ERPA phase

FRPA year t	Financing Plan (Millio	n USD)	Assumed El Nino Level	
	Enabling Program	Mitigation Action		
2023/2024	1.21	5.99	El Nino	
2024/2025	1.1	5.42	Normal	

We also included another factor of impactness to represent the potential impact of program in addressing the drivers of emissions. The higher the impactness factor, the higher the likely of emission reduction. The impactness factor (IF) is strongly related to the risks and how the funded mitigation programs could address the drivers of emissions effectively. We use impactness factors of 30% in the first year, and gradualyu increase to 70% in the fifth year, to be conservative.

	Expected financing impact (%)		Assumed El Nino Impact	% ER
ERPA year t	Enabling Program	Mitigation Action		
2020/2021	1.5%	15.7%	1.50	12.93%
2021/2022	2.3%	21.6%	1.00	19.12%
2022/2023	3.8%	17.9%	(0.50)	7.59%
2023/2024	3.3%	16.2%	(1.00)	0.00%
2024/2025	3.0%	14.7%	1.00	31.80%

Table 37. Expected Financing Impact based on ERPA phase

To estimate annual emission reduction percentage (%ER), we used below equation:

$$\% ER = ((\% AFI) + (ENI \times \% AFI)) \times IF$$

The estimated annual emissions from 2020/2021 to 2024/2025 are from 18.3 million tCO2 to 26.8 million tCO2, respectively. Therefore, with an expected set aside of 8% that reflects the level of uncertainty (43.3%), the annual estimated emission reduction is ranging from 0 million tCO2 to 8.2 million tCO2, annually. In five years during the ERPA phase, Jambi BioCF ISFL is expected to entitle emission reduction of 19.3 million tCO2. It is simulated that in 2023/2024 period, the actual emission will be as high as the baseline, due to projected prolonged dry season followed by major fire events. During the prolonged dry season period, it is expected that there will be no ER performance, regardless of all mitigation efforts. However, without mitigation actions, ER performance could be even more reduced to negative.

	Table	38.	Estimation	of	Emission	Reductions
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ERPA year t	Emissions Baseline (tCO2-e/yr)	Estimation of expected emissions under the ISFL ER Program (tCO2-e/yr)	Estimation of expected set-aside to reflect the level of uncertainty associated with the estimation of ERs during the Term of the ERPA (tCO ₂ -e/yr)	Estimated Emission Reductions (tCO2- e/yr)
2020/2021	26.764.488	23.304.688	138.392	3.321.408
2021/2022	26.764.488	20.367.123	255.895	6.141.471

2022/2023	26.764.488	25.023.708	69.631	1.671.149
2023/2024	26.764.488	26.764.488	0	0
2024/2025	26.764.488	18.252.075	340.497	8.171.916
Total				19.305.943

4.7 Reversal

4.7.1. Assessment of the anthropogenic and natural risk of Reversals

Risk	Description and Mitigation strategies
Anthropogenic	
Anthropogenic Expansion of commercial and smallholders' agriculture/plantation into forested land	Given the continued pressures from local people and migrants and weak law enforcement in the field, this issue will be faced again and again in the future. In the case of coffee farmers in Kerinci and Merangin areas in Jambi (main coffee production areas in Jambi), it has to be found out first what kind of coffee species mostly planted by the farmer. If it is Arabica, then law enforcement measures should be taken to restrict land clearing at a higher altitude while introducing suitable arabica species that can grow best in lower altitudes. If it is Robusta species, then the government will need to support intensification by providing incentives/subsidies to maximize the production in the existing land. At the same time, law enforcement measures are taken to prevent the movement toward higher altitudes, especially if it involves land clearing. Another potential approach is to use the social forestry scheme to support the agroforestry system by planting coffee in the forest areas without or with limited land
	clearing. However, this approach will need to be further explored, especially to see the effectiveness and success stories of similar systems at other places. With regards to other crops such as oil palm, rubber, and cassia Vera, the control of further expansion into forested areas could only be done by enforcing the law, for example, by enforcing the moratorium on the utilization of primary natural forest and peatlands, as currently being reenacted in August 2019. However, alternative channels such as social forestry and conservation partnership should be explored for those who have already had plantations inside the forest.

Table 39. Risk of Reversals and Mitigation Strategic

Risk	Description and Mitigation strategies
Illegal logging	Illegal logging occurs due to several reasons, such as the immediate needs for economic income, social activities by the local population (limited logging), organized logging supported by the capital owner, illegal felling by concession owner, etc.
	Different treatments to different actors will need to be initiated. In combination with alternative livelihoods, law enforcement has shown some successes in the past in other places. Similar strategies will need to be tried in Jambi. Those that have the stake in the forest must be prioritized for alternative livelihoods.
	It is expected that at the end of pre-investment and ERPA periods, some combination of law enforcement and community development/alterative livelihoods will help neutralize the illegal logging practices.
Encroachment and opening land by using the burning	Forest encroachment took place due to many factors such as land grab business by mafia liked actors and agricultural land expansion by local farmers or migrants.
method	The easiest way to open land for agriculture expansion is by burning the land. This has been practiced by farmers and companies for quite some time and has recently been accused of causing a lingering forest fire.
	Although socialization and law enforcement have been implemented, some actors are still using this burning method to save time and resources in opening land.
	At the pre-investment stage, the effort to socialize no-burning policy could be intensified by using an innovative method, such as a moral movement involving local-traditional-informal leaders to stop land burning mentality.
	Social forestry is commonly used now to deal with encroachment by local people to the forest area. However, it has to be ensured that when a social forestry scheme is introduced, those who participate in the program should follow the procedures set up in the licensing agreement, including no land clearing, avoid monoculture planting, only plant forest trees, etc.
Mining (illegal and legal)	Small scale illegal mining has been practiced widely in Jambi, especially the drilling of oil from shallow wells scattered around some forested areas, especially in Tahura Sultan Thaha Syaifudin.
	This is an exclusive activity in terms of area coverage and is limited in one or two areas. However, looking at the magnitude of land destruction and environmental impacts, strong enforcement measures will need to be made while providing alternative livelihoods for local people involved.
	In the future, the BioCF could provide training and alternative livelihood supports to those who have lost income due to the cessation of illegal drilling activity. Otherwise, these groups will be tempted to participate in other illegal activities such as illegal logging and forest encroachment creating leakages in other places.
	Legal coal mining is quite common in Jambi, especially in Sarolangun, Bungo, Muaro Jambi, and Merangin Districts. Although mining areas in these districts are quite

Risk	Description and Mitigation strategies
	extensive (more than 350,000 hectares) ⁵⁹ , only around 5,000 hectares of land are being exploited for coal production. Although the provincial government has strictly
	enforced the reclamation policy for ex-mining areas, the future mining areas' expansion, especially in the non-forest land (APL), will need to be closely monitored. This has the potential for planned deforestation in the future and therefore will be the potential source of reversal.
Natural	
Forest fires	Forest fires have been reported as frequent even in Jambi during the dry season, especially in the peatland area. So far, Jambi has all the required laws and regulations, and institutions to deal with forest fires ranging from the provincial, district, and village and farmer group levels. The BioCF program is also expected to expand forest fire prevention and handling by expanding related officials and farmers' training and organization.
	Looking after the severity of the forest fire and the Jambi Government's seriousness to deal with it, BioCF will need to support this program during the pre-investment phase focusing on capacity building and institutional support and development at the local level.
Pest outbreak	Agriculture pest attaches can usually be seen from the decrease of production and the death of the plan or pest's spreading. Simultaneously, the reduction of biodiversity in the surrounding forest will also reduce natural enemies that usually control the pest.
	Decrease of production or the death of crops from pest attack can lead to the removal of the plant in the WPK. When farmers try to find alternative crops, it can lead to the opening of new plantation inside and outside WPK, which can involve land clearing (this will need to be verified during field visit).
	Lack of knowledge from the farmers and local extension workers on pest management causes a slow response from the government. At the same time, the loss of forest from illegal logging and encroachment can lead to increased pest attach due to the decrease of its natural enemy that mostly live in the forest.
	A few strategies to mitigate the above risks are:
	 Using the natural agent to kill the pest; Applying the Integrated Pest Management approach in agriculture and plantation system; Using the cultural innovation in existence inside the communities (for example, the arrangement of plantation pattern and timing);
	 Using the agroforestry approach or avoiding a monoculture system.

⁵⁹ Based on information presented by the representative from Provincial ESDM Office of Jambi during the safeguards workshop in early July 2019

4.7.2. Assessment of the level of risk of Reversals

<u>Risk Factor A</u> : Lack of long-term effectiveness in addressing underlying key drivers of AFOLU emissions and removals							
Indicators	Analysis	Level of Risk ²⁶	Reversal Set- Aside Percentage ²⁷²⁸				
Lack of broad and sustained stakeholder support	The successful implementation of the BioCF- ISFL Emission Reduction program is affected by support from various stakeholders such as government, private sectors, and communities at national, provincial, and district levels. To increase these supports, the BioCF-ISFL program should be well understood by all stakeholders by engaging them to participate in the project. Based on various meetings conducted with local government, private sectors, technical offices, and NGOs at the provincial and district levels, including some FGDs with indigenous people and local villages, there are no negative sentiments towards the JERP. However, some activists also moved at the provincial level to challenge the JERP concept, especially if the plantation companies will also benefit from carbon payments. The draft BSP for Jambi has concluded.	Low	5%				

Table 40. Assessment of the level of risk of reversal

Risk category	Definition
High	The potential of emission reversal after project intervention due to occurrence of
	measure(s)
	mentioned in the indicators is high, or certain
Medium	The potential of emission reversal after project intervention due to occurrence of the
	situation(s) mentioned in the indicators is limited, or likely
Low	The potential of emission reversal after project intervention due to occurrence of
	measure(s)
	mentioned in the indicators is low, or unlikely

	that the private sector will not receive cash benefit from BioCF-ISFL implementation. Although there is strong support by stakeholders at the national and provincial levels, the field's situation could vary depending on the level of understanding about the program and what the program will offer to the local actors. The FPIC that will be conducted in the 100 villages within the accounting area is expected to raise support for Biocf-ISFL. Based on the above analysis, the risk for this indicator is considered Low.		
Significant occurrences of conflicts over land and resources in the program area	Current analysis and exposure proved that conflict over natural resources, especially land, is a common and serious issue in Jambi. More than 30 conflicts, 50% of which are active cases and in the process of mediation/resolution involving government, local communities, and companies, have been recorded in Jambi (SESA, 2019). The government has already had institutional mechanisms in the form of Conflict Resolution Teams set up at the district level by the Head of the District to settle these conflicts. Efforts have been made to do so; some have been resolved, but more needs to be done in the future due to the complexity of the issues. Based on this assessment, conflicts can be considered a Medium Risk to the project but emission-wise for reversal, it can be considered Low Risk.	Low	
Lack of institutional capacities and/or ineffective vertical/cross- sectoral coordination	One way to improve environmental management is by supporting good governance in forest and peatland management. One component of it is intersectoral coordination. While sectoral efforts under Forestry and	Low	

	 Plantation services are important and have been proved to be working (in the case of Fires-Care Farmer under Plantation Service and Forest Fires Brigade under forestry service), various intersectoral efforts have also been tried at provincial and district levels, including different communique by provincial governments to control forest fires. With the issuance of Ministerial Decree No. 19/2019 (Permen LHK No. 10/2019) on the Management of Peat Dom based on the Hydrological Unit, socialization of this new regulation to the related sites and management units in Jambi will be needed. It could take both vertical and horizontal coordination in Jambi, involving primarily the Peatlands and Mangrove Rehabilitation Agency (BRGM). Despite the fact that many signs of progress have been noticed, it is realized that the issue with the cross-sectoral and vertical coordination as currently experienced between Ditjen PPI and the provincial government and between related provincial offices (OPD) in Jambi is still occurring. The BioCF-ISFL program has anticipated this by putting the provincial secretary as part of the National Technical Committee (NTC) and the head of the subnational project management unit (PMU). Therefore, this risk is considered Low. 		
Lack of long-term incentives beyond climate finance to decouple deforestation and degradation from increase in agriculture production and other economic activities.	It is clear that the provincial government of Jambi, through its Provincial Medium-term Development Plan (RPJMP), has stressed increasing economic growth through commodity development, but it will be done according to good agriculture practices	Medium	

	 in which care for the environment will be given priority as well. At the same time, The New Green Growth Plan for Jambi also discussed the strategic intervention to greening Jambi's future development, including the emission reduction strategic plan. This is a good sign of the positive move of the provincial government to provide long-term incentives for green development in the province. Component 1 of the BioCF's Pre- Investment Plan puts necessary conditions for long-term incentives to harmonize agriculture development and emission reductions and removals. However, in reality, this is not always the case. Some sporadic agricultural practices are still targeting the forest land and have been done either illegally or in a way that is not very 		
	responsive to the environment. Based on the above assessment, the risk for this section can be considered as Medium.		
Lack of relevant legal and regulatory environment conducive to addressing key drivers of AFOLU emissions and removals and lack of progress in the implementation of that policy and legal framework	As explained in subsection 3.1.4 of ERPD on legal framework analysis, Indonesia has almost all the needed legal basis to address critical driver of AFOLU emission and removal. The issue is how to effectively and consistently enforce the law. Component 1 of BioCF Pre-Investment plan has emphasized providing the necessary environment for implementing policy and legal framework to control deforestation and forest degradation.	Medium	
Risk Factor B. Exposure and	vulnerability to natural disturbances		
Is the Accounting Area vulnerable to fire, storms, droughts, etc?	Most of the peatland areas within the implementation program (around 400,000 hectares) are vulnerable to fire and droughts experienced during the El Nino times	Medium	10%

	in 2015 and again in the long drought		
	season in 2019. This area accounts for		
	< 20 %t of the accounting area and will		
	therefore fall under Medium Risk.		
Are there capacities	In addition to flooding and pest	Low	
and experiences in	outbreaks, recurrent forest and peat		
effectively preventing	fires can be considered as key natural		
natural disturbances or	disturbance responsible for carbon		
mitigating their	emission. Jambi has all the necessary		
impacts?	Means to fight the fire, starting from		
	provincial regulation supported by		
	national policy up to community forces		
	in the form of fire care farmers and fire		
	brigades, as well as the most recent		
	institutional setup under the police		
	force to monitor forest fire in real time		
	called ASAPGITAL. At the same time,		
	the Peatland Restoration Agency is also		
	very active in Jambi, preventing forest		
	fires and restoring the degraded		
	peatland. It has been observed that		
	during droughts as currently		
	experiences in Jambi, efforts to control		
	fire should be intensified.		
	Based on this, it can be considered that		
	in terms of capacity and intuitional		
	setup, Jambi has been prepared to fight		
	land and forest fire and can be rated as		
	Low Risk.		
Total	1	1	15%

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Annex 1: Drivers of AFOLU Emissions and Removals

A quantitative analysis was carried out to identify the drivers of AFOLU emissions and removals during the base period of 2006-2018 using forest and land cover maps generated by MoEF. The GHG inventory program conducted in this analysis for the AFOLU sector suggested that the net emission level of historical emissions from land use change, peat soil disturbance, and agriculture were 56.4%, 40.9%, and 2.7%, respectively. The largest subcategories contributing to the emissions and removals were deforestation, peat decomposition, and peat fires, with annual emissions of 22.5 MtCO2e, 18.4 MtCO2e, and 5.1 MtCO2e, respectively.

Definitions of deforestation, forest degradation, forest gain, vegetation degradation, and vegetation growth are described below:

- **Deforestation,** as used in this analysis, is the loss of natural forest cover (all types of natural forests, excluding timber plantations) into non-forest classes, including agricultural lands and shrubs. The conversion of mangrove forests into ponds was not included due to its insignificant contribution.
- Forest degradation is the decrease of forest quality, e.g., decreased forest biomass in forests that remain as forests. This methodological approach determines forest degradation by changing primary forests into secondary forests.
- Forest gain is the increase of biomass stock due to the change of non-forest classes into forest classes.
- Vegetation degradation is the change of non-forest land cover classes into other non-forest types with lower biomass values.
- Vegetation growth is the increase of biomass stock due to the change of non-forest classes into other non-forest classes.

Categories	Sub-Categories	Total 2006-2018	Annual Emission / Removal	% Absolute level		
	Total FOLU	389,466,122	21,228,141			
FOLU	Deforestation	269,532,517	22,461,043			
	Forest Degradation	11,448,418	954,035	EG /9/		
	Enhacement Carbon Stock	- 8,564,290	- 713,691	50.4%		
	Vegetation Degradation	41,120,971	3,426,748			
	Vegetation Growth	- 58,799,926	- 4,899,994			
	Total Soil Disturbance	212,434,609	23,548,309			
Organic Soils	Peat Decomposition	151,161,516	18,442,218	40.9%		
-	Peat Fire	61,273,093	5,106,091			
A	Total Agriculture	18,675,050	1,556,254			
	Biomass Burning	omass Burning 887,740 73,9		2 70/		
Agriculture	Livestock	4,117,470	343,123	2.1%		
	Managed Soils	13,669,840	1,139,153			

Table A1-1. Historical emissions and removals of AFOLU sectors in Jambi province

Vegetation growth was the most significant removal source, representing the biomass growth in non-forest classes, with annual sequestration of -4.9 MtCO2e. The second largest removal was from the enhancement of forest carbon stock, which included replanting forest plantations.

The most significant emissions occurred between 2006 and 2009, 2012-2013, and 2015/2016, with strong El-Nino events in 2006, 2009, 2012, and 2015. This suggests that fires boosted by strong El-Nino exacerbate the loss of forests by encouraging small and large-scale oil palm plantations to clear the lands by slash and burn method or by increasing the probability of escaped fires during the land preparation. This premise is aligned with the evidence of drivers of deforestation, where shrub land, bare land, and crop plantation dominated the land cover classes after deforestation.



Figure A1- 1. Sankey diagram of forest cover transition in Jambi Province from 2006 to 2018

	2006-	2009-	2011-	2012-	2013-	2014-	2015-	2016-	2017-	Total
Land Cover	2009	2011	2012	2013	2014	2015	2016	2017	2018	Area (Ha)
Primary dryland										
forest	641,233	641,167	640,534	636,255	631,106	629,971	603,085	585,326	582,388	5,591,065
Primary mangrove										
forest	1,070	1,070	1,070	1,070	1,070	935	1,027	956	312	8,578
Primary swamp										
forest	188,570	188,187	184,134	179,509	179,235	169,148	132,932	132,480	125,358	1,479,553
Secondary dryland										
forest	492,080	438,028	410,195	329,594	312,488	306,315	292,186	290,411	281,499	3,152,795
Secondary										
mangrove forest	6,240	6,240	6,240	6,192	6,192	6,342	6,549	6,329	6,857	57,182
Secondary swamp										
forest	56,423	49,337	46,563	42,675	41,537	39,626	62,825	46,199	50,239	435,424
Mixed dry	1,807,71	1,833,75	1,836,83	1,842,69	1,845,52	1,867,32	1,408,21	1,435,56	1,142,19	15,019,83
agriculture	9	0	9	6	4	9	6	5	3	2
Estate crop	438,200	447,897	448,817	447,067	657,409	667,274	982,160	976,249	987,800	6,052,873
Pure dry agriculture	341,222	341,453	341,561	341,421	147,183	146,395	98,312	99,059	99,012	1,955,617
Plantation forest	177,566	204,231	171,023	173,230	206,519	206,560	235,980	240,081	245,866	1,861,056
Paddy field	17,461	17,461	17,461	17,461	18,609	17,278	17,062	17,062	17,072	156,848
Bare ground	171,727	177,701	238,907	325,692	296,305	312,667	255,702	233,953	200,622	2,213,277

Table A1 2 Annual	forest and lan	d covor in	lamhi Dravinca	from 2006 to 2019
Table A1- Z. Allilual	iorest and ian	u cover m	Jampi Province	

	2006-	2009-	2011-	2012-	2013-	2014-	2015-	2016-	2017-	Total
Land Cover	2009	2011	2012	2013	2014	2015	2016	2017	2018	Area (Ha)
Dry shrub	151,057	152,189	154,002	153,711	166,700	169,095	435,854	445,950	748,625	2,577,182
Wet shrub	269,688	261,351	262,426	262,881	257,348	224,566	215,974	209,202	228,511	2,191,947
Settlement	56,913	56,913	56,997	56,997	50,247	53,117	91,006	91,225	87,104	600,519
Transmigration areas	21,830	21,830	21,830	21,830	21,830	21,830	21,836	21,836	26,966	201,618
Open swamps	16,635	16,635	16,635	16,593	15,707	15,581	15,144	15,144	15,522	15,522
Open water	42,842	42,842	42,842	42,842	42,712	43,459	14,555	43,332	43,442	358,811
Mining areas	5,909	5,909	6,116	6,476	6,471	7,508	14,594	14,642	15,612	83,181
Fish pond/aquaculture	1,018	1,018	1,018	1,018	1,018	216	211	211	211	5,941
Savanna and grasses	88	88	88	88	86	86	86	86	86	781
Port and harbor	83	83	83	83	83	83	83	83	83	751

The size of plantations (mostly oil palm) has doubled from 438 thousand hectares in 2006 to 987 thousand hectares in 2018. Out of 914 thousand, about 162 thousand hectares of the crop plantation were originally developed in the areas covered with natural forests in 2006. At the same time, bare lands and shrubs were potentially the results of over exploitation regime, both legal and illegal logging coupled with other threats, such as fires, shifting agriculture, and land speculation. The size of shrub lands and bare lands that were originally forested areas in 2006 was 193 thousand hectares and 172 thousand hectares, respectively.



Figure A1- 2. Forest and land cover change transition in Jambi Province from 2006 to 2018

Timber plantation also plays a role in Jambi deforestation. More than 162 thousand hectares of timber plantation in 2017 were initially covered with natural forests in 2006. The development of fast-growing and monoculture plantations since 2006 was extensive. In 2018, more than 316 thousand hectares of timber plantation were established in Jambi province, five times larger than in 2006 with 85 thousand hectares. Natural forests initially covered about 161 thousand hectares in 2006, equal to 67% of total timber plantation in 2018.

In addition, demand for agricultural land contributed significantly to Jambi province's deforestation. More than 155 thousand hectares of farmlands in 2018 were initially forested in 2006. Dryland forests were converted the most to fulfill the demand for agricultural land.

The causes of AFOLU emissions and removals in Jambi are differentiated into planned and unplanned drivers (see table below).

Drivers	Planned	Unplanned
Deforestation	 Conversion of forested areas for timber plantation Forest conversion for mining Conversion of forested areas outside forest zones for other land use, such as plantation, infrastructures Land use change due to provincial spatial plan Roads and canal development in by concessions 	 Illegal logging Forest encroachment for small scale mining, plantation, agriculture, and settlements Forest and land fires Forest and land tenure conflicts
Land degradation	Selective loggingConversion to mining	Uncontrolled land firesConversion to low biomass agriculture
Land growth	 Conversion of large-scale plantation from highly degraded lands (low carbon stock) 	 Community based plantation and agroforestry
Peat degradation	 Canal development for water management and transportation by companies Canal development for irrigation and accessibility by public work agency 	 Canal development by illegal loggers for accessibility and transportation
Forest degradation	 Selective logging by timber concessions 	 Small-scale Illegal logging Illegal logging by concessions, e.g. outside permitted locations Forest and land fires Small-scale shifting cultivation
Peat Fires	 There are no planned drivers for peat fires, since land preparation using fires is prohibited by law 	 Land burning for agriculture preparation by communities Land preparation by burning by companies for large scale plantation
Forest growth	Increment from forest concessions	 Increment from forested areas outside forest zones

Table A1- 3. Drivers	s of deforestation	from planned	and unplann	ed deforestation
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Deforestation, forest degradation, and land use change had become significant issues in Jambi since 1970, when large-scale concessions started for timber extraction in pristine mineral forests. Although the logging concessions must apply a selective logging system, unsustainable practices were often performed to reach the timber production target. This led to excessive timber extraction beyond the forests' capacity to regrow. As a result, Jambi's logging and timber industry declined due to scarce resources (Figure A.1-3).



Figure A1- 3. Round wood production (in m3) from Jambi province since 2006 (BPS Jambi, 2019)⁶⁰

According to BPS Jambi (2019), the production of round wood in Jambi province drastically decreased from 27 million cubic meters in 2012 to only 130 thousand cubic meters in 2013. This suggests that sustainable forest management is not fully implemented in Jambi. Timber concessions seem to focus on timber extraction for short-term benefit, neglecting the sustainable principles of applying annual allowable cuts based on actual timber stock and increment and implementing reduced impact selective logging. When the annual cut is larger than the increment to grow, such practices will lead to severe degradation and eventually deforestation. In addition, when the concessions fail to ensure community participation in managing forest resources, additional pressures from external actors will increase the rate of deforestation.

Based on the forest cover change analysis from 2006-2018, we found that five major land cover classes dominate the classes into which forest classes in 2006 were changed in 2018, i.e., shrubs, bare lands, timber plantation, estate crops, and agriculture (Table below). Three are related to forestry and agriculture commodities such as pulp, oil palm, and mixed commodities. The other two top-rank drivers are related to unmanaged or unproductive lands due to over-extraction of timber due to illegal logging or fires.

Based on the land use plan, most of the deforestation occurred in the production forest, a forest estate allocated for timber production, including selective logging and timber plantation after clearcut. In the production forest, the most significant land cover after deforestation was bare land (169 thousand hectares), timber plantation (131 thousand hectares), and mixed agriculture (50 thousand hectares). Forest clearing for timber plantations is legal and part of planned deforestation. However, converting forests into agriculture and bare lands in forest estates results from illegal activities, including illegal logging, encroachments, or excessive timber harvesting.

⁶⁰https://jambi.bps.go.id/dynamictable/2017/10/26/227/produksi-kayu-hutan-dan-hasil-hutan-ikutan-menurut-jenis-produksi-2000-2016.html

Land	Other	her Nature Permanent Limited								
Use/Land Cover after Deforestation	Land Use (APL)	Nature Preserve (CA)	National Park (TN)	Forest Park (TAHURA)	Permanent Production Forest (HP)	Limited Production Forest (HPT)	Convertible Production Forest (HPK)	Protection Forest (HL)	Total	
Bare ground	55,020	542	11,093	8,938	169,567	32,095	190	9,642	287,087	32.69
Mixed dry agriculture	61,182	236	11,546	10,632	57,305	21,042	125	3,626	165,693	18.87
Plantation forest	6,627	0	0	0	131,059	2,752	6	41	140,485	16.00
Wetshrub	44,306	12	5,079	7,339	28,057	11,708	192	11,743	108,436	12.35
Estate crop	65,285	31	34	0	7,252	13,446	1,958	5,859	93,864	10.69
Dry shrub	11,111	5	8,191	0	31,328	13,815	113	3,893	68,455	7.80
Pure dry agriculture	5,842	30	326	0	4,918	4	1	1,489	12,611	1.44
Mining areas	91	0	39	0	560	0	0	0	690	0.08
Open water	1	0	25	0	276	2	0	0	304	0.03
Fish pond/aquacul ture	216	0	0	0	0	0	0	0	216	0.02
Settlement	147	1	0	0	17	0	0	0	166	0.02
Paddy field	114	0	0	0	0	0	0	0	114	0.01
Total	249,942	857	36,331	26,909	430,338	94,864	2,586	36,293	878,121	100

Table A1- 4. 2017 land cover classes change from 2006 forest cover classes

At the district level, significant deforestation occurred in Tebo, Muaro Jambi, Batanghari, Tanjung Jabung Barat, and Tanjung Jabang Timur, with cumulative deforestation of more than 100 thousand hectares from 2006 to 2017 (Table below). The main drivers of deforestation vary among districts. For example, in Batanghari district, the major causes of deforestation were forest plantation and agriculture, while in Muaro Jambi district, the development of oil palm plantation was the major driver of deforestation.

No	Land cover after deforestation	Kab. Batanghari	Kab. Bungo	Kab. Kerinci	Kab. Merangin	Kab. Muaro Jambi	Kab. Sarolangun	Kab. TanJabBar	Kab. TanJabTim	Kab. Tebo
1	Shrubs	6,926	23,216	3,391	29,477	4,191	17,201	6,320	1,556	24,609
2	Swamp shrubs	324	0			29,391	85	10,267	36,130	
3	Forest plantation	52,056	1,452		83	9,336	8,574	48,078	21,520	21,645
4	Estate crops	23,262	4,329		701	90,600	10,331	10,477	19,539	3,148
5	Settelements	14	0		0	116	31	17	85	14
6	Dryland agriculture	56	0	251		2,552		7,865	1,762	
7	Mix dryland agriculture	41,481	1,130	2,642	10,805	4,818	11,013	18,804	2,204	49,941
8	Barelands	6,830	8,019	1,316	7,757	21,320	9,593	22,452	18,308	76,777
9	Mining		451		39	9	98			728
10	Paddy rice						87			
11	Aquaculture							201	10	
	Total	130,950	38,597	7,601	48,863	162,333	57,012	124,481	101,114	176,862

Table A1- 5. Land cover after deforestation by district

Conversion of forests for plantation, mining concessions, or infrastructure development is often part of government programs or private sector plans that have been regulated or permitted (Table 5). These planned drivers can be identified at the beginning of the programs and thus can be addressed or anticipated through policy intervention or law enforcement.



Figure A1- 4. Fluctuation of crude palm oil price in Indonesia⁶¹

The trend and drivers of tropical deforestation often change from time to time, depending on the relative values of the lands, which are often determined by the market, policy, and institutional interventions (Barbier et al., 2010). Demand for land for agriculture is often driven by commodity price; the higher the price, the higher the land demand, thus increasing the risk of deforestation. The prices of crude palm oil in Indonesia have fluctuated since 2006 (Figure A.1-4), influenced mainly by global demand. The most recent case was the European Union resolution to phase out and eventually ban biofuels made from oil palm by 2030. The price of crude palm oil was going down to less than 500 USD per ton CPO. This may continue for an extended period if the oil palm diplomacy by Indonesia fails, and the EU ban continues. However, this may change only the market location, as India's demands for oil palm are predicted to be higher and could increase the price slowly. If this happens, the risk of deforestation due to oil palm extension remains valid.

Based on the analysis of the drivers of emissions, it is crucial to protect the remaining natural forests to reduce emissions from the largest source of emissions. The remaining forests in 2018 were 1.1 million hectares, resided in conservation areas (53.4 %), forest management units (40.9 %), and other non-forest uses (5.6%). Historical deforestation occurred in primary and secondary forests with 13% and 87%, respectively. The most significant historical deforestation occurred in production forests and protection forests managed under FMUs, averaging 54.0 thousand hectares annually.

The second most significant source of emissions was degradation in non-forest classes. However, this equals the removals that occurred in the non-forest categories (croplands, grasslands, settlement). This means that the emissions from the degradation of non-forest classes cancel out the removals within the same non-forest classes. Forest degradation is the third largest source of emissions from a land cover change in Jambi province.

However, Jambi forests face threats from the development of the road network, including the planned roads crossing the Kerinci Seblat National Park⁶² and seaport development in the coastal area of Jambi. Road development will potentially increase deforestation by about 1-3 km from the roads. Another road development plan inside forest

⁶¹ http://www.palmoilanalytics.com/price/15

⁶²Three http://www.conservationandsociety.org/article.asp?issn=0972 4923;year=2014;volume=12;issue=3;spage=280;epage=293;aulast=Bettinger

areas includes 31 km crossing PT REKI, which could increase the risk of deforestation and forest degradation. The new MoEF regulation (P.23/MENLHK/SETJEN/KUM.1/5/2019) on strategic roads in forest areas allows road development by the national government for specific purposes, including connecting regions, national security, and protecting national assets.

The historical forest and land cover changes showed that natural forests in Jambi province have decreased from about 28% to 22% of the total province area (Table A.1-2). In contrast, estate crops and degraded lands have increased from about 7% to 20% and 8% to 18%, respectively. Timber plantation increased slightly from 2% to 7% only. Surprisingly, agricultural lands decreased from 42% to 31%. Based on the historical trends of forest and land cover changes, we developed linear models to predict the future trend of forest and land cover change in Jambi province.



Figure A1- 5. Jambi forest and land cover change models developed from historical data

The business-as-usual scenario will lead to further depletion of forest cover in Jambi to about 0.7 million hectares and 0.4 million hectares in 2025 and 2030, or equal to 13.4% and 9.1% of total lands, respectively. In contrast, estate crops will increase from 0.9 million hectares in 2025 to 1.3 million hectares in 2030. Similarly, degraded lands will increase from 1.0 million to 1.4 million hectares. At the same time, forest plantation will slightly increase from 0.3 million hectares in 2030.

Annex 2: Financing Plan for JERP Program

 Table A2- 1. Summary of Financing Plan of Jambi – Emission Reduction Program/JERP (The green shade is the contribution fund from pre-investment of JSLMP)

Со	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
1.	Strengthenin g Institution and Policy to improve land/forest governance	Improving policies and regulations to support implementatio n of ER Program	Strengthening and accelerating implementatio n of spatial plan policies	Acceleration One Map Policy Implementation at provincial level	650,000,000	260,000,000	445,000,000	320,000,000	-	-	1,025,000,000	73,214
				Improving KLHS document for Spatial Planning of the Province and 10 Districts (1,300,000,000						1,300,000,000	92,857
				Developing Provincial Environmental Management and Protection Plan (RPPLH)		700,000,000					700,000,000	50,000
				Enhancing implementation of peat moratorium policies		445,000,000	105,000,000				550,000,000	39,286
				Developing Provincial Forestry Master Plan of Jambi (RKTP) (2022 – 2041)		260,000,000					260,000,000	18,571

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Component			Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
		Improving and legalizing Forestry Spatial Plan of 17 FMUs with the Provincial Spatial Plan of Jambi Province		985,000,000	985,000,000	985,000,000	985,000,000	985,000,000	4,925,000,000	351,786
	Improving regulatory framework for fire management in Jambi	Developing district regulation (10 district) on fire management		151,875,000	151,875,000	151,875,000	151,875,000		607,500,000	43,393
	Developing legal framework of the private sector's roles in reducing emissions	Facilitating provincial regulation related to private sectors' contributions to ER Program Through (HCV/HCS, ISPO, PHPL Peat and fire management)		787,500,000	787,500,000	787,500,000	787,500,000	787,500,000	3,937,500,000	281,250
	Legalizing and mainstreaming Green Growth Plan (GGP) into Provincial Regulation and its adoption into Province Long-term Development	Facilitating relevant stakeholders to develop KLHS and synchronize with GGP.			750,000,000	750,000,000			1,500,000,000	107,143

Con	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
			Plan (2025 – 2045)									
				Facilitating relevant stakeholders to develop RPJP (2025 – 2045) based on the adopted KLHS from GGP.			950,000,000	950,000,000	500,000,000	250,000,000	2,650,000,000	189,286
			Recognition of MHA in Jambi	Facilitating recognition of indigenous people's area (Hutan Adat) through local regulation			300,000,000	300,000,000	300,000,000	300,000,000	1,200,000,000	85,714
				Facilitating recognition of existing indigenous people (MHA) through local regulation		500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	2,500,000,000	178,571
			Development of Draft Local Regulation on Provincial Social Forestry				300,000,000.00	400,000,000.0 0			700,000,000	50,000
2	Improving Sustainable Land and Forest	Promoting Sustainable Forest Management, Conservation,	Ensuring the full implementatio n of PHPL for all forest	Facilitating and monitoring implementation of SFM/PHPL in			650,000,000	550,000,000	650,000,000	550,000,000	2,400,000,000	171,429

Cor	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
	managemen t	and Restoration	concessions in Jambi	active forest concessions								
			protecting remaining natural forests including from fires inside forest concessions	Supporting implementation of ASAP GITAL Program to prevent Forest and Land fire	21,600,000,00 0	20,235,000,00 0	17,505,000,000	17,505,000,00 0	17,505,000,000	7,440,000,000	101,790,000,000	7,270,714
				identifying remaning natural forests and peatlands inside 17 forest management units	19,097,029,30 2	24,062,803,70 2	19,157,623,202	18,779,275,30 2	16,876,607,802	11,277,144,302	109,250,483,610	7,803,606
				Faclitating capacity building and tools for governments in forest protection and fire management		589,000,000	470,000,000	383,000,000	110,000,000		1,552,000,000	110,857
				strengthening law enforcements, patrolling, and facilitating conflict resolutions	1,086,800,000	4,355,500,000	6,065,023,600	5,067,748,600	3,903,521,000	224,523,000	20,703,116,200	1,478,794
				increasing community awareness on the risk of fires in dry seasons	72,350,000	115,500,000	761,746,000	652,570,000	657,075,000	326,230,000	2,585,471,000	184,677

Cor	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
				on peatlands and forests								
				Facilitating market and financial access for farmers to increase the sale of timber and non-timber forest products	402,500,000	1,217,500,000	913,525,000	560,000,000	384,845,000	384,845,000	3,863,215,000	275,944
				Identifying potential post- harvest products in order to increase value added incomes for community		610,000,000	885,000,000	460,000,000	335,000,000		2,290,000,000	163,571
			Strengthening and accelerating of Social Forestry Program	forest gazetting to ensure the boundary of social forestry area based on the license			950,000,000	1,150,000,000	1,200,000,000	1,250,000,000	4,550,000,000	325,000
		Promoting sustainable estate crops	Protecting remaining natural forests, including from fires inside estate crop concessions	identifying remaining natural forests and peatlands for restoration planning and management inside estate crops concession areas	17,374,517,90 0	25,527,188,61 9	24,777,183,689	24,051,264,69 9	23,996,711,419	23,996,711,419	139,723,577,745	9,980,256

Cor	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
			Promoting sustainable value chain of estate crop products	promoting private sectors to engage with RSPO/ISPO principles		500,000,000	350,000,000	300,000,000	150,000,000	150,000,000	1,450,000,000	103,571
				RAD KSB District (Sustainable Oil Palm Action Plan)		-	350,000,000	300,000,000	150,000,000	150,000,000	950,000,000	67,857
				Fasiltasi Small Holder untuk mendapatkan ISPO		324,720,000	581,642,000	379,582,000	535,600,000	535,600,000	2,357,144,000	168,367
				Facilitating market and financial access for farmers to increase the sale of estate crops products		335,000,000	275,000,000	120,000,000	155,000,000	155,000,000	1,040,000,000	74,286
				Identifying potential post- harvest products in order to increase value added incomes for community		610,000,000	885,000,000	460,000,000	335,000,000		2,290,000,000	163,571
		Promoting Climate Smart Agriculture	Providing enabling conditions for increasing productivity of existing smallholder agriculture crops products	Capacity building and technical assistance to farmers to both promote intensification and productivity of existing	939,716,000	4,510,536,000	4,240,942,000	2,640,377,000	1,415,706,000	1,415,706,000	15,162,983,000	1,083,070

Con	nponent	 		Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
			smallholder agriculture crops								
			Capacity building for farmers in implementation of climate smart agricultural practices		750,000,000	750,000,000	750,000,000	750,000,000	750,000,000	3,750,000,000	267,857
		Facilitating value chain and market sustainability	Facilitating market and financial access for farmers to increase the sale of agricultural products		500,000,000	750,000,000	850,000,000	750,000,000	750,000,000	3,600,000,000	257,143
			Identifying potential post- harvest products in order to increase value added incomes for community		300,000,000	300,000,000	300,000,000	300,000,000	300,000,000	1,500,000,000	107,143
			Promoting agricultural products less emissions through sustainable agroforestry and intercropping in order to increase productivity by avoiding forest encroachment	18,183,166,00 0	21,108,076,00 0	2,570,000,000	2,070,000,000	2,070,000,000	2,070,000,000	48,071,242,000	3,433,660

Con	nponent				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
		Providing alternative livelihoods for generating incomes of communities	Promoting agroforestry in peatland such as alley cropping, trees along border, and mix trees and agricultural plants (seasonal trees)	Supporting implementation of PALUDI KULTUR in peatlands			750,000,000	750,000,000	850,000,000	950,000,000	3,300,000,000	235,714
				Supporting Agroforestry system (social forestry program) in State and non- state forests.			350,000,000	350,000,000	350,000,000	350,000,000	1,400,000,000	100,000
			The utilization of buffer area by communities with the support of national parks through conservation partnership (Perdirjen P.6/KSDAE/Set/ Kum.1/6/2018)	Empowering community through partnership conservation between community and national parks (such as eco- tourism, agriculture, handicrafts, non- timber forest products)	2,275,655,000	6,100,438,060	7,419,875,000	4,636,501,000	1,617,750,000	1,617,750,000	23,667,969,060	1,690,569
			providing incentive mechanisms for communities to prevent encroachment,	Clearing Forest without Burning through providing seedlings, tools,			650,000,000	750,000,000	850,000,000	950,000,000	3,200,000,000	228,571

Component				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD	
			including fires in surround forest concession and estate crops areas.	and supporting replanting, etc.								
3	Program Managemen t and Coordinatio n	Ensuring implementatio n of Safeguards in place	Capacity building for safeguards implementation		625,000,000	1,903,000,000	2,620,000,000	1,049,000,000	854,000,000	755,000,000	7,806,000,000	557,571
			Finalization SESA-ESMF enhancement		1,000,000,000						1,000,000,000	71,429
			Establishing and operationalizing FGRM (Policy, instrument, institutional Arrangement, SOP)		150,000,000	300,000,000	500,000,000	300,000,000	150,000,000	-	1,400,000,000	100,000
			Monitoring and Developing Safeguards Implementation Report			80,000,000	40,000,000	40,000,000	40,000,000		200,000,000	14,286
			Conducting studies related to carbon and non-carbon benefits (such as habitat conservation, ecosystem services, good governance, Indigenous Peoples, etc.) beyond ERPA period			252,111,112	176,055,556	176,055,556	176,055,556	176,055,556	956,333,336	68,310
			Developing FGRM Website	Developing web- database, hosting, plus maintenance	300,000,000	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000	675,000,000	48,214
		Ensuring implementatio n of MAR in place	Establishing institutional arrangement for MAR system for the province		450,000,000	405,000,000	405,000,000	255,000,000	105,000,000	105,000,000	1,725,000,000	123,214
			Strengthening capacity of responsible personnel,		1,000,000,000	-	-	-	-		1,000,000,000	71,429
Con	Component				Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
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			Infrastructure and analysis and repo	d institution for rting								
			Developing ERMR (GHG Counting)	R1 and ERMR2	2,531,200,000	2,932,560,000	2,343,080,000	1,655,080,000	2,343,080,000	590,200,000	9,461,920,000	675,851
			Annual Monitoring Reporting on Emission Reduction				300,000,000			300,000,000	300,000,000	21,429
		Ensuring Benefits disbursed and channeled to beneficiaries	Capacity building for beneficiaries on Developing Proposal and reporting for the use of benefits				1,373,125,000	1,373,125,000	1,373,125,000	1,373,125,000	2,746,250,000	196,161
			Capacity building governments/age charge for monito evaluation on the benefits	for encies that are in pring and e use of the			316,875,000	316,875,000	316,875,000	316,875,000	633,750,000	45,267.86
			Strengthening Institutional arrangements for BSP at village, district, and provincial level				2,327,500,000	2,327,500,000	2,327,500,000	2,327,500,000	4,655,000,000	332,500.00
			Developing Benef Annual Report	fit Sharing Plan				300,000,000	300,000,000	300,000,000	30000000	21,428.57
			Strengthening and supporting the role of local intermediary agency to disseminate the benefits to the local beneficiaries within the province	conducting audit internal, fiduciary assessment, and SOPs	-	250,000,000	250,000,000				500,000,000	35,714.29

Component					Year 1 (2021)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Year 6 (2026)	Total 6 years	USD
			Implementing annual BSP Monitoring, Verification, and Reporting	Field visits to 10 Districts	-	-	300,000,000	400,000,000	400,000,000	500,000,000	1,600,000,000	114,285.71
		Knowledge Sharing Management	Disseminating Jambi ER lessons learned to relevant stakeholders and available online for public				1,750,000,000	2,000,000,000	2,250,000,000	2,500,000,000	8,500,000,000	607,142.86
			Attending BioCF International Event on The Climite Isu to other Countries		-	1,500,000,000	1,500,000,000	1,500,000,000	1,500,000,000	1,500,000,000	7,500,000,000	535,714.29

573,261,454,950 40,947,247

Table A-2.2. Summary of Financing Plan and Funds Resources

	Component Program	Financing Plan (USD)		
Α.	Cost of Program Implementation			
1	Strengthening Institution and Policy to improve land/forest governance	1.561.071		
2	Improving Sustainable Land and Forest management	35.746.229		
3	Program Management and Coordination	3639947		
	TOTAL A	40.947.247		
В.	Source of Funding			
1	BioCF ISFL Pre – Investment grant	2.000.000		
2	Provincial Forestry Service Budget under APBN Budget 2022 - 2026	15.000.000		

	Component Program	Financing Plan (USD)
	Provincial Women's Empowerment, Child Protection and Population Control Service Budget under APBD 2022 –	
3	2026*	12.100.000
4	BioCF ISFL Pre – Investment grant	11.500.000
5	Provincial Regional Planning Agency Budget under APBD 2022 – 2026)*	4.600.000
	TOTAL B	45.200.000
С.	Financing Surplus or Gap of ER program in Jambi	
	(TOTAL B - TOTAL A = TOTAL C)	4.252.753

Annex 3: Assessment of Land and Resource Tenure in the Program Area

2. Pattern of Using Space / Land in Jambi Province

Jambi Province is located 0° 00 45′ – 20 45′ South Latitude and 1010 10′ – 1040 55′ East Longitude. The north borders Riau Province and Riau Islands, the East with the South China Sea, and at the southern borders South Sumatra Province, and the west borders West Sumatra and Bengkulu Provinces. The area of Jambi Province is about 53,435 Km2, divided into a land area covering approximately 50,160.05 Km2 and the rest of its waters and oceans, covering the area of about 3,247.95. Jambi Province is divided into nine districts, two cities, 131 sub-district, 1. 375 villages, and 187 sub-districts/ kelurahan^[63]. In detail, the area and number of administrations of the Jambi Province government in 2021 are described in the table below:

No.	Districts/Cities	Ar	ea (Km2)	Capital City	Number of Sub districts
1	Kerinci	Land	3.335,27	Siulak	18
2	Merangin	Land	7.679,00	Bangko	24
3	Sarolangun	Land	6.184,00	Sarolangun	10
4	Bungo	Land	4.659,00	Muaro Bungo	17
5	Tebo	Land	6.461,00	Tebo Estuary	12
6	Batanghari	Land	5.804,00	Muaro Bulian	8
7	Muaro Jambi	Land	5.326,00	Sengeti	11
8	Tanjung Jabung Barat	Land	4.649,85	Kuala Tungkal	13
9	Tanjung Jabung Timur	Land	4.445.00	Muaro Sabak	11
10	Sungai Penuh City	Land	391,50	Sungai Penuh	8
11	Jambi City	Land	205,43	Jambi	11
	Total		53.435,92		131

 Table A3- 1. Area and Number of Administration of Jambi Provincial Government in 2010

Source: Jambi in figures, 2021

Functionally, land use in Jambi Province is divided into 1). Forest Area covers 2,098,235 Ha, equivalent to 41.83% of the total land area, and 2) Other Use Area (APL) / Cultivation area of 2,917,470.00 Ha or equal to 58.13%. The details of the area of Jambi Province based on its function are described in the table below.

⁶³. Jambi's Statistic Bodies, Jambi In Figures, 2021, Page 11

			Forest	Areas Functio	n (Ha)				
No	Districts	Prote <i>c</i> ted Forest	Nat Park & Nat Resource Unit	Limited Production Forest	Production Forest	Converting Production Forest	Total (Ha)	Other Land Use/ APL (HA)	Total (Ha)
		(HL)	(TN/ BKSDA)	(HPT)	(HP)	(HPK)			
1	Batanghari		50,920.83	55,040.26	129,578.60	73.85	235,613.54	334,786.46	570,400.00
2	Muaro Jambi	23,636.59	37,980.54	57,458.76	34,155.01	4,725.29	157,956.19	374,643.81	532,600.00
3	Tanjung Jabung Barat	15,017.74	11,969.70	36,364.16	179,440.60	616.42	243,408.62	221,576.38	464,985.00
4	Tanjung Jabung Timur	22,190.13	126,147.18		55,197.58	1,270.47	204,805.36	339,694.64	544,500.00
5	Tebo	6,712.49	37,112.14	20,718.09	223,799.28		288,342.00	357,758.00	646,100.00
6	Sarolangun	44,577.83	8,792.40	55,172.94	117,565.57		226,108.74	392,297.26	618,406.00
7	Merangin	45,347.80	165,324.22	33,530.79	111,979.61		356,182.42	411,717.58	767,900.00
8	Bungo	22,110.42	37,507.43		77,833.43	4,712.29	142,163.57	323,735.75	465,899.32
9	Kerinci		186,281.38		33,301.29		219,582.67	115,944.33	335,527.00
10	Kota Sungai Penuh		23,436.18	941.03			24,377.21	14,772.70	39,149.91
11	Kota Jambi						-	20,543.00	20,543.00
	Jumlah	179,593.00	685,472.00	259,226.03	962,850.97	11,398.32	2,098,540.32	2,907,469.91	5,006,010.23

Table A3- 2. Area of Jambi Province Based on the Function of the patent

Source, Jambi in figures, 2021

The table above shows that almost half of Jambi Province Forest areas function as conservation areas in the form of protected forests as well as national parks and nature reserves, covering an area of 865,059 Ha or equivalent to 41.22% of the total forest area in Jambi Province. The rest is a production forest area that can be used for direct economic development, an area of 1,233,476 Ha or 58.88%. However, if you look at it in more detail, the actual area of production forest that can be optimized for utilization is an area of 974,249.97 ha. In contrast, the remaining area of 259,226.03 cannot be optimally mandated because it functions as a Limited Production Forest (HPT).

The utilization of production forests in Jambi Province is dominated by permits for Industrial Plantation Forests (PBPH-HT). In total, 20 (twenty) PBPH-HT permits were issued by the Ministry of Environment and Forestry (KLHK) RI in Jambi Province, with a total permit area of 598,663 Ha, followed by permits for Social Forestry as many as 415 permits with a total area of 204,296.97 Ha. Furthermore, there are 2 (two) Ecosystem Restoration Permits (PBPH-RE) covering an area of 85,050 Ha. Finally, Natural Forest Utilization Permits PBPH-HA as many as two permits with a total area of 56,045 Ha^[64]. Thus, the total production forest area that has been burdened with rights/permits in Jambi Province is an area of 944,054.97 Ha or equivalent to 77.4% of the total production forest area (HPT, HP, and HPK) of 1,233,416 Ha. The percentage of control of the Production Forest area in Jambi Province can be seen in the diagram below;

⁶⁴. Compilation of Forestry permits in Jambi Province. Jambi's Forestry Office, 2022.



Figure A3- 1. Percentage of use of Production Forest Areas in Jambi Province in 2021 Source, Forest Service 2022

On the other hand, Land Use with the function of Other Use Areas (APL) / Cultivation in Jambi Province is dominated by plantation sector businesses. Jambi Province has seven primary plantation commodities: Palm Oil, Rubber, coconut, Coffee, Cinnamon, and Cocoa. The total land use in APL for the seven primary commodities of the plantation is 2,139,686 Ha or 73.34% of the total APL area in Jambi Province.

Judging from the total area of its use, of the seven leading plantation commodities, Palm Oil is the most important commodity. Location permits for oil palm plantations were recorded at 1,363,425 Ha, with a total IUP-B of 1,031,724.05 Ha granted to 186 companies ^[65]. The IUP-B area of the oil palm plantation is equivalent to 35.36% of the total APL area in Jambi Province. However, the realization of planting in the location permit / IUP-B is only 541. 926 Ha or only 52.53% of it; permit holders cannot manage the rest due to various problems, including conflicts with the community.

The details of the use of APL areas for seven leading plantation commodities in Jambi Province can be seen in the table below;

⁶⁵ Indonesia Agriculture Ministry decree No.833, Year of 2019

No	Plantation Commudities	Total Land used	Persentage
1	Palm Oil	1,134,640	53.03
2	Rubber	791,025	36.97
3	Coconut	118,994	5.56
4	Cinnamon	46,132	2.16
5	Coffee	25,847	1.21
6	Areca	20,694	0.97
7	Сасао	2,354	0.11
	Total	2,139,686	100.00

Table A3- 3. Data on the Area of Use of APL Area in Jambi Province for seven leading commodities in the plantation sector in 2021

Source: Jambi Provincial Plantation Office, 2022

Furthermore, the use of APL areas in Jambi Province is dominated by mining businesses, especially in the Mineral sector and mainly coal mining permits (Minerba). There are 126 mineral and coal mining permits with a total permit area of 197,754 ha, or 7% of the total APL area in Jambi Province ^[66]. Thus, the total APL area used for plantations and mineral and coal is an area of 2,337,440 ha or equivalent to 80% of the total APL area of Jambi Province. Furthermore, APL in Jambi Province is used for smallholder plantations (non-mainly), agriculture, settlements, oil and gas, and government infrastructure. Based on the explanation of the pattern of space/land use in Jambi Province above, it can be concluded that the control and use of space/land in Jambi Province are dominated by permits in the forestry, plantation, and mineral and coal mining sectors. Thus, it is not surprising that the sector/business sector has the most significant contribution contributing to the Gross Regional Domestic Product (GRDP) of Jambi Province, which is 46-50% in the last ten years ^[67].

2. Analysis of Tenure Conflicts in Jambi Province

Judging from the significant dominance of land use in the forestry sector, plantations, and mineral and coal mining amount to 80% of the total APL area in Jambi Province. With most of its business being controlled by permit holders, it is not surprising that land conflicts in Jambi Province have become very high. Until the end of 2021, 146 land conflicts had occurred in Jambi Province. With details in the forestry sector, there were 115 conflicts and as many as 31 land conflicts in the plantation sector.

2.1. Tenure Conflicts in the Forestry and Plantation Sectors

Judging from its function, most conflicts in the forestry sector until 2021 occurred in forest areas with the Production Forest function, which was 104 cases or around 90.43% compared to tenure conflicts that occurred in forest areas with conservation functions, as many as 11 cases or around 9.57%. However, of the total 104 conflict cases that occurred in the Production Forest area, until the end of 2021 as many as 64 cases or around 64% of them have been successfully handled by the Jambi Provincial Forestry Service with various concepts of Social Forestry based on the

⁶⁶. Energy and Mineral Resources Office (ESDM) of Jambi Province. ESDM Information Book, 2021, page 26

⁶⁷. Jambi's Statistic Bodies, Compilation of Jambi in Figures of 2012, 2014, 2018 and 2021

Minister of Environment and Forestry Regulation No. 9 of 2021 with details as many as 50 cases have reached the KK Manuscript stage and 14 other cases have reached the Kulin KK stage. Meanwhile, as many as 9 or about 9% of cases are still in the process of mediation and as many as 31 or about 30% of other cases are still in the process of encouraging mediation and resolution.

Judging from the large number of tenure conflict cases that have been successfully pushed into the mediation process and even have been equally at the NKK and Kulin KK stages mentioned above, it can be concluded that the Jambi Provincial government together with the Ministry of Environment and Forestry (KLHK) have a very strong commitment and have succeeded in resolving the majority of conflicts (64%) in the forestry sector in Jambi Province. The details of the tenure conflict case in the forestry sector and the process of resolving it can be seen in the picture below.



Figure A3- 2. Number and status of conflict resolution in the forestry sector in Jambi Province (Source: Forest Service 2022)

Furthermore, in more detail related to conflicts that occurred in the forestry sector in Jambi Province, judging from the subject, the majority of them occurred between Forest Farmer Groups and PBPH-HT permit holders, namely 52 cases and followed by conflicts between Forest Farmer Groups and PBPH-RE / Ecosystem Restoration permit holders, namely 11 cases and between Forest Farmer Groups and Village Governments / regional administrations with PBPH-RE Permit Holders and KPH Stakeholders with 5 cases each. Meanwhile, when viewed from the subject of the Management Unit and the type of permit, data was obtained that the most conflicts occurred in the area of PBPH-HT permit holders, namely 68 cases, followed by PBPH-RE permit holders, namely 19 cases and Social Forestry / PS permit holders as many as 10 cases. While the conflicts involving national park managers were 7 cases, while the number of conflicts involving Production Forest Stakeholders (KPH) was 9 cases. The details of the number of conflicts in the forestry sector based on the subject and type of managers in Jambi Province until the end of 2021 can be seen in the table below;

Table A3- 4. Data on tenure conflicts in forest areas based on the Subject and Type of Forest Management Unit in Jambi Province until the end of 2021

No	Subject (Community Groups)	NP	Natural Resouces Unit	Timber Plantation	Social Forastry Licenses (HD, HTR, HKM, Kemitraan)	Ecosistem Restoration license	Logging Permits	FMU	Personal
1	Forest Smallholders Group	0	0	52	4	11	0	5	0
2	Farmers Group	0	0	1	0	2	0	2	0
3	Personal	0	0	5	0	0	0	0	0
4	Indigenous Groups (Including SAD)	3	0	2	0	1	0	1	0
5	Cooporative	0	0	3	2	0	0	0	2
6	Village Government	4	0	5	0	5	0	1	0
7	Non Forestry License (HGU)	0	0	0	4	0	0	0	0
	Total	7	0	68	10	19	0	9	2

Source, Forest Service 2022

Furthermore, as explained above, oil palm plantations dominate the use / control of land with APL status in Jambi Province. The area of location permits for oil palm plantations was recorded at 1,363,425 Ha with a total IUP-B covering an area of 1,031,724.05 Ha which was given to 186 companies. The IUP-B area of the oil palm plantation is equivalent to 35.36% of the total APL area in Jambi Province. However, the realization of planting in the location permit / IUP-B is only 541. 926 Ha or only 52.53% of it, the rest cannot be managed by permit holders due to various problems including conflicts with the community.

The total conflicts in the oil palm plantation sector until the end of 2021 were recorded as many as 40 cases. 10 of them or 25% were successfully resolved by various parties, especially the Regency / City Government and Jambi Province, while as many as 30 other cases or 75% of them are still in progress. When viewed from the subject, conflicts in the oil palm plantation sector occurred between communities / villages and plantation permit holders, namely as many as 10 cases and followed by conflicts between farmer / plasma groups and permit holders as many as 9 cases and between cooperatives and permit holders, namely as many as 8 cases. The following is data on conflicts in the oil palm plantation sector by subject;

No	Cubicata		Subject	t	
NO	Subjects	Cooperative	Private Sector	Government	Numbers
1	Personal		5		5
2	Farmer Group/ Plasma		9		9
3	Cooperative	1	8		9
4	Villagers/ Village		10		10
5	Private Sector		2	1	3
6	Indigenous Groups		2		2
7	Transmigration		2		2
Tota	I	1	38	1	40

Table A3-5. Data on tenure conflicts in the oil palm plantation sector in Jambi Province until the end of 2021

Source, Plantation Office 2022

The data above also illustrates that almost all conflicts in the oil palm plantation sector, as many as 38 cases out of a total of 40 cases involving plantation permit holders / IUP-B while the remaining 2 cases occurred between cooperatives and cooperatives related to claims to their partnership land and between companies and the government regarding the issuance of permits. Judging from the causes of the conflict, based on data owned by the Jambi Provincial Plantation Office, the majority of conflicts in the oil palm plantation sector were caused by land overlap between communities and IUP-B permit holders in 27 cases. Followed by the problem of unclear schemes and / or distribution of partnership proceeds in 11 cases and related to the issuance of permits by the district government as many as 2 cases. The data related to the number of conflicts in the oil palm plantation sector based on their causes and resolution can be seen in the following table;

Status No **Cause Factors** Numbers Mediated **Ongoing Process** Permits/license 2 2 1 0 2 Partnership Profit Sharing 11 3 8 Land Overlap 7 3 27 20 Total 40 10 30

Table A3- 6. Data on tenure conflicts in the oil palm plantation sector in Jambi Province until the end of 2021

Source, Plantation Office 2022

2.2. Typology and Factors causing tenure conflicts in Jambi Province

Based on data related to conflicts in the forestry and plantation sector in Jambi Province above, when viewed from the conflicting subjects and the object of conflict, the majority of tenure conflicts occur between community groups and permit interns. This is inseparable from the different perspectives of the parties to the conflict on the boundaries of the administrative territories they own or believe in. From the perspective of natural resource conflicts, conflicts like this are called **"Structural Conflicts."** According to *Christoper W Moore* ⁶⁸^[6], in *the theory of The Circle Of Conflict*, Structural conflict is a conflict that occurs because political-governmental aspects influence it. Imbalance of authority/ control over society, inequality of control over potential resources, the definition of rules/rules of the game.

Structural conflicts related to natural resources in Indonesia occur due to factors of strength/authority/power outside the conflicting parties. In this case, it is a regulatory / policy factor and the government's authority related to the determination of the boundaries of the administrative area, especially the determination of forest areas. Determining the boundaries of permit areas within the forest area and in the Other Utilization Area (APL) is based on the authority granted by the Law to the central government and local governments.

To assess the tenure conflict in Jambi Province, it is necessary to look at the conflict based on the causative factors, namely, structural and substance factors.

A. Structural Factors

As explained earlier, Structural Factors are closely related to the authority possessed by the government granted by the Law. In this case, the authority related to the regulation of forest areas was first regulated in Law No. 5 of 1967, which was later replaced by Law No. 41 of 1999 concerning Forestry and was last amended in Law No. 11 of 2021

⁶⁸. Moore, C. W., 1986, Decision Making and Conflict Management, Colorado, CDR Associates, Boulder

related to the Job Creation (UUCK). Based on the provisions of the law, the authority to regulate forest areas in Indonesia is only given to the Central Government, which is then technically regulated by the Ministry of Environment and Forestry (KLHK). As for other use areas (APL), the authority to regulate their use, in general, was last regulated in Law No. 23 of 2014 concerning Local Government as last amended in Law No. 9 of 2015 concerning the Second Amendment to Law No. 23 of 2014 concerning Regional Government. In addition, technically, sectoral-related authorities are regulated in more specialized legislation. For example, related to the plantation sector is regulated in Law No. 4 of 2009 concerning Mineral and Coal Mining, as last amended by Law No. 3 of 2020 concerning Amendments to Law No. 4 of 2009 regarding Coal Mining, and so on.

The provisions stipulated in the law above give the central and local governments regulatory authority to determine administrative boundaries and land use in Indonesia. Thus, the Central Government for Forest Areas and Local Governments for Other Utilization Areas (APL) also owns the power to grant permits. With its authority, the Ministry of Environment and Forestry has determined that the forest area of Jambi Province is an area of 2,098,535.00 Ha, or equivalent to 41.83% of the total land area of Jambi Province. It thus leaves an Area of Other Use (APL)/ Cultivation covering an area of 2,917,470.00 Ha or 58.13%.

The authority and determination of the forest areas in Jambi Province, owned by the Central Government, has indirectly caused hundreds of villages in Jambi Province to be inside, administratively intersecting, and located around forest areas. Kerinci Regency and Full River City are even in the middle of Kerinci Seblat National Park; it's become the main factor causing the high number of tenure conflicts in the forest area in Jambi Province. Until 2021, the Jambi Provincial Forestry Service has recorded as many as 104 cases of tenure conflicts occurring in forest areas with a Production function and as many as 11 Cases of Tenure Conflicts occurring in forest areas with Conservation functions.

In Other Use Areas /APL (non-forest), tenure conflicts occur most in the plantation sector. This is inseparable from the many oil palm plantation permits issued by the Provincial and Regency Governments. As explained above, oil palm plantations dominate the use/control of land with APL status in Jambi Province. The area of location permits for oil palm plantations was recorded at 1,363,425 Ha, with a total IUP-B covering an area of 1,031,724.05 Ha, which was given to 186 companies. The IUP-B area of the oil palm plantation is equivalent to 35.36% of the total APL area in Jambi Province. However, the realization of planting in the location permit / IUP-B is only 541. 926 Ha or only 52.53% of it; permit holders cannot manage the rest due to various problems, including because they are still in conflict with the community.

The extent of local government granting location permits for oil palm plantations, which reaches 1,363,425 ha, has caused land tenure between permit holders and community groups in Jambi Province. Until the end of 2021, the Plantation Office of Jambi Province noted that there had been as many as 40 cases of tenure conflicts, with details of 38 cases involving community groups with plantation permit holders / IUP-B, while the remaining 2 cases occurred between cooperatives and cooperatives related to claims to their partnership land and between companies and the government related to the issuance of permits.

B. Substance Factor / Importance

The substance factor is closely related to the parties' interest in the natural resources controlled, especially economic and economic interests. The Central Government and Local Government view Natural Resources as a tool to obtain state and local revenues which will eventually be used to encourage economic growth and the achievement of national and regional development targets. The government invites investment to manage and utilize these natural resources with a licensing format to achieve this. With authority given by the Law mentioned above, the Central Government and Sub National issued many permits both in the forestry sector and in the plantation sector in Jambi Province. With this approach, it is not surprising that the forestry, plantation, and agriculture sectors have become the main contributors to the Gross Regional Domestic Product (GRDP) of Jambi Province in the last ten years, with an average contribution of 26% - 29% per year^[69].

Similarly, people also view natural resources as the main medium/capital that is important to get their income/household income which will be used to meet the needs of life and achieve welfare. This interest causes most of the people of Jambi Province to depend on the forestry and plantation sectors. Thus, it is unsurprising that the community has used around 217,745 ha of forest area to cultivate agricultural and plantation commodities. With details, an area of 190,933 Ha is in a forest area with a production function, and around 26,812 Ha is in a forest area with a conservation function ^[70]. On the other hand, as mentioned above, about 2,139,686 Ha, equivalent to 73.34% of the total APL area, has been used to cultivate seven leading commodities of Jambi Province, of which around 806, 772 Ha is cultivated by the communities. Thus, judging from the large percentage of forest area used for agriculture and plantations and the large APL area used by the community, it shows the high potential for tenure conflicts that can occur in Jambi Province due to the pattern of space use that has been regulated through laws and regulations in Jambi Province.

Furthermore, in addition to economic interests, for the people of Jambi, land / Tenure is also considered to have a significant value in terms of culture. The land is a media used to preserve culture, especially in forest areas. Forests are not only viewed from their economic and environmental benefits, such as a source of wood, food, and other forestry commodities; forests are also an inseparable part of the life system of the Indigenous Peoples (MHA) in Jambi Province. Some MHA groups use forests as a medium to honor and worship the spirits of their ancestors by using the names of their ancestors as the names of their forest areas; some even designate forest areas as important conservation areas that must be protected because they are the main source of clean water that is not only used for daily needs but also used as the main source of irrigation for agricultural and plantation businesses. To prevent the destruction of this forest area, MHA groups usually refer to it as a Customary Forest (HA) area and use myths or supernatural things that have been believed for many years as a tool to prevent the entry of people into this area. This condition is one of the main factors for tenure conflicts in forest and APL areas used as customary forests by MHA groups.

Although the State has recognized the rights of MHA in Indonesia in the Constitution and Law No. 41 of 1999 concerning Forestry and as last amended in Law No. 11 of 2021 related to Job Creation (UUCK) and some of its derivative rules, the status of its forest areas has not changed. Likewise, with the APL area that has been burdened with permits, this cannot be separated from the position of the Pusan Government, and Local Government in the Laws and Regulations related to the determination of functions and administrative boundaries for the use of space are considered higher than the MHA group. Until the end of 2021, the Jambi Provincial Environmental Service painted, there are 29 MHA groups in Jambi Province spread throughout the Regencies/ Cities that already have a Customary Forest (HA) determination decree both issued by the Ministry of Environment and Forestry and issued by the Regional Government (Perda and Regent's Decree. In detail, 1 SK HA is in the Conservation Area, 4 SK is in the production forest area, and 24 SK is in the APL. Furthermore, the Jambi Provincial Forestry Service noted that there are still 13 ha determination proposals that are still being determined by the Ministry of Environment and Forestry of the Republic of Indonesia. Thus, the potential for tenure conflicts in Jambi Province will remain until 2022.

⁶⁹. Jambi's Statistic Bodies. Compilation of Jambi in Figures of 2012, 2014, 2018 and 2021

⁷⁰. BioCF-ISFL, Presentation of MRV Specialist, June, 7, 2022

Annex 4. Current Version of the Benefit Sharing Plan for the JERP (see BSP document)

Annex 5: Design Process for Benefit Sharing Arrangements for the ISFL ER Program (see BSP document)

Annex 6: GHG inventory of all AFOLU categories, subcategories, gases and pools in the Program Area

6.1. GHG Inventory of AFOLU Sector

6.1.1. Agriculture

There are various sources of emissions associated with agriculture, such as soils, fuels and livestock. For BioCF analysis on agriculture emissions, we follow the guidance from national GHG inventory report. Emissions from agricultural sector calculated in this analysis are limited to the emissions from managed soils, biomass burning and livestock related to the non-mechanical sources. While mechanical sources such as the use of mechanical equipment are estimated elsewhere, i.e. in the energy sector. Emissions from forest cover change due to agricultural development are also excluded in this sector but included in the forest and land cover change component. Only biomass burning of the residual crops is included in this emission calculation.



Figure A6- 1. Emissions from agriculture include emissions from livestocks, managed soils and biomass burning (source: IPCC)

Emissions from agriculture sector comprise emissions from livestock (enteric fermentation and manure management), managed soils (fertilizers, liming, direct and indirect N2O as well as methane) and biomass burning (in grassland and cropland). Emissions due to forest conversion into cropland are calculated in the forestry and land use sector. Similarly, emissions from peat fires in the cropland will be accounted in the forestry and land use sector (aboveground biomass) and emissions from organic soils.

6.1.2. Forest and Land Cover Change

Emissions from forest and land cover change include the emissions due to the loss of aboveground biomass (AGB), below ground biomass (BGB), dead organic matter (DOM) and soil organic carbon (SOC) during or after the

conversion processes. Conversion related to forest land contributes to a significant amount of emissions and removals. In this analysis, the categorization of changes follows the IPCC land use categories and REDD+ activities. The IPCC land use categories include six land use classes, including:

- 1. Forest land
- 2. Cropland
- 3. Wetland
- 4. Grassland
- 5. Settlement
- 6. Other land

The categorization of existing forest and land cover classes into IPCC categories, which in compliance with the categorization used in the national GHG inventory (see Table A.6-6).

6.1.3. Soil Organic or Peatland Disturbance

Peatlands store large amounts of soil organic carbon due to accumulation and preservation of dead organic matter in anaerobic environment under natural condition, of which constantly or seasonaly inundated. This anaerobic envirionment limits the access of oxygen to the peat layers, thus slowing down the decomposition of organic matter and increase the accumulation rate of organic matter. Peatland is defined as an area with an accumulation of decomposed organic matter, saturated with water containing at least 12% organic material content and a cumulative layer of at least 50 cm in depth (Agus *et al.*, 2016). This definition is adopted for the peatland mapping in Indonesia (Anda et,al, 2021). Peat dome is part of peatland ecosystem that has indistingtively higher elevation than in the surroundings. The center of the dome is where the deepest peat is located. Therefore peat dome is ecologically and hidrologically important as they serve as carbon sinks and water storage.

The anthropogenic factors has driven the deforestation and forest defradation of peat swamp forests and development of canals for accessibility which cause emissions due to biomass loss and organic soil oxidation. Development of canals through the peatdomes are led to drained peatlands which are susceptible to fires (Usup et al, 2004) and peat decomposition during the dry seasons (Itoh et al, 2017).



Figure A6- 2. Emissions due to soil organic disturbance includes peat fires and peat decomposition

The emission calculation from peat decompositions involved only emissions in peatlands that dominated by organic soils, either in forested or non forested classes. The changes of primary peat swamp forests to secondary forest or non forest classes are presumably due to antropogenic factors. drainage of the peatland, either for water management purpose or accessibility. Drained peatlands are susceptible to fires and release huge GHG emissions due to organic soil burning. The calculation of emissions from peat fires accounts only the loss of organic soils due to burning. Burned biomasses are assumed to be included in emission estimation from forest and land cover changes.

6.2. Methodology for GHG Inventory

6.2.1. Categories, Sub-Categories, Carbon Pools, Sources and Sinks

For the agricultural sector, we used the categorization following the GHG Inventory. In the BioCF ISFL Methodological Approach, the FOLU sector categorization was following the IPCC, which based on the combination of conversion from the six IPCC land use categories: In addition to this IPCC categorization, we categorized the activities following the national approach, which has more focus on monitoring deforestation and forest degradation for REDD+. Table A.6-1 shows the summary of activities and carbon pools included in the GHG inventory analysis, which covers AFOLU sector.

Category	No	Sub Category	Sink or Source	Pools and Gases	Definition and Justification if Different to National Approach
Forest Land	3B1a	Forest Land Remaining Forest Land	Source and Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Forest Land	3B1bi	Cropland Converted to Forest Land	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Forest Land	3B1bii	Grassland Converted to Forest Land	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Forest Land	3B1biii	Wetlands Converted to Forest Land	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Forest Land	3B1biv	Settlements Converted to Forest Land	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Forest Land	3B1bv	Other Land Converted to Forest Land	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.

Table A6- 1. Activities and carbon pools accounted in this GHG inventory

Category	No	Sub Category	Sink or Source	Pools and Gases	Definition and Justification if Different to National Approach
Cropland	3B2a	Cropland Remaining to Cropland	Source and Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Cropland	3B2bi	Forest Land Converted to Cropland	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Cropland	3B2bii	Grassland Converted to Cropland	Source and Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Cropland	3B2biii	Wetlands Converted to Cropland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Cropland	3B2biv	Settlements Converted to Cropland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Cropland	3B2bv	Other Land Converted to Cropland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Grassland	3B3a	Grassland Remaining to Grassland	Source and Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Grassland	3B3bi	Forest Land Converted to Grassland	Source	AGB, BGB, SOC,	The definition and methods are similar to those used for national GHG inventory and reporting.

Category	No	Sub Category	Sink or Source	Pools and Gases	Definition and Justification if Different to National Approach
				DOM; CO2	
Grassland	3B3bii	Cropland Converted to Grassland	Source and Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Grassland	3B3biii	Wetlands Converted to Grassland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Grassland	3B3biv	Settlements Converted to Grassland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Grassland	3B3bv	Other Land Converted to Grassland	Sink	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Wetlands	3B4a	Wetlands Remaining to Wetlands	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Wetlands	3B4b	Cropland Converted to Wetlands	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Wetlands	3B4b	Forest Land Converted to Wetlands	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.

Category	No	Sub Category	Sink or Source	Pools and Gases	Definition and Justification if Different to National Approach
Wetlands	3B4b	Grassland Converted to Wetlands	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Wetlands	3B4b	Other Land Converted to Wetlands	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Wetlands	3B4b	Settlements Converted to Wetlands	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Settlements	3B5a	Settlements Remaining to Settlements	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Settlements	3B5b	Cropland Converted to Settlements	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Settlements	3B5b	Forest Land Converted to Settlements	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Settlements	3B5b	Grassland Converted to Settlements	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Settlements	3B5b	Other Land Converted to Settlements	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.

Category	No	Sub Category	Sink or Source	Pools and Gases	Definition and Justification if Different to National Approach
Settlements	3B5b	Wetlands Converted to Settlements	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6a	Other Land Remaining to Other Land	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6bi	Forest Land Converted to Other Land	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6bii	Cropland Converted to Other Land	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6biii	Grassland Converted to Other Land	Source	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6biv	Wetlands Converted to Other Land	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other Land	3B6bv	Settlements Converted to Other Land	-	AGB, BGB, SOC, DOM; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other	3D	Peat Decomposition	Source	SOC; CO2	The definition and methods are similar to those used for national GHG inventory and reporting.
Other	3D	Peat Fires	Source	SOC; CO2, CH4	The definition and methods are similar to those used for national GHG inventory and reporting.

6.2.2. Methods and Approaches

6.2.2.1. Emissions from Agriculture

Emissions from agricultures are originated from various activities, including from livestock, fertilizers and liming application and paddy fields, which include CO2, N20 and CH4 emissions. We used the approach used in SIGN-SMART, a web-based system developed by MoEF for GHG inventory.

For instance, to estimate emissions from paddy rice cultivation, we estimated the areas managed for paddy rice (in hectare) as activity data. The emission factor used for this analysis is the total methane per hectare in the paddy rice

cultivation (EF = 1.61 kg/ha/day). The methane emission from paddy rice was converted into CO2 equivalent using GWP of 21. For emissions from the use of fertilizers, we included N2O, urea and liming application.

For activity data, we used the total fertilizers applied annually. Then we multiplied each activity data with the associated emission factor and GWP values to convert into CO2 equivalent.

No.	Category	Gases	Emission Factor	Source	Tier
3A1	Enteric fermentation	CH4	Emission factor	Veterinary Research Contor	
3A2a	Manure management	N2O	values	2017	
3A2b	Direct N2O from manure management	N2O	Emission factor derived from national values using a typical average animal mass (TAM)	Puslitbangnak 2017	2
3C6	Indirect N2O from manure management	N2O	Default values	IPCC Guideline	1
3C1b	Biomass burning in paddy rice	CO2, CH4, N2O	Default values	IPCC Guidelines	1
3C1c	Biomass burning in cropland	CO2, CH4, N2O			-
3C2	Liming	CO2	Default values	IPCC Guidelines	1
3C3	Urea application	CO2	Default values	IPCC Guidelines	1
3C4	Direct N2O from managed soils	N2O	Default values	IPCC Guidelines	1
3C5	Indirect N2O from managed soil	N2O			
3C7	Rice Cultivation	CH4	Emission factor derived from national values	Agricultural Research Agency	2

TABLE A6-2. LISTS OF CATEGORIES, EF AND TIER USED FOR THE ESTIMATING AFOLU EMISSIONS AND REMOVALS

No.	Gas	GWP (CO ₂ .e)
1	CO ₂	1
2	Methane (CH ₄)	21
3	Nitrous Oxide (N ₂ O)	310
4	PFC-14 (CF ₄)	6,500
5	PFC-116 (C ₂ F ₆)	9,200
6	Sulfur hexafluoride (SF ₆)	23,900

Table A6- 3. Global Warming Potential (GWP) used in the national GHG inventory system (known as SIGN SMART), based on the Second Assessment Report

For estimating emission from livestock, we used the number of livestock annually then multiplied with emissions factor. The total number of livestock are provided by the Ministry of Agriculture. The emission factor for estimating emissions from livestock is available in the tables below. The baseline was generated by averaging the historical annual emissions, which is in line with national approach.

Livestock	Sub category	Sex	Percentage (%)	EF CH4 Enteric Fermentation (Kg CH4 /year/head)	EF CH4 Manure Management (Kg CH4 /year/head)	Local livestock weight (kg)
Beef cattle	Weaning (0-1 th)	Female + Male	19.3	18.1839	0.7822	63.00
	Yearling (1-2 th)	Female + Male	25.85	27.1782	1.6202	134.48
	Young (2-4 th)	Female + Male	18.15	41.7733	3.4661	286.00
	Mature (>4 th)	Female + Male	26.89	55.8969	3.6352	400.00
	Imported (fattening)	Male	9.81	25.4879	7.9662	500.00
Dairy cattle	Weaning (0-1 th)	Female + Male	21.73	16.5508	0.5167	46.00
	Yearling (1-2 th)	Female + Male	24.03	35.0553	2.5152	198.64
	Young (2-4 th)	Female + Male	21.7	51.9609	5.5262	275.00
	Mature (>4 th)	Female + Male	32.54	77.1446	12.181	402.50
Buffalo	Weaning (0-1 th)	Female + Male	16.32	20.5531	0.7476	100.00
	Yearling (1-2 th)	Female + Male	20.67	41.1063	3.9864	200.00
	Young (2-4 th)	Female + Male	20.74	61.6594	8.9695	300.00
	Mature (>4 th)	Female + Male	42.27	82.2126	15.9457	400.00
Goat	Weaning	Female + Male	27.12	2.2962	0.0252	8.00
	Yearling	Female + Male	26.9	2.6482	0.017	20.00

Table A6- 4. Emission factor for enteric fermentation

Livestock	Sub category	Sex	Percentage (%)	EF CH4 Enteric Fermentation (Kg CH4 /year/head)	EF CH4 Manure Management (Kg CH4 /year/head)	Local livestock weight (kg)
	Mature	Female + Male	45.98	3.2705	0.0295	25.00
Sheep	Weaning	Female + Male	27.66	1.3052	0.0079	8.00
	Yearling	Female + Male	25.9	4.3304	0.0465	20.00
	Mature	Female + Male	46.44	5.2502	0.0752	25.00
Swine	Weaning	Female + Male	32.3	0.4331	0.0013	15.00
	Yearling	Female + Male	32.74	1.0291	0.0075	60.00
	Mature	Female + Male	34.96	1.2785	0.0115	80.00
Horse	Weaning	Female + Male	18.82	25.9888	0.5967	200.00
	Yearling	Female + Male	22.62	53.2693	2.5071	350.00
	Mature	Female + Male	58.56	74.8457	4.9494	500.00
Poultry						
Native	-	-	-	-	0.0031	1.50
Layer	-	-	-	-	0.0043	2.00
Broiler	-	-	-	-	0.0039	1.20
Duck	-	-	-	-	0.0035	1.50

$Table A0^{-}$ J. Linission factors and other parameters used to estimate the emissions norm agricultural sector	Table A6- 5. Emission factors a	ind other parameters	used to estimate the	e emissions from a	agricultural sector
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Code	GHG Category, Emission and removals		Emission Factor (EF) and Other Parameter (OP)					
3.C.1.b	Biomass Burning Cropland	EF CH4	CH4 Emission factor from agricultural	2.7	Gram CH4/kg Dry matter	IPCC Guideline 2006		
			residuals (default)			(table 2.5)		
		EF	N2O Emission factor from	0.07	Gram N2O/kg Dry matter	IPCC Guideline 2006		
		N2O	residuals (default)			(tabel 2.5)		
		OP	Burned Fraction (default)	0.7	%	Minitry of Agriculture		
			Mass of fuel available for	6.19	(ton/ha)	IPCC Guidelines 2006 ((Tabel 2.4)		
			(default)			and expert judgement		
			Combustion factor (Default)	0.8	%	IPCC Guidelines 2006 ((Table 2.6)		

Code	GHG Category, Emission and removals		Emission Factor (EF)	and Other Paramete	er (OP)	Data source
3.C.1.d	Biomass Burning Grassland	EF CH4	Emission Factor CH4 from agricultural residues (default)	2.7	Gram CH4/kg Dry matter	IPCC Guideline 2006
		EF N2O	Emission Factor N2O from agricultural residues (default)	0.07	Gram N2O/kg Dry matter	IPCC Guideline 2006
		OP	Burned Fraction (default)	0.8	%	Kementan
			Mass of fuel available for combustion (default)	26.7	(ton/ha)	IPCC Guidelines 2006 ((Tabel 2.4)
			Combustion factor (Default)	0.95	%	IPCC Guidelines 2006 ((Tabel 2.6)
3.C.2	Liming	EF CO2	Emission Factor from dolomites (default)	0.13	ton C/dolomites	IPCC Guidelines 2006
3.C.3	Urea Application	EF CO2	Emission Factor from urea application (default)	0.2	ton C/ urea	IPCC Guidelines 2006
3.C.4	Direct N2O Emissions from Managed Soils	EF N2O	Emission Factor for N2O (default)- managed soil	0.01 (managed) 0.003 (flooded rice)	Kg N2O-N/ Kg N Input	IPCC Guidelines 2006 (table 11.1)
3.C.5	Indirect N2O missions from Managed Soils	EF N2O	Emission Factor N2O from N deposit on soil and water	0.01	[kg N–N2O per (kg NH3–N + Nox–N	IPCC Guidelines 2006
		OP	surface (default) Synthetic N fertilizer fraction which volatilized as NH3 and NOx (default))	0.1	volatilized)] volatilized kg N per kg N	(tabel 11.3) IPCC Guidelines 2006 (tabel 11.3)
		OP	Volatile N fraction from organic fertilizers, manure (default)	0.2	(kg NH3-N + NOx-N) (kg of applied or stored N)-1	IPCC Guidelines 2006 (tabel 11.3)
3.C.6	Indirect N2O Emissions from Manure Management	EF N2O	Emission Factor for indirect N2O-N emission (default)	Pastura: 0.007; Daily spread: 0.008; Dry lot:: cow &buffalo 0.007; other 0.01; Poultry: 0.01		IPCC Guideline 2006 (tabel 11.3)

Code	GHG Category, Emission and removals		Emission Factor (EF) and Other Parameter (OP)					
		OP	Laju ekresi (default)	Sapi potong 0.34; kerbau 0.32; kambing 1.37; domba 1.17; babi 0.50; kuda 0.46; ayam petelur & buras 0.82; ayam potong 1.10; itik 0.83	Kg N/ kg berat ternak/hari	IPCC Guideline 2006 (tabel 10.19)		
		OP	Berat Ternak (typical Animal Mass) (country specific)	(Dalam tabel slide 4)	Kg	Kementan		
		OP	Sistem Pengelolaan Kotoran ternak	Pastura: sapi potong; Daily spread: sapi perah; Dry lot: sapi potong, kerbau, kambing, domba, babi, kuda; Poultry with litter: ayam potong, petelur; Poultry without litter: ayam buras,itik.		IPCC Guideline 2006		
		OP	Fraksi N yang diekresikan per tahun (default)	Pastura 30%; Daily spread 100%; Dry lot: sapi potong 70%, lainnya 100%; Poultry 100%	%	IPCC Guideline 2006 (Tabel A4- A8)		
		OP	Fraksi N yang yang tervolatilisasi (default)	Pastura 0%; Daily spread 7%; Dry lot: sapi potong 30%, Babi 45%, kerbau/kambing/ domba/kuda 12%; Poultry: Litter 40%, without litter 50%.	%	IPCC Guideline 2006 (Tabel 10.22)		
3.C.6	Emisi N2O langsung dari pengelolaan kotoran	EF N2O	Emission Factor untuk emisi langsung N2O-N (default)	Sapi potong & kerbau 0.0144; kambing,domba,		IPCC Guideline 2006 (tabel 10.21)		

Code	GHG Category, Emission and removals		Emission Factor (EF) and Other Parameter (OP)					
	(Direct N2O Emissions from Manure Management)			babi,kuda 0.02; unggas 0.001				
		OP	Laju ekresi (default)	Sapi potong 0.34; kerbau 0.32; kambing 1.37; domba 1.17; babi 0.50; kuda 0.46; ayam petelur & buras 0.82; ayam potong 1.10; itik 0.83	Kg N/ kg berat ternak/hari	IPCC Guideline 2006 (tabel 10.19)		
		OP	Berat Ternak (typical Animal Mass)	(Dalam tabel slide 4)	Кg	Kementan		
		OP	Sistem Pengelolaan Kotoran ternak	Pastura: sapi potong; Daily spread: sapi perah; Dry lot: sapi potong, kerbau, kambing, domba, babi, kuda;		IPCC Guideline 2006		
				Poultry with litter: ayam potong, petelur; Poultry without litter: ayam buras,itik.				
		OP	Fraksi N yang diekresikan per tahun (default)	Pastura 30%; Daily spread 100%; Dry lot: sapi potong 70%, lainnya 100%; Poultry 100%	%	IPCC Guideline 2006 (Tabel A4- A8)		
3.C.7	Rice Cultivation (Budidaya Padi)	EF CH4	Emission Factor baseline untuk padi sawah dengan irigasi terus- menerus dan tanpa pengembalian bahan organic (country spesific)	Emission Factor dari lahan sawah di Indonesia (berdasarkan riset terkini/ =1.61)	kg CH4 ha-1 day-1	Kementan		
		OP	Periode budidaya padi	Jumlah hari dalam satu kali periode tanam	Hari	Kementan		

Code	GHG Category, Emission and removals		Emission Factor (EF) and Other Parameter (OP)					
		OP	Faktor skala yang menjelaskan perbedaan rejim air	SF Koreksi (berdasarkan riset terkini)	-	Kementan		
		selama periode budidaya	(Irigasi 1; Non irigasi 0.49; SLPTT 0.46; SRI 0.71)					
		OP	Faktor skala yang menjelaskan perbedaan rejim air sebelum periode budidaya	SF Koreksi (berdasarkan riset terkini) -1	-	Kementan		
		OP	Jumlah bahan organik yang digunakan, dalam berat kering atau berat segar	Asumsi penggunaan pupuk kandang (country specific) -2	ton/ha	Kementan		
		OP	Faktor konversi bahan organic	(Jerami 0.29; Pupuk kandang 0.14)	-	IPCC Guidelines 2006 (Tabel 5.14)		
		OP	Faktor skala untuk jenis tanah	(Jambi 0.95)	-	Kementan		
		OP	Emission Factor harian yang terkoreksi untuk luas panen tertentu	(Jambi 1.55)	kg CH4 per hari	Kementan		

6.2.2.2. Emissions and Removals from Land Cover Change

Emissions from forestry, land use and land cover change were generated through spatial analysis in combination with simple tabulation process to integrate emission factors into the calculation. The workflow of emissions calculation from the AFOLU sectors is shown in Figure A.9-1. The workflow involved two main processes, i.e. (1) data combining process, which include spatial overlay, categorization and emission factor data join and (2) calculation process. Each process works in a different software environment. The 1st process was done using GIS software, while the 2nd process used Excel Sheet. A more detail process on this analysis has been described in the BioCF spatial analysis guidance (Direktorat IGRKMPV, 2022).

For calculating emissions and removals from land use and land cover changes, we used a stock difference approach. In practice we used below equation to quantify the emissions (E_{LC}) based on the activity data (AD_{ij}) of the change of initial land cover class *i* to the current land cover class *j* (in hectare) and emissions (EF_{ij}) or removal factors (RF_{ij}) which was derived from the difference between the carbon stock of the initial land cover class *i* and the current land cover class *j* (tC/ha). To convert form biomass to carbon unit, we used 0.47 carbon fraction (IPCC, 2006). To convert to CO2 equivalent, we multiply the carbon value with conversion factor (CF) of 44/12.

$$E_{LC} = \sum_{i=1}^{n} \sum_{j=1}^{j} (AD_{ij} \times EF_{ij}) \times CF$$

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Activity data was derived from the results of land cover change analysis using land cover maps of two monitoring points from 12 years baseline period, i.e the beginning monitoring period of 2006/2007 and the end monitoring period of 2017/2018. The activity data for land cover change was the annual average area of each subcategory, which was derived from the total area of subcategories during the baseline period devided by 12 years.

$$R_{LC} = \sum_{i=1}^{n} \sum_{j=1}^{j} (AD_{ij} \times RF_{ij}) \times CF \times 12/20$$

For estimating the AGB and BGB removals (R_{LC}) from conversion subcategories that have increasing carbon stocks, the transitional period is applied. The transitional period of 20 years (IPCC default value) was assumed to be the time required for the change to reach an equilibrium level. The transitional period is also applied for estimating the emissions and removals from SOC and DOM carbon pools.

The cycle of annual monitoring of the NFMS refers to the acquisition time of satellite imageries, which starts in July and ends in June the next year. For instance, the monitoring period of 2017/2018 involved any good satellite imageries acquired during the period of July 2017 to June 2018. The NFMS annual cycle therefore does not coincide with the calendar year.

IPCC Category	LC Code	MoEF Land Cover Classes	(t.d.m AG	AGBha ⁻¹) (t.d.m BGBha ⁻¹) Tot		Total Biomass (t.d.m ha ⁻¹) U lean SE Mean SE 98.81 2.93 439.53 10.59 64.22 1.84 285.67 6.47 78.24 9.68 433.87 37.50 1 45.55 1.83 252.61 7.58 1 73.45 4.66 309.62 15.96 1 13.57 1.78 131.59 15.82 2 52.40 5.20 213.63 16.83 1 30.32 3.63 158.81 15.78 1 33.26 4.77 135.61 15.43 2 1.34 0.72 5.95 2.58 8 1.21 0.68 6.31 2.97 9 2.04 0.98 10.68 4.25 7 0.00 0.00 0.00 0.00 9 3 9.71 1.99 50.86 8.67 3 5.99 3.28 35.94	U (%)		
category			Mean	SE	Mean	SE	Mean	SE	
Forest land	2001	Primary dryland forest	340.72	10.17	98.81	2.93	439.53	10.59	4.70
Forest land	2002	Secondary dryland forest	221.45	6.20	64.22	1.84	285.67	6.47	4.40
Forest land	2005	Primary swamp forest	355.63	36.23	78.24	9.68	433.87	37.50	16.90
Forest land	20051	Secondary swamp forest	207.06	7.36	45.55	1.83	252.61	7.58	5.90
Forest land	2004	Primary mangrove forest	236.17	15.26	73.45	4.66	309.62	15.96	10.10
Forest land	20041	Secondary mangrove forest	118.02	15.72	13.57	1.78	131.59	15.82	23.60
Forest land	2006	Plantation forest	161.23	16.00	52.40	5.20	213.63	16.83	15.40
Grassland	2007	Dry shrub	128.49	15.36	30.32	3.63	158.81	15.78	19.48
Cropland	2010	Estate crop	102.35	14.67	33.26	4.77	135.61	15.43	22.30
Settlements	2012	Settlement	4.61	2.48	1.34	0.72	5.95	2.58	85.18
Other land	2014	Bare ground	5.11	2.89	1.21	0.68	6.31	2.97	92.17
Grassland	3000	Savanna and grasses	8.64	4.13	2.04	0.98	10.68	4.25	77.88
Wetlands	5001	Open water	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grassland	20071	Wet shrub	41.15	8.44	9.71	1.99	50.86	8.67	33.42
Cropland	20091	Pure dry agriculture	29.95	16.38	5.99	3.28	35.94	16.71	91.10
Cropland	20092	Mixed dry agriculture	137.52	4.89	27.50	0.98	165.03	4.99	5.93
Cropland	20093	Paddy field	21.27	8.26	5.02	1.95	26.29	8.49	63.27
Wetlands	20094	Fish pond/aquaculture	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other land	20121	Port and harbour	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A6- 6. Carbon stocks of MoEF forest and land cover classes used in this analysis (source: 2nd FREL)

Settlements	20122	Transmigration areas	29.95	16.38	5.99	3.28	35.94	16.71	91.10
Other land	20094	Mining areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wetlands	50011	Open swamp	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The SOCFREF and stock change factor values used the default value from Table 6.2 of 2006 IPCC Guidelines. The stock change factors of the F_mg_F_lu and F_i values from grassland, other land, and settlement are selected based on stock change factor provided in Table 5.5, Table 5.10, Table 6.2, Section 8.3.3.2 and Section 9.3.3 of 2006 IPCC Guidelines. For the grassland, previously we used the value as in the SIGN SMART, which refer to Table 5.5 of 2006 IPCC Guidelines for cropland. The source of each factor is provided in the Table A6-7.

Table A6- 7. carbon stock of soil organic carbon for various IPCC categories (Source: 2006 IPCC Guidelines and SIGN SMART)

IPCC Category	Land Cover	ver SOC _{REF} St		Stock Change Factor			Data Sources
		(t C ha⁻¹)	F_{LU}	F _{MG}	Fi	(t C ha-1)	
Forest land	Primary dryland forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Secondary dryland forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Primary swamp forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Secondary swamp forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Primary mangrove forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Secondary mangrove forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Forest land	Plantation forest	47.00	1.00	1.00	1.00	47.00	FLU =Tropical, FMg and FI = Managed Forest, Table 5.10, Chapter 5 IPCC 2006
Cropland	Estate crop	47.00	1.00	1.15	1.00	54.05	FLU = Perennial, FMg = Reduced tropical moist, FI = Medium, Table 5.5 Chapter 5 IPCC 2006
Cropland	Pure dry agriculture	47.00	0.48	1.15	0.92	23.87	FLU = Longterm cultivated tropical moist, FMg = Reduced tropical moist, FI = Low tropocal moist, Table 5.5 Chapter 5 IPCC 2006
Cropland	Mixed dry agriculture	47.00	0.48	1.15	0.92	23.87	FLU = Longterm cultivated tropical moist, FMg = Reduced tropical moist, FI = Low tropocal moist, Table 5.5 Chapter 5 IPCC 2006
Cropland	Paddy field	47.00	1.10	1.00	1.11	57.39	FLU = Paddy rice, FMg = Full All, FI = High without manure moist, Table 5.5 Chapter 5 IPCC 2006
Grassland	Dry shrub	47.00	1.00	1.00	1.00	47.00	FLU = All, FMg = Nominally managed (non degraded), FI = Medium All, Table 6.2 Chapter 6 IPCC 2006
Grassland	Savanna and grasses	47.00	1.00	1.00	1.00	47.00	FLU = All, FMg = Nominally managed (non degraded), FI = Medium All, Table 6.2 Chapter 6 IPCC 2006

Grassland	Wet shrub	47.00	1.00	1.00	1.00	47.00	FLU = All, FMg = Nominally managed (non degraded), FI = Medium All, Table 6.2 Chapter 6 IPCC 2006
Settlements	Settlement	47.00	1.00	1.00	1.00	47.00	FLU, FMg and FI = Section 8.3.3.2, Chapter 8 IPCC 2006
Settlements	Transmigration areas	47.00	1.00	1.00	1.00	47.00	FLU, FMg and FI = Section 8.3.3.2, Chapter 8 IPCC 2006
Other land	Bare ground	47.00	1.00	1.00	1.00	47.00	FLU, FMg and FI = Section 9.3.3, Chapter 9 IPCC 2006
Other land	Port and harbor	47.00	1.00	1.00	1.00	47.00	FLU, FMg and FI = Section 9.3.3, Chapter 9 IPCC 2006
Other land	Mining areas	47.00	1.00	1.00	1.00	47.00	FLU, FMg and FI = Section 9.3.3, Chapter 9 IPCC 2006
Wetlands	Open water	0	0	0	0	0	
Wetlands	Fish pond/aquaculture	0	0	0	0	0	
Wetlands	Open swamp	0	0	0	0	0	

Table A6- 8. Carbon stock of dead organic matter for various IPCC categories (Source: Solichin et al, 2011)

	Land Cover	Total DOM Bio	mass	
IPCC	Land Cover	Mean	SE	EF
		(t ha-1)		(t C ha-1)
Forest land	Primary dryland forest	15.11	4.16	26.04
Forest land	Secondary dryland forest	8.34	2.09	14.37
Forest land	Primary swamp forest	15.11	4.16	26.04
Forest land	Secondary swamp forest	8.34	2.09	14.37
Forest land	Primary mangrove forest	15.11	4.16	26.04
Forest land	Secondary mangrove forest	8.34	2.09	14.37
Forest land	Plantation forest	0.26	0.10	0.45
Cropland	Estate crop	0.26	0.10	0.45
Cropland	Pure dry agriculture	0.26	0.10	0.45
Cropland	Mixed dry agriculture	0.67	0.27	1.15
Cropland	Paddy field	0.26	0.10	0.45
Grassland	Dry shrub	13.81	5.52	23.79
Grassland	Savanna and grasses	0.67	0.00	1.15
Grassland	Wet shrub	13.81	5.52	23.79
Settlements	Settlement	0.00	0.00	0.00
Settlements	Transmigration areas	11.80	6.52	20.34
Other land	Bare ground	0.00	0.00	0.00
Other land	Port and harbor	0.00	0.00	0.00
Other land	Mining areas	0.00	0.00	0.00
Wetlands	Open water	0.00	0.00	0.00
Wetlands	Fish pond/aquaculture	0.00	0.00	0.00
Wetlands	Open swamp	0.00	0.00	0.00

The estimation of the emissions and removals from land cover change accounts for all carbon pools, including the aboveground and belowground biomass, soil organic carbon and dead organic matter. The emission and removal factors were calculated based on the carbon stock difference of the associated forest and land cover changes. For instance, when a primary forest was deforested or converted into mixed agriculture, then the emission factor was the difference between the carbon stock in the primary forests and mixed agriculture. In the opposite process, for instance an increasing of carrbon stock from old shrub change into a forest land, then the removal factor is calculated as the difference between the forest and the old shrub biomass stocks adjusted with the reference period (12 years) divided by transitional period (20 years) i.e. 12/20. The use of adjustment factor in calculation of biomass pool emissions, for accomodating the transitional period, is applied to only the subcategories that are removals.

Aboveground carbon stock values for land cover classes are required. Due to unavailable data specific for Jambi province, we compiled the carbon stock values of forest and non forest classes from the 2nd FRL (Table A.6-6). Currently BioCF is compiling data on carbon stock measurement in Jambi to improve the carbon stock value of Jambi province. However, there are some land cover classes that are not well represented by sufficient plot number.

The reference carbon stock value of soil organic carbon (SOC_{REF}) was derived from the IPCC default reference values for tropical moist region in low activity clay (LAC) soil (Table A.6-7). The values were also used in the SIGN SMART. To estimate emissions and removals from SOC in mineral soil, we used the 2006 IPCC Guidelines equation 2.25, where the delta SOC is deduction of SOC in t0 with SOC in t1, then divided with transition period (D). The transition period used for this calculation is 20 years. SOC was generated by multiply the reference SOC (SOC_{REF}) with stock change factor for landuse in the last year of an inventory period (FLU), stock change factor for management regime in last year of an inventory period (FMG), and stock change factor for C input in the last year of the inventory period (FI) (see Table A.6-7).

EQUATION 2.25 Annual change in organic carbon stocks in mineral soils						
$\Delta C_{Mineral} = \frac{(SOC_0 - SOC_{(0-T)})}{D}$						
$SOC = \sum_{c,s,i} \left(SOC_{REF_{c,s,i}} \bullet F_{LU_{c,s,i}} \bullet F_{MG_{c,s,i}} \bullet F_{I_{c,s,i}} \bullet A_{c,s,i} \right)$						
(Note: T is used in place of D in this equation if T is \geq 20 years, see note below)						

The activity data of SOC loss was generated from the forest and land cover change dataset. Further selection criteria were applied from the existing forest and land cover dataset, including: only for mineral soil and only subcategories related to conversion.



To estimate emissions and removals of DOM, we used the equation 2.23 of 2006 IPCC guidelines, where the delta carbon stock is the deduction of DOM in new land cover with DOM in the old land cover, multiplied with the activity data, then devided with the transition period, i.e. 12/20. This approach is in line with the approach used in the national GHG inventory. The carbon stock of dead organic matter (Table A.6-8) were generated from the inventory results conducted in a production forest in South Sumatra (Solichin etal, 2011). The use of study in peat swamp forests of South Sumatra due to unavailability of comprehensive DOM values from the 2nd FRL document, which available only for forest classes. In addition, the DOM values in the 2nd FRL are mostly very high. Thus the use of the

data from South Sumatra study, considered to be conservative compared to Tier 2 data used in the FRL. The source of Tier 2 data used in the 2nd FRL was from INCAS study in peatland of Central Kalimantan (Krisnawati et al., 2015).

Due to unavailability of DOM values for non forest classes, such as agricultural lands, we used the values from the existing classes that were assumed to have similarity to replace the DOM values of the agricultural land classes. The activity data used for estimating emissios and removals from DOM was generated from the forest and land cover change database. All remaining subcategories were excluded in the DOM calculation. Additional spreadsheet calculation has been to estimate emissions from SOC and DOM generated (SOC_DOM_BiomassBurn_Accounting_20230918.xlsx)

6.2.2.3. Emissions from Peat Decomposition

CO2 emissions from peat decomposition were estimated based on the land cover classes of the peatlands. Disturbances in peat forests are normally due to anthropogenic factors, which lead to deforestation or drained of the peatlands. To extract timber from logged peat swamp forests, access is required. The most common access in peat swamp forest is through canal digging, which will drain the water level, flowing them to the rivers. The drained degraded peatland will result in peat decomposition of dry peat soil due to aerob condition (Hooijer et al, 2006). Once degraded peat forests and lands are drained, and therefore emitting CO2 gases. CO2 emissions due to peat decomposition were estimated using below equation.

$$E_{PD} = AD \times \frac{EF_i + EF_c}{2}$$

where:

 E_{PD} : CO2 emissions from peat decomposition (tCO2)AD: area of degraded peatlands (ha) EF_i : emission factor from the initial land cover (tCO2/ha) EF_c : emission factor from the post-conversion land cover (tCO2/ha)

To estimate the annual emission, we involved the emission factors from the previous and current land cover classes, assuming that the conversion was happening in between these two periods. This approach is aligned with the national FREL/FRL, which investigates the initial land cover and the subsequent land cover types for estimating emission from peat decomposition. For example, if the land cover in 2017 was primary peat swamp forest which was converted to shrub in 2018, then we used the mean of both EFs from the primary peat forest and shrub (i.e. 22.54 tCO₂ ha⁻¹yr⁻¹ instead of 45.04 tCO₂ ha⁻¹yr⁻¹). This approach is based on the assumption to avoid overestimation of emission from peat decomposition, which consider that the forest conversion happened in the middle of the year, not in the beginning of the year.

The peat decomposition emissions from non forest classes are included in the calculation, therefore not only in forested areas but also non forested areas where the peatlands are. Also we include the emissions of peat decomposition from stable classes, because of the inclusion of legacy emissions. The emissions calculated form peat decomposition of Jambi emission reduction program was covering all FOLU subcategories, different to those in REDD+ activities, which focusing only in forest related subcategories, i.e deforestation, forest degradation and enhancement of forest carbon stock. The subcategories or REDD+ activities, in which the peat decomposition was calculated in the FREL are also included in the FOLU subcategories reported in Jambi ER program. However our approach similar to the approach used for estimating peat decomposition in national GHG inventory in BURs documents

The activity data used for this analysis is the land cover change maps overlaid with peatland maps to select the area of interest for peat decomposition estimation. The emission factor used the same emission factor used in the national approach (FREL, 2016)

Land Cover	Mean (t CO2 ha ⁻¹ yr ⁻¹)	95% Confidence Inte ha ^{.1} yr ^{.1})	Uncertainty %	
Primary dryland forest	0			
Secondary dryland forest	32.42	24.85	40.00	23.38
Primary mangrove forest	0			
Primary swamp forest	0			
Plantation forest	72.95	50.04	95.87	31.42
Dry shrub	45.04	26.21	63.87	41.81
Estate crop	36.63	27.60	45.65	24.62
Settlement areas	45.04	26.21	63.87	41.81
Bare ground	63.79	49.61	77.98	22.24
Savanna and Grasses	45.04	26.21	63.87	41.81
Open water	0			
Secondary mangrove forest	32.42	24.85	40.00	23.38
Secondary swamp forest	32.42	0.00	0.00	-100.00
Wet shrub	45.04	26.21	63.87	41.81
Pure dry agriculture	45.42	25.12	65.72	44.69
Mixed dry agriculture	54.66	30.42	78.91	44.37
Paddy field	33.71	-0.72	68.14	102.14
Fish pond/aquaculture	0			
Port and harbour	0			
Transmigration areas	54.66	30.42	78.91	44.37
Mining areas	63.79	49.61	77.98	22.24
Open swamp	0			

Table A6- 9. Emission factors for peat decomposition

Emissions from peat decomposition occur due to drainage of peatland that create aerobic condition and oxidation of the peat organic soils. The magnitude of the emissions is affected by the water level. The lower the water level the higher the emissions from peatlands. The emission factors were estimated based on the assumption of water level of specific forest and land cover classes. The emission factors were compiled from various studies conducted in Indonesia (Novita et al, 2021). The EFs used are the same as in the modified 2nd FRL, which were derived from Novita et al. (2021). Novita et al (2021) compiled previous studies in Indonesia and analyse using meta-analysis (https://drive.google.com/file/d/1-WVTFBYYvEcsa0AdWgtrmX1AnCrizJ_G/view?usp=share_link). As stated in Novite etal, 2021, Section 2.2: "The dataset on total CO2 and heterotrophic emissions was collected through a systematic review of publications of peatlands in Indonesia, as shown in Table 1 Additional data were also extracted from the publications to provide predictor variables (moderators) that might explain the heterogeneity of CO2 emissions. Among others, the predictor variables used in this meta-analysis were geographical coordinates (latitude and longitude), land use class/land cover class, water table depth (cm), air temperature, annual rainfall (mm.year⁻¹), and bulk density (g.cm⁻³). Where necessary, the CO2 emissions and predictor variables data were elicited by converting graphical data using the GetData Graph Digitizer (http://getdata-graph-digitizer.com (accessed on 23

February 2021)) and by accessing an online climate database (https://power.larc.nasa.gov/data-access-viewer (accessed on 24 February 2021)) when air temperature and annual rainfall data were absent in the publications."

6.2.2.4. Emissions from Fires

Two different emission related to fires are estimated, including peat fires and biomass burning. Emission from peat fires includes only soil carbon pool and exclude aboveground biomass. Emissions from aboveground biomass burning is included in the emission calculation from land cover change and biomass burning.

For estimating emissions from peat fires, we used the emission factors used in the 2nd FRL, which were compiled from studies in Indonesia (MoEF, 2022). The parameters that need to be monitored for estimating emissions from peat fires are the size and depth of burnscar (D_b), peat bulk density (BD) and emission factor (*gEF*). The emission from peat fire ($E_{PeatFire}$) was estimated using the following equation.

 $E_{peat fire} = AD \times D_b \times BD \times Cf \times GEF \times GWP \times 10$

where :

- AD : activity data, i.e. burnscar (ha),
- *D*^b : average burnt peat depth (m),
- BD : soil bulk density (t.m⁻³),

Cf : combustion factor

gEF : emission factor (g kg⁻¹)

GWP= Global Warming Potential (1 for CO2)

The activity data for peat fires are produced by the Directorate of Forest Fire Control using visual interpretation of Landsat images, combining with various data, including MODIS hotspot and ground truthing data.

Table A6- 10. Emission factors and other parameters used to estimate emissions from peat fires (Source: 2nd FREL)

Parameter	Mean	(SE)	Unit
Cf (Combustion Factor)	0.54	0.05	-
Gef CO ₂ (CO ₂ Emission Factor)	1670.13	34.03	g kg ⁻¹ CO ₂
Gef CH ₄ (CH ₄ Emission Factor)	8.47	24,36	g kg⁻¹ CH₄
BD (Bulk Density)	0.16	0.015	g cm⁻³
Db (Burn Depth)	31.88	4.68	cm
GWP CO ₂	1.00		
GWP CH ₄	21.00		
EF CO ₂	460.03		tCO ₂ yr ⁻¹
EF CH ₄	48.99		tCO ₂ yr ⁻¹

There is potential overlapping occurences of peat decomposition and peat fires, but the processes are separately different. Peat decomposition is related to the annual accumulation of slow peat oxidation due to drainage or decreasing of water level, while peat fires occur normally in dry season and the oxidation happen instantly. However,

as long as the peat soils are not completely oxidized, there will be no double counting. The double, counting or overestimation could occur only if the peatland is totally decomposed or oxidized.

To estimate emissions from biomass burning, we follow the approach used in the 2nd FRL, which estimates not only CO2 emissions but also CH4 and N2O emissions. For CO2 emissions, only biomass burning from remaining subcategories are included in the calculation. While for N2O and CH4 emissions were calculated for all subcategories. We used the equation 2.27 of 2016 IPCC Guidelines, where the burned mass (Mb) was generated from the sums of AGB and DOM. For combustion factor (Cf), emission factor (Gef), and global warming potential (GWP) we used the values compiled from the national GHG inventory database (Table A6-11).

EQUATION 2.27 ESTIMATION OF GREENHOUSE GAS EMISSIONS FROM FIRE

 $L_{fire} = A \bullet M_B \bullet C_f \bullet G_{ef} \bullet 10^{-3}$

Table A6- 11. Emission factors and other parameters used to estimate emissions from biomass burning (Table 2.5 Chapter 2, 2006 IPCC Guidelines)

Land Cover	МВ	SE MB	Cf	Gef-CH4	SE Gef- CH4	Gef-N2O	SE Gef- N2O	Gef-CO2	SE Gef- CO2	GWP	GWP
	(t ha-1)			(g kg-1 DM burnt)		(g kg-1 DM burnt)		(g kg-1 DM burnt)		СП4	INZU
Primary dryland forest	269,11	70,00	0,36	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Secondary dryland forest	231,34	56,00	0 <i>,</i> 55	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Primary swamp forest	269,11	70,00	0,36	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Secondary swamp forest	231,34	56,00	0,55	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Primary mangrove forest	269,11	70,00	0,36	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Secondary mangrove forest	231,34	56,00	0,55	6,80	2,00	0,20	0,00	1580,00	90,00	21,00	310,00
Plantation forest	108,26	0,00	0,63	6,80	2,75	0,20	0,05	1569,00	131,00	21,00	310,00
Estate crop	108,26	0,00	0,63	6,80	0,00	0,20	0,00	1515,00	177,00	21,00	310,00
Pure dry agriculture	49,80	21,00	0,80	2,70	0,00	0,07	0,00	1515,00	177,00	21,00	310,00
Mixed dry agriculture	49,80	21,00	0,55	2,70	0,00	0,07	0,00	1515,00	177,00	21,00	310,00
Paddy field	49,80	21,00	0,00	0,00	0,00	0,00	0,00	1515,00	177,00	21,00	310,00
Dry shrub	83,81	28,00	0,72	2,30	0,90	0,21	0,10	1613,00	95,00	21,00	310,00
Savanna and grasses	0,67	0,00	0,74	2,30	0,90	0,21	0,10	1613,00	95,00	21,00	310,00
Wet shrub	83,81	28,00	0,72	2,30	0,90	0,21	0,10	1613,00	95,00	21,00	310,00
Settlement	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
Transmigration areas	49,80	21,00	0,80	2,30	0,00	0,21	0,00	0,00	0,00	21,00	310,00
Bare ground	0,00	0,00	0,80	2,30	0,00	0,21	0,00	0,00	0,00	21,00	310,00
Port and harbor	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
Mining areas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
Open water	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
Fish pond/aquaculture	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
Open swamp	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	21,00	310,00
The activity data for biomass burning was generated using the overlaid data of burned areas and forest and land cover change data. Emissions from CO2 gases were estimated for subcategories remaining in the same subcategories, to avoid double counting with the emissions from land cover change. Non CO2 emission was estimated for all subcategories. Additional spreadsheet calculation has been generated to estimate emissions from biomass burning (SOC_DOM_BiomassBurn_Accounting_20230918.xlsx).

6.3. GHG Inventory from AFOLU Sector

The landscape approach to emissions reduction for Jambi BioCF ISFL program required assessment of historical emissions and removals to generate baseline for quantifying the emission reduction performance. Several categories have been identified, including agriculture, forest and land cover change, and peat degradation.

6.3.1. Emissions from Agriculture

In this analysis we quantified agricultural emissions from several sub-categories, including emissions from paddy rice cultivation, urea application, liming application, nitrogen fixation and livestock. In general, the emissions from the agriculture was increasing from 848 thousand tCO2 in 2006 to 1.2 million tCO2 in 2017, with total emissions of 13.2 million tCO2e. The largest contribution was emissions from paddy rice cultivation with total emission of 4.4 million tCO2 during the baseline period. Emissions from nitrogen fixation in managed soils was increasing from 318.3 thousand tCO2e in 2007 to 313.0 thousand tCO2e in 2018. Similarly, emissions from livestock is also increasing from 228.8 thousand tCO2e in 2007 to 367.7 thousand tCO2e in 2018. Emissions from urea application, liming and biomass burning seem to be negligible. Also, CO2 emissions from biomass burning should not be counted due to double counting with emissions from land cover change.



Figure A6- 3. ANNUAL EMISSIONS FROM AGRICULTURE

Emissions from agricultural sector related to biomass are reported in the land use change emissions, for instance emissions due to forest conversion into agricultural land and plantation. The categorization is aligned with IPCC and national approach.

6.3.2. Emissions and Removals from Land Use Change and Forestry

In land use change and forestry category, there are six categories, i.e. forest land, cropland, grassland, wetland, settlement and other land, with 36 combination of sub categories. The changes in land use change and forestry category were highly dynamic, resulting in emissions and removals withon various subcategries. Emissions and removals from aboveground biomass and belowground biomass have the largest contributions compared to the emissions and removals from soil organic carbin, dead organic matters and biomass burning,

.		То	Annual Net Emissions			
Category	Sub-Category —	AGB+BGB	soc	DOM	Biomass Burning	-
Cropland	Cropland Remaining to Cropland	-19.977.777	0	0	329.531	-19.648.247
	Forest Land Converted to Cropland	103.486.829	570.862	283.377	482.322	104.823.389
	Grassland Converted to Cropland	-2.737.733	155.377	100.605	31.814	-2.449.938
	Other Land Converted to Cropland	-1.589.528	23.451	-467	-	-1.566.544
	Settlements Converted to Cropland	-1.178.144	9.722	-280	0	-1.168.702
	Wetlands Converted to Cropland	-261.283	-24.009	-67	-	-285.359
Forest Land	Cropland Converted to Forest Land	-887.736	-20.999	-2.810	203	-911.342
	Forest Land Remaining Forest Land	27.560.532	0	0	212.859	27.773.391
	Grassland Converted to Forest Land	-1.284.781		11.573	6.042	-1.267.166
	Settlements Converted to Forest Land	-22.754	-	-23	0	-22.777
	Wetlands Converted to Forest Land	-30.804	-1.332	-112	-	-32.247
	Other Land Converted to Forest Land	-2.515.750	-	-1.211	-	-2.516.961
Grassland	Cropland Converted to Grassland	5.174.402	-2.238.081	-604.021	3.661	2.335.961
	Forest Land Converted to Grassland	79.552.224	-	-76.774	709.118	80.184.568
	Grassland Remaining to Grassland	99.635	0	0	372.917	472.553
	Other Land Converted to Grassland	-1.350.846		-10.713	-	-1.361.559
	Settlements Converted to Grassland	-56.737	-	-428	0	-57.166
	Wetlands Converted to Grassland	-7.110	-666	-160	0	-7.937
Other Land	Cropland Converted to Other Land	4.743.394	-70.660	961	1.408	4.675.102
	Forest Land Converted to Other Land	75.425.657	-	112.196	537.979	76.075.832
	Grassland Converted to Other Land	633.424	-	4.688	30.672	668.784
	Other Land Remaining to Other Land	-1.086	0	0	-	-1.086
	Settlements Converted to Other Land	0	0	0	0	0
Settlements	Cropland Converted to Settlements	10.472.875	-132.687	-2.929	0	10.337.260
	Forest Land Converted to Settlements	180.347	-	268	-	180.615
	Grassland Converted to Settlements	57.019	-	416	0	57.434
	Other Land Converted to Settlements	-1.820	-	-3	0	-1.823
	Settlements Remaining to Settlements	-6.155	0	0	236	-5.919
	- Wetlands Converted to Settlements	-1.445	-1.596		0	-3.041
Wetlands	Cropland Converted to Wetlands	429.487	7.153	89	0	436.729
	Forest Land Converted to Wetlands	222.502	3.680	440	11	226.633
	Grassland Converted to Wetlands	1.229	121	17	0	1.367

Table A6- 12. Total Emissions and Removals 2006/2009 - 2017/2018

ISFL ERPD-14112023

Other Land Converted to Wetlands	95	75	-	-	170
Settlements Converted to Wetlands	23	19	-	0	43
Wetlands Remaining to Wetlands	0	0	0		0
Grand Total	276.128.185	-1.719.569	-185.370	2.718.771	276.942.016

The net emissions from abovegroud biomass and belowground biomass was 276.1 MtCO2e. The emissions from dead organic matters and biomass burning were -0.18 MtCO2e and 2.7 MtCO2e, respectively. While soil organic carbon contributes to removals of -1.7 MtCO2e.

		Total 2006/2009 - 2017/2018					
E/R LCC All	AGB+BGB	SOC	DOM	Biomass Burning			
Cropland Converted to Forest Land	-887.736	- 20.999	- 2.810	203	-911.342		
Cropland Converted to Grassland	5.174.402	- 2.238.081	- 604.021	3.661	2.335.961		
Cropland Converted to Other Land	4.743.394	- 70.660	961	1.408	4.675.102		
Cropland Converted to Settlements	10.472.875	- 132.687	- 2.929	0	10.337.260		
Cropland Converted to Wetlands	429.487	7.153	89	0	436.729		
Cropland Remaining to Cropland	-19.977.777	0	0	329.531	-19.648.247		
Forest Land Converted to Cropland	103.486.829	570.862	283.377	482.322	104.823.389		
Forest Land Converted to Grassland	79.552.224	-	- 76.774	709.118	80.184.568		
Forest Land Converted to Other Land	75.425.657	-	112.196	537.979	76.075.832		
Forest Land Converted to Settlements	180.347	-	268	-	180.615		
Forest Land Converted to Wetlands	222.502	3.680	440	11	226.633		
Forest Land Remaining Forest Land	27.560.532	0	0	212.859	27.773.391		
Grassland Converted to Cropland	-2.737.733	155.377	100.605	31.814	-2.449.938		
Grassland Converted to Forest Land	-1.284.781	-	11.573	6.042	-1.267.166		
Grassland Converted to Other Land	633.424	-	4.688	30.672	668.784		
Grassland Converted to Settlements	57.019	-	416	0	57.434		
Grassland Converted to Wetlands	1.229	121	17	0	1.367		
Grassland Remaining to Grassland	99.635	0	0	372.917	472.553		
Other Land Converted to Cropland	-1.589.528	23.451	- 467	-	-1.566.544		
Other Land Converted to Forest Land	-2.515.750	-	- 1.211	-	-2.516.961		
Other Land Converted to Grassland	-1.350.846	-	- 10.713	-	-1.361.559		
Other Land Converted to Settlements	-1.820	-	- 3	0	-1.823		
Other Land Converted to Wetlands	95	75	-	-	170		
Other Land Remaining to Other Land	-1.086	0	0	-	-1.086		
Settlements Converted to Cropland	-1.178.144	9.722	- 280	0	-1.168.702		
Settlements Converted to Forest Land	-22.754	-	- 23	0	-22.777		
Settlements Converted to Grassland	-56.737	-	- 428	0	-57.166		
Settlements Converted to Wetlands	23	19	-	0	43		

Table A6- 13. Emissions from forest and land cover change category

ISFL ERPD-14112023

			Annual		
E/R LCC All	AGB+BGB	SOC	DOM	Biomass Burning	
Settlements Remaining to Settlements	-6.155	0	0	236	-5.919
Wetlands Converted to Cropland	-261.283	- 24.009	- 67	-	-285.359
Wetlands Converted to Forest Land	-30.804	- 1.332	- 112	-	-32.247
Wetlands Converted to Grassland	-7.110	- 666	- 160	0	-7.937
Wetlands Converted to Settlements	-1.445	- 1.596	-	0	-3.041
Wetlands Remaining to Wetlands	-	-	-	-	0
Grand Total	276.128.185	-1.719.569	-185.370	2.718.771	276.942.016

Enhancement of carbon stock from other lands to forest lands shared the largest portion of removals in forest land category, with total removals of 60.2 million tCO2. Within forest land category, forest land remaining forest lands contributes to emissions of total 27.7 million tCO2, due to changes of primary forests to secondary forests, or known as forest degradation. The largest sources of emissions from forest and land use sector was forest lands converted to cropland, with total emissions of 104.8 million tCO2 during the baseline.

6.3.3. Emissions from Peat Fires

Estimation of emissions from peat fires include the CO2 and CH4 emissions, two major GHG from burning organic soils. The emissions were estimated using the activity data (i.e. annual burned peatland) multiplied with emission factor for each gas. The emissions from burned peatlands from the baseline period varied from zero in 2010/2011 and 2017/2018 to more than 20 million tCO2 in 2006/2007 and 2015/2016. The largest CO2 and CH4 emissions were from 2015/2016 with total of 25.4 million tCO2 and 2.7 million tCH4, respectively.



FIGURE A6-4. Annual emissions from peat fires

6.3.4. Emissions from Peat Decomposition

Emissions from peat decomposition contribute to 40% of total national emissions from deforestation, forest degradation and peat decomposition (MoEF, 2016). However, it is the most difficult source of emission to be reduced (MoEF 2018). Therefore, peat decomposition will potentially become a challenge in Jambi province to achieve the goals in reduction of GHG emissions from AFOLU sector.



Figure A6- 5. Annual emissions from peat decomposition in Jambi province

Based on the spatial analysis of emissions from peat decomposition in Jambi during the base year, the emissions are increasing from 12.9 MtCO2 in 2006 to 18.4 MtCO2 in 2017. The increases were steep from 2006 to 2009 then slowed down during the period of 2009 to 2015, before it rises from 2015 to 2017. In 2108, emission from peat decomposition was slightly reduced, due to the decrease of deforestation. The increase of the emissions most likely will always occur if the deforestation of peat swamp forests continues beyond the baseline. The annual increase of the peat emissions was 497,793 tCO2 on average. The projection of emission from peat decomposition used this annual increased of emissions.

Annex 7: Review of the available data and methods for the subcategories from the initial selection against the quality and baseline setting requirements for ISFL Accounting

To generate activity data and emission factors from AFOLU sectors, the list and review of datasets required for the analysis were provided in the below. Most of data from forestry and land use sector used the spatial data format derived from the MoEF and MoA. The activity data used for the estimation of emissions and removals include forest and land cover data from MoEF, and annual burn scar maps from MoEF, which are part of the National Forest Monitoring System's products.

The NFMS have been developed to monitoring Indonesian forest since 1990 using Landsate imageries. At that time, the Directorate General of Forestry Planning of the Ministry of Forestry (MoFor) (now become Ministry of Environment and Forestry-MoEF) was responsible for land cover mapping of Indonesia. The wall-to-wall forest monitoring system was initially updated every two to six years based on data availability, which was limited by clouds occurence, and available funds (prior to 2008, Landsat imageries had to be purchased). A new data sharing policy of the United States Geological Survey (USGS) was published in 2008 which made Landsat data freely available on the internet. The policy greatly benefits Indonesia through the availability of more Landsat scenes for supporting the national mapping system. In 2013, MoFor started to use the newly launched Landsat 8 OLI to monitor Indonesian land cover condition and placed the Landsat 7 ETM+ as a substitude or for cloud removal during image mosaicking. Up to now, land cover data is available for the years of 1990, 1996, 2000, 2003, 2006, 2009, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020, which are generated from mosaic of Landat imageries which acquired from 1990–1996, 1996–2000, 2000-2003, 2003-2006, 2009-2011, 2011-2012, 2012-2013, 2014, 2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019 and 2019-2020, respectively (https://nfms.menlhk.go.id/peta). Detail method on forest and land cover mapping has been documented in manual (https://sigap.menlhk.go.id/sigap-trial/files/download/petunjuk-teknis-penafsiran-citra-satelit-resolusi-sedang.pdf).

The national forest monitoring system (NFMS) apply the regularly updated forest and land cover mapping to define the forest and land cover changes. The maps, that were used in the previos version, were updated regularly by deliniating the changes which identified in the satellite imageries. Once there is a change in the imageries, new land cover class is delineated. Therefore the change of land cover classes is based on the actual changes in the imageries. We dont assume the transition period of certain land cover remain in a conversion category after a change in land use (e.g 20 years). The land cover change in Indonesia could be very dynamic for certain land use classes, for example deforestation could occur in 1 year, and become a bare land, and the next year the land become a plantation. However it is not possible for a plantation forest to become primary forest is within a year. If this happens, this may be due to error in classication. However, we believe that the most current map products have better accuracies due to better understanding and capacities. Therefore, instead of using the annual maps, we used only the maps from the beginning and the end of the reference period, not using the maps from the interim years. Our approach could be verified using satellite imageries, as we did for the uncertainty analysis using Olofsson et all (2014) approach (see Annex 9.2).

The forest plantation has defined as monoculture forest planted in a area of reforestation / rehabilitation / afforestation and industry (concession) activities. Generally, the plantation forest will harvest by land clearing every 5 years depending on the species, and will be planted again in 1 year. Bare land in plantation forest areas caused by plantation rotation has still classified as a forest plantation. This method can be applied using visual interpretation. Thus in our maps, the clear-cut harvesting within the plantation forests is not considered as deforestation.

The approach is based on the guideline of interpretation for medium-resolution satellite images Section 5.C.1.h.2.d page 9 that can be accessed through the link:

<u>https://nfms.menlhk.go.id/download/petunjuk-teknis-penafsiran-citra-satelit-resolusi-sedang</u>. However, this approach that considering forest plantation as a land use has been started only since 2017, previous approach still follows the actual land cover change. Therefore, using the maps from the beginning and the end of reference year, willexclude this error and reduce the uncertainty.

To generate activity data related to fire emissions, we used burnt areas generated by MoEF. MoEF generated burnt areas map based on visual interpretation of medium spatial resolution of satellite imageries (KLHK, 2021). The maps were produced from 2000 to 2020 by Forest Resource Inventory and Monitoring Directorate and validated using ground truthing data by Directorate of Forest and Land Fire Control of the MoEF. The classification method for identifying burn areas was based on visual interpretation of medium resolution imageries, i.e. Landsat 5/7/8 with 30 m resolution and Sentinel 2A and 2B with 20 m resolution. In addition, several additional datasets were used to support and validate the burn scars, including MODIS and NOAA hotspot, groundthruthing data and burn area model based on normalized burn ratio (NBR).

Visual interpretation of the satellite imageries was performed on a map scale of 1:25,000 – 1:50,000 to obtain a reasonable resolution of published maps at a scale 1:50,000 to 1:250,000. The minimum burn area polygon to be identified was 0.5 cm x 0.25 cm at map scale of 1:50,000, which is equivalent to a minimum area of 6.25 hectares. The burnt area can be detected from medium resolution imagery, such as Landsat 8, using the visual interpretation method, based on the colour (red, brown, or black), tone (dark) from the RGB combination of SWIR-1, Near Infrared, Red, pattern, site and association. Either hotspot or field check data were used for burn scar validation. Based on the data and objects that can be detected from remote sensing data, the burn scar area can be classified into three levels of accuracy as below. The classification of each burn area polygon will include the delineation of the polygon with three levels of accuracy, *i.e.* high, medium and low, as presented at Figure Annex 3.3. High level accuracy, if within the polygon, satellite imageries, hotspot data and ground thruthing data confirm that fire occurs in the polygon. While medium level accuracy if only hotspot and burn scars in satellite imageries are detected. When fire is detected only in satellite imageries, the polygon will be considered low level accuracy. Classification of burn scar area refers to SOP of Forest and Land Fire Assessment that can be accessed via https://opsroom-sipongi.menlhk.go.id/storage/files/537383_1647404256.pdf.

Peatland distribution map was produced by the Ministry of Agriculture in 2019, based on compilation of several peat maps, field surveys, and further ground check for verification. A comparative method was used. All data collected from any sources were compared spatially using spatial data analysis tools and combined with a literature review. In order to increase the accuracy of the results of the comparative method, validation was conducted by ground truth surveys. The map is the improvement of previous peatland map published in 2011 based on interpretation of medium and high-resolution imageries, and additional soil survey data (Anda et al, 2021). The revised peatland map has a higher resolution (1:50,000 map scale) than the previous map version (1:250,000 map scale).

Sub-Categories	Data and Parameters	Description of the methods	Data level	Data Compliance
Forest and land cover change	Activity data	The annual forest land cover change	The spatial data	The datasets
	of land cover	data were generated from time series	are available	used for this
	changes.	forest and land cover maps generated	since 1990/1996.	analysis are
	There are	using visual classification of Landsat	Before 2011, the	complied with
	selected 11	imageries since 1990/1996 until now.	data are not	the
	subcategories	The Landsat imageries used for the	available	requirement of
	selected 11	imageries since 1990/1996 until now.	data are not	the
	subcategories	The Landsat imageries used for the	available	requirement of
	of forest and	classification of the land cover maps are	annually:	ISFL, which

Table A7-1. Description of data and parameters used

Sub-Categories	Data and	[Descriptio	on of th	e met	hods		Data level	Data
	Parameters								Compliance
	land cover change.	the con imageri longest acquisif in 1972 Landsat ETM+, a The cyc NFMS r satellite and end instance 2017/2 imageri July 202 annual with the	npilation es. Lands -running tion prog and ope t sensors t 4 MSS, I and Land le of ann efers to t e imageri ds in June e, the mo 018 invol es acquir L7 to June cycle the e calenda	of the a sat prog satellite ram, wh rating u were us Landsat sat 8 OL ual mor the acqu es, while the acqu es, while the nei ponitoring ved any red duri e 2018. refore c ar year.	vailat ram is e imag nich co ntil no sed, ir 5 MS	ole s the gery omme ow. Va ncludii S, Lan g of t n time rts in r. For od of satel e perio FMS ot coi	enced arious ng dsat 7 he e of July lite od of incide	1996/2000;2000/2003;2003/2006;2006/2009;2009/2011. Since2011/2012 thedata areavailableannually.The data level isApproach 3which usingsatelliteimageries thatcovers nationalland areas.For purposes ofthis ERPD,	available for the relevant historical years in Jambi province and covering the six IPCC categories.
		Classifio 23 fore	cation wa st and lai	as done nd cove	visual r class	ly bas es	ed on	Indonesia only used 2006/2009 and 2017/2018	
	Forest carbon stock values	Current are deri Sumatr Sumatr carbon distribu types (s	C stock v ived from a island. a island u stock val ted unev ee table Primary dryland forest	values for nation Total NF used for ues are renly thi below).	or for al NFI FI plot estim 700 p rough rough rough swa mp fore st	est cla datas s for lots out fo seco ndar y dryl and fore st	set for rest	The data level is Tier 2, which uses national data of NFI plots.	The data is complied with ISFL requirement. The use of local equation (Manuri etal, 2017) and Chave's global equation is justified in the
		1990	1	2			3		FRL 2022 document
		1991		7	1	5	13		through a
		1992	1	12		9	22		comparison
		1993	4 5	15	1	8	31		with local
		1995	1	25	1	19	46		equations
		1996		17		21	38		
		1997	6	22	2	13	43		
		1998	5	21	2	14	42		

Sub-Categories	Data and	I	Description	on of th	e met	hods		Data level	Data
	Parameters								Compliance
		1999	9	32		7	48		
		2000	3	10	1	2	16		
		2002		2		6	8		
		2003	2	6		3	11		
		2004	1	7	2	2	12		
		2005	1	5			6		
		2009		2	1	3	6		
		2010	1	5			6		
		2011	2	4			6		
		2012	11	17	1	17	46		
		2013	39	13		2	54		
		2014	8	13	1	8	30		
		2015	26	35		3	64		
		2016	20	13	1	3	37		
		2017	11	12		4	27		
		2018	11	28	1	2	42		
		2019	8	9		5	22		
		Total	176	351	15	158	700		
		The larg second 351. M by the l 15 plot NFI plo with 20 grids, tl each fo Manuri to conv plot da plots, C equatic NFI dat recorde each sp density sources databas	gest num ary fores angrove f east num s. ts are dis km x 20k nerefore rest cove et al, 20 erting th ta measu have, et on was us a measu ed tree sp ecies wa databaso s includin se from F	ber of N t class w forests v nber of p tributec cm, or 10 the nun er class i 17 equa e bioma rement al, 2005 sed to es red tree becies. V s derive e compi g from v forest Re	IFI plo vith to were r plots, I syste Okm x hber o s not o tions s not o tions . For r mang stimat DBH a Vood d fror led fro wood esearc	ts is f tal plo epres with c ematic 10km f plot optim were m the nangr grove e AGE and densif n the om va densif ch,	rom ot of ented only cally cally s for um. used NFI ove 3. The ty of wood rious		
		(FORDI	A) and IC	RAF.	ation	Agen	Ly		

Sub-Categories	Data and Parameters	Desc	ription o	f the me	thods		Data level	Data Compliance
		Because NF (diameter a 10 cm), not correction f were used Similarly, ro to estimate (BGB) from various fore from Krisna (see table b	I data co at breast I saplings actor bas (see table oot shoot the belo the AGB. est cover wati etal pelow).	vers only neight of and und sed on ra below). ratio (RS wground The RSR classes v , 2014 (ir	trees more f erstore sio to / R) was bioma s for vere de o 2 nd FR	than ey, AGB used ass erived RL)		
		Forest	Ratio t	o AGB tree	e (%)			
		types	Sapling	Unders torey	Root			
		Primary dryland forest	0.2	0.5	29			
		Secondary dryland forest	1.1	2.7	29			
		Primary swamp forest,	11.4	2.4	22			
		Secondary swamp forest	11.1	3.8	22			
		Primary mangrove forest	0	0	31.1			
		Secondary mangrove forest	0	0	11.5			
		To convert and from C used carbo Guidelines) Uncertainti stocks are s Annex 10). The carbon in 2016 FRE	from bion to carbon n fraction and 44/1 es of mar still relativ stock val	mass to c n dioxide of 0.47 L2, respe ngrove fo vely very ues were ent.	arbon (CO2) (2006 I ctively. orest ca high (s e publis	(C) we PCC arbon see		

-

Sub-Categories	Data and	Description of the methods	Data level	Data
	Parameters			Compliance
	Non-forest carbon stock values	The use of DOM values from a study in peat swamp forests of South Sumatra due to unavailability of comprehensive DOM values from the 2nd FRL document, which available only for forest classes. In addition the DOM values in the 2nd FRL are mostly very high. Thus the use of the data from South Sumatra study, considered to be conservative compared to Tier 2 data used in the FRL. The source of Tier 2 data used in the PRL was from INCAS study in peatland of Central Kalimantan (INCAS) Current c stock values for non-forest classes are derived from the compilation of literatures from national studies. These datasets were compiled for the 2 nd FREL. Root shoot ratio was used to estimate the belowground biomass (BGB) from the AGB. The ratio was derived from 2019 IPCC guideline and Gautam et al, 2021. To convert from biomass to carbon (C) and from C to carbon dioxide (CO2) we used carbon fraction of 0.47 and 44/12, respectively (2 nd FRL). The DOM values for non foreat classes refer to the study in South Sumatra. Uncertainties of some land cover classes are still relatively very high (see Annex 10).	The data is Tier 2 level, since it was compiled from literatures of studies conducted in Indonesia.	It is Tier 2 level, although some land cover classes have very high uncertainties due to unstandardized methods.
Peat decomposition	Peatland distribution map	The map was derived from visual interpretation of satellite imageries combined with the ground truthing data of soil surveys. Definition of peatland was applied which defining threshold of peat depth (minimum 0.5 m), and carbon content (minimum of 50%).	The data is Approach 3 level, since satellite imageries were used for the wall-to-wall mapping.	It is an Approach 3 level and the best available data so far.

Sub-Categories	Data and	Description of the methods	Data level	Data
Ū	Parameters			Compliance
	Emission factors for peat decompositio n	The emission factors used in this analysis are based on the2nd FREL (2020)	The data were derived mostly from studies in Indonesia (Novita et al, 2021), and are considered as Tier 2.	It is considered as Tier 2, due to the study site locations
Peat fires	Annual burned peatland maps	The burned area maps are generated through visual interpretation of medium resolution satellite imageries, such as Landsat or Sentinel. The maps should be generated annually covering whole Jambi province. Currently, there is a regular mapping of burned areas under DG of Climate Change of MoEF. The data should be available annually and relevant for this analysis.	The data is Approach 3, since they are generated using satellite imageries for national coverage.	The data complies with the ISFL requirement, using Approach 3 for the activity data
		The annual burned peatland maps are gerenated by overlaying the burned area maps and peatland map. The peatland map was generated by the Minstry of Agriculture based on visual interpretation of satellite imageries in combination with ground thruthing data		
	Emission factors for burned peatland	Emissions from peat fires occur due to the burned organic soils of the peatlands. The emission factor (<i>EF</i>) for peat fires was derived from the computation of various parameters including depth of burn scar (<i>D_b</i>), peat bulk density (BD) and emission factor (<i>gEF</i>). The emission factors used in this analysis are based on the computation of various	The data is Tier 2, since they are compiled from various studies in Indonesia	The data complies with the ISFL requirement, which using Tier 2 for the emission factor.
		studies in Indonesia for the development of Indonesia 2 nd FREL.		
Biomass burning	Annual burned maps	The burned area maps are generated through visual interpretation of medium resolution satellite imageries, such as Landsat or Sentinel. The maps should be	The data is Approach 3, since they are generated using	The data complies with the ISFL requirement,

Sub-Categories	Data and	Description of the methods	Data level	Data
	Parameters			Compliance
		generated annually covering whole Jambi province. Currently, there is a regular mapping of burned areas under DG of Climate Change of MoEF. The data should be available annually and relevant for this analysis.	satellite imageries for national coverage.	using Approach 3 for the activity data
	EF for biomass burning	The EF values for biomass burning refers to IPCC default values	The data is Tier 1	The data is not incompliance with ISFL requirements
Agriculture	Activity data for agriculture Number of livestock, paddy rice, etc	The activity data for agriculture category were derived from national statistical data and cropped for Jambi province. The data is available online at the national GHG inventory (SIGN SMART) website.	The data is Approach 2, which use national statistical data	This data is Approach 2. Since this category is insignificant. There is no urgency to improve to Approach 3
	EF for agriculture	The EF for agricultural emissions were derived from compilation of IPCC default values and national data.	The datasets are a combination of Tier 1 and Tier 2	This category is insignificant. There is no urgency to improve to Tier 2 or 3

Annex 8: GHG Accounting Scope and Improvement Plan (GHG-ASIP): A time bound plan to increase the scope of accounting and improve data and methods throughout the ERPA Term

8.1. Section A: Agreed GHG Accounting Scope and Improvement Plan

8.1.1. Summary of the process of developing and reaching agreement to this this plan

This plan was developed through some series of FGD on GHG accounting since 2019. Although the FGD meetings were not specifically designed for plan discussions, there were always sessions of next steps or discussions on further plan. All workshops and meetings involved relevant stakeholders from the MoEF (Directorate of GHG Inventory, Directorate of Climate Change Mitigation and Directorate on Forest Resource Inventory of DG Forest Planning and Environmental Governance) and Jambi province MAR team (including provincial government representatives, NGOs, and universities).

During June to July 2019 period, several coordination workshops on data management for BioCF GHG accounting was held in Jambi province involving all relevant stakeholders from national and province levels. National agencies involved in the workshop include Dit MPI, IGRK-MPV, IPSDH, national parks and Balai PPI. Provincial agencies were invited including Bappeda, forestry service, environment service, estate crop service, agricultural service and forest management units (KPHP Muaro Jambi, Tanjung Jabung Timur, Tanjung Jabung Barat, Batanghari, Limau, Kerinci, Merangin, Sarolangun, Tebo Barat, Tebo Timur, UPTD Tahura). In addition, NGOs (KKI Warsi, Sekber PSDH, Mitra Aksi, Pundi Sumatera, ZSL, Setara, Gita Buana dan Cakrawala) and university (Universitas Jambi, IPB, UNILA) representatives were also invited.

Several important discussion notes include recommendation to utilize existing data, including forest fire emission factor data studied by researchers from various research institutions and institutions. Including comprehensive research related to monitoring emissions and reducing emissions, including those developed by research institutions. However, the Ministry of Environment and Forestry encourages the system used to be in accordance with the methods used at the national level, so that reporting becomes more consistent with national reporting.

Uncertainty analysis of the activity data for the ISFL baseline, that was conducted in 2021 to 2022 in collaboration with IPSDH, provides information on potential improvement of activity data. Further discussions with IPSDH as the data custiodian of most of the activitity data and emission factors, has been conducted to formulate the improvement plan. In addition, improvement plan than has been identified in the 2nd FRL document, is also incorporated, wherever relevant.

8.1.2. Overview of entities that have agreed to this plan

Table A8- 1. List of entities that have been consulted on the GHG accounting methods and results

Name of entity	Role of entity	Name of entity representative	Job title of entity representative
Directorate of GHG Inventory, MoEF	Development of MRV system, GHG Inventory for AFOLU sector	Budiharto, MSi	Deputy Director for GHG Inventory

Directorate of Climate Change Mitigation, MoEF	Coordination of national and sub national REDD+ implementation	Franky Zamzani, MSc	Deputy Director for Climate Change Mitigation
Directorate of Forest Resources Inventory	Providing activity data for forest and land cover change and peat fires	Judin Purwanto, MSi	Deputy Director for Forest Resource Mapping
MAR Section, Sub National PMU	Coordination and implementation on Sub National MRV System	Syamsul Bahri	Coordinator of MAR Section

8.2. Section B: Summary of analysis underlying this plan

Table A8- 2. Summary of the analysis done to determine the selection of subcategories eligible for ISFL accounting

Subcategory from initial selection	Emissions Baseline setting requirement(s) met? (Yes/No)	Methods and data requirement(s) met? (Yes/No)	Spatial information requirement(s) met? (Yes/No)	Eligible for ISFL Accounting? (Yes/No)
Forest Land Remaining Forest Land	Yes	Yes	Yes	Yes
Cropland Converted to Forest Land	Yes	Yes	Yes	Yes
Grassland Converted to Forest Land	Yes	Yes	Yes	Yes
Other Land Converted to Forest Land	Yes	Yes	Yes	Yes
Settlements Converted to Forest Land	Yes	Yes	Yes	Yes
Wetlands Converted to Forest Land	Yes	Yes	Yes	Yes
Forest Land Converted to Cropland	Yes	Yes	Yes	Yes
Forest Land Converted to Grassland	Yes	Yes	Yes	Yes
Forest Land Converted to Other Land	Yes	Yes	Yes	Yes
Forest Land Converted to Settlements	Yes	Yes	Yes	Yes
Forest Land Converted to Wetlands	Yes	Yes	Yes	Yes
Peat decomposition	Yes	Yes	Yes	Yes
Peat fires	Yes	Yes	Yes	Yes

All methods and data used for construction of the baseline are in line with the requirements of BioCF ISFL methodological approach. All subcategories from AFOLU sector has been identified and calculated. Most of significant carbon pools and gases are included in the calculation. However, there are some gaps in terms of carbon pools and gases. The emission and removal estimates from forest and land cover change include only aboveground biomass and belowground biomass, therefore improvement should include other significant carbon pool, such as

dead wood. Litter carbon pool may not be too significant. Gases from peat decomposition includes only CO2, N2O and CH4.

8.3. Section C: Agreed actions to be undertaken to increase the completeness of the scope of accounting and improve data and methods for the subsequent ERPA Phases during the ERPA Term

8.3.1. Actions to be undertaken to bring required subcategories into alignment with ISFL accounting requirements

Subcategory	All 11 key subcate							
Identification of gaps								
ISFL Accounting requirements	Requirements met? (Yes/No)	lf not met, de	of the gap(s)					
 Historic time series for baseline setting 	Yes							
• Quality of data and methods	Yes	All emission f Tier 2.	All emission factor used are either Tier 1 or Tier 2.					
 Spatial land representation for land use change-related subcategories 	Yes	Most of subca have very low more than 30						
Identification of actions	to address the gap							
Identified gap	Description of what is technically is needed to address it	Potential data sources	Responsible entity	Planned completion	Sources of funding/support			
Uncertainty of activity data of land cover change is relatively low with overall accuracy of 65%	Quality control and quality assurance of forest and land cover classification is required to improve the	Medium and high resolution satellite data	IPSDH, BPKH, MAR	2025	GCF – RBP FCPF-RBP BioCF RBP Other international supports			

Table A8- 3. Identification of gaps for ISFL accounting requirement

accuracy of the maps				
Technical	Technical	involve not	will be	GCF – RBP
correction based	correction	only MAR	implemented	FCPF-RBP
on the results	will also	team but also mapping	in 2024 and	BioCF RBP
analysis of	available		operational	Other
activity data, in particular for the	high resolution	BPKHTL (regional office	in 2025	international supports
subcategories that have the highest	imageries.	of IPSH) and IPSDH as the data		
uncertainty.		custodian.		
Apply hybrid		IPSDH, BPKH	The process	GCF – RBP
approach using			to be	FCPF-RBP
change			commenced	BioCF RBP
detection based			in 2024 and	Other
on 3-monthly			fully	international
and MODIS/VIRS			2026	supports
data. The				
change				
detection data				
information on				
pixel changes				
that will serve as				
initial				
information				
cover				
classification				
process. This				
hybrid methods				
which involve				
interpretation				
and automatic				
classification will				
be a continuous				
process and				
become a standard				
procedure for				

land cover mapping by IPSDH.				
Improvement of activity data for monitoring tree planting is being developed by MoEF in cooperation with BRIN (national research agency), which expected to be finalized by 2025	High resolution data or cencus method	IPSDH, BRIN		GCF – RBP FCPF-RBP BioCF RBP Other international supports
Intensive capacity development through training for operators on interpretation and supervisors for QA procedures. Currently, related training is conducted 1-2 times a year with only 1 representative from each BPKHTL.	-	IPSDH, BPKHTL, MAR	This should be commenced in 2024	GCF – RBP FCPF-RBP BioCF RBP Other international supports
Develop standardization procedures for QA/QC in 2024	-	IPSDH, BPKHTL, MAR	The process is expected to be commenced in 2024 and fully operational 2026	GCF – RBP FCPF-RBP BioCF RBP Other international supports

Low tier data of emission factor	Revised emission factor based on locally measured data, especially from field plot of forest and land inventory	Forest inventory data from various sources in Jambi,	BPKH and all relevant stakeholders in Jambi	2029	BioCF RBP, MoEF and Other international supports for the new NFI
	Redesign of the NFI method, which accommodate the measurement of other relevant carbon pools, i.e. DOM.	New NFI data	IPSDH, BPKHTL	2030	GCF – RBP FCPF-RBP BioCF RBP Other international supports (FAO)

8.3.2. Financing Plan

Subcategory		Action		Financ (per	e requireme r year in US\$	ents)		Total (US\$)	Finance available (US\$)	Source and Type of Finance (grant/ loan/ government budget) (US\$)	Finance gap (US\$)
			¥1	¥2	¥3	¥4	Y5				
	CL_FL, GL_FL, OL_FL, SL_FL, WL_FL, FL_GL, FL_OL, FL_SL, FL_WL, CL_GL	Improve accuracy of forest and land cover maps, in particular non forest classes	30,000	30,000	30,000	30,000	30,000	150,000	150,000	BioCF preinvestment fund, preparation phase fund and RBP fund	0
	FL_FL, CL_FL, GL_FL, OL_FL, SL_FL, WL_FL, FL_CL, FL_GL, FL_OL, FL_SL, FL_WL, CL_GL	Compile existing forest inventory data to improve Tier 3 emission factor. Develop inventory plots to fill the gaps if required	30,000	30,000	30,000	30,000	30,000	150,000	150,000	BioCF preinvestment fund, preparation phase fund and RBP fund	0

TABLE A8-4. FINANCING PLAN FOR IMPROVEMENT ACTIONS

8.3.3. Additional planned improvement to bring not-required subcategories into alignment with ISFL accounting requirements

Subcategory	Cropland remainin Cropland converte	Cropland remaining cropland; Grassland converted to cropland converted to grassland							
Identification of gaps									
ISFL Accounting requirements	Requirements met? (Yes/No)	If not met, o gap(s)	letailed description	on of the					
 Historic time series for baseline setting 	Y								
 Quality of data and methods 	Y								
 Spatial land representation for land use change-related subcategories 	Ν	Not met the because it is the third lar category and data is very	ISFL accounting r not a conversion gest emission oth d the uncertainty high.						
Identification of action	s to address the gap								
Identified gap	Description of what action is needed to address it	Potential data sources	Responsible entity	Expected completion	Sources of funding/support				
These subcategories have very high uncertainty	Improvement of mapping accuracy as identifed	MoEF forest and land cover maps	MAR, BPKH, IPSDH	2025	International supports				

Table A8- 5. Additional improvement plan

Annex 9: Estimation of the Emissions Baseline

The Jambi BioCF GHG accounting framework uses the best available data, a transparent method and can be replicated semi-automatically. Based on a fairly complex and sequential process, to ensure the fulfillment of the principles of transparency, accuracy, consistency, completeness, and comparability. The GHG accounting for the Jambi BioCF ISFL program was performed using various software, including GIS and spreadsheets, that allow spatial analysis combined with tabular calculation and dashboard display. The workflow of the Jambi BioCF GHG accounting can be seen in the Figure A.9-1.



Fugure A9- 1. Workflow of the GHG Accounting for Jambi BioCF FOLU sector

The BioCF toolbox was specifically built as an extension tool working under ArcGIS environment to support the process of land cover change analysis and GHG accounting for the FOLU sector for Jambi Province. The toolbox combines all relevant spatial data including activity data, administrative and land management boundaries and processes them into an analysis-ready dataset. The output from the BioCF IFSL Jambi toolbox is spatial data on land cover change classification and emission calculations within a certain period, this spatial output can be converted into other database formats such as excel, dbf, csv, txt for summary analysis with pivot table tool or Business Intelligent (BI) software, such as Power BI. More detail step by step guidance was provided in a separate manual to ensure the MAR team could continue the analysis and perform the calculation using the same approach.

Below is the process om how the BioCF Tool work:

- Step 1: User defines the EF used for estimating the emissions, i.e. c stocks of forest and land cover types, peat decomposition and peat fires.
- Step 2: User uploads and combines all relevant spatial data that will be used for generating the activity data. The land cover data used in this analysis is part of the NFMS which is accessible via the NFMS website: <u>https://nfms.menlhk.go.id/peta</u> as online interactive and links to website of map server (<u>https://dbgis.menlhk.go.id/server/rest/services/Time_Series/</u> for land cover of 1990-2020 period). We further cropped the NFMS land cover data using Jambi province boundary for faster analysis.

- Step 3: The BioCF Tools will create categorization of forest and land cover classes based on REDD+ activities and IPCC subcategories. New columns on categorization will be created. Area of the polygons will be recalculated in hectare, which serves as the activity data.
- Step 4: The BioCF Tools will calculate the emissions based on the recalculated activity data with the associated emission factors. New columns on the total emissions or removals will be created in the database.

Step 5: User converts the new database into database or spreadsheet format, e.g. excel or txt.

Once new database is created, we use spreadsheet software to further analyze the emissions and removals by category. We developed the emission baseline through below processes:

Step 6: Open the new database in Microsoft Excel.

- Step 7: Using **Pivot Table** tool, generate the annual activity data (ha/year) from land cover change, peat decomposition and peat fires for all years from the baseline period (i.e. 2006/2009 2017/2018).
- Step 8: Use the results from the sample-based area estimation (Annex 9.1) to adjust the activity data.
- Step 9: Use the Monte Carlo Simulation worksheet template to input the activity data generated from Step 7 and Step 8.
- Step 10: Add all emission factors used for estimating emissions and removals from land cover change (only key subcategories), peat fires and peat decomposition
- Step 11: Calculate the annual emissions for each subcategory in the MCS work sheet. Apply 90% of confident interval and 10,000 iterations. For the subcategories of conversion to forest lands, multiply the removals with 12/20 to accommodate 20 years transitional period.
- Step 8: Generate mean annual emissions or removals for each selected subcategories, including forest and land cover change subcategories (only the key subcategories), peat decomposition and peat fires.
- Step 9: Estimate the mean annual emissions or removals for all selected key categories. For emissions that involving legacy emissions from peat decomposition, use the average increase of emission as the baseline⁷¹.
- To generate the baseline emissions from the legacy emissions of peat decomposition, we apply annual increase of emissions (ΔE) using the equation below:

$$\Delta E = \left(\frac{E_{ty} - E_{tx}}{y - x}\right)$$

Where

 E_{ty} : Emission from the last year of base period

 E_{tx} : Emission form the beginning year of base period

x : Beginning year of base period

⁷¹ The inclusion of peat decomposition emissions from stable classes or called legacy emission is possible following the footnote 15 of ISFL Program Requirement which stated that "Alternatively, for subcategory(ies) where legacy effects are significant, ISFL ER Programs may use the GHG Emissions and Removals resulting from average annual historic activities if it can be documented that this is more conservative for the relevant subcategory(ies) and the required data is available"

y : The last year of base period

To estimate the total peat decomposition emision baseline which include the legacy emissions used below equation:

$$E_{ty+i} = E_{ty} + i(\Delta E)$$

Where

 E_{ty+i} : Baseline total emissions at i-year after the last year of base period i : number of year after the last year of base period, i = 1,2,3,4,...

9.1. Sample-based Area Estimation

Uncertainty levels of emission factor data are identified and reported in the original data sources. For example, the uncertainty level of emission factor for peat decomposition were compiled from the 2014 IPCC Guidelines, from which the mean estimates of the emission factors were derived. The uncertainty level of the data is equivalent to the standard error of the mean.

The uncertainty for burned areas has been assessed for the burned area maps from 2009 and 2014, with overall accuracy of 96.5% and 96.2%, respectively (MoEF, 2021)⁷². The uncertainty of peatland map is not reported in the resource document (Ritung etal, 2011). However, the 2016 FREL for national REDD+ stated that the uncertainty level of the peatland decomposition activity data was 20%.

To estimate the uncertainty of activity data for emissions and removals from land cover changes, we performed an uncertainty analysis of the change categories of land cover change, following the methods applied in FCPF (Olofsson etal, 2014; Tosiani etal, 2020) based on the IPCC subcategories. Based on the key category analysis, we identified 15 subcategories that are significant to BioCF emission reduction and removal enhancement.

To estimate sample size (n), we used the following equations suggested by Cochran (1977) and Olofsson et al, 2014:

$$n = \left(\frac{\sum W_i S_i}{S(\hat{0})}\right)^2$$

Where W_i is the area proportion of subcategory i, S_i is the standard deviation of subcategory i, and $S(\hat{O})$ is the expected overall accuracy. For this analysis we used 10% expected accuracy, which resulted in estimated sample size of 1616. First, we distributed the samples using proportional allocation of each subcategory (see column "ni Proportional") combined with minimum of 50 sample plot. Stratified random sampling was applied to distribute the allocated samples throughout the 15 subcategories.

The accuracy assessment of subcategories was carried out by a team of remote sensing specialists from IPSDH and MAR team. The subcategories from the mapping results were compared with the satellite imageries as the reference data. Various satellite imageries were used during the assessment, including medium (Landsat) and high-resolution data (SPOT) derived from LAPAN (Indonesian Space Agency). Quality control (QC)of the assessment results were

⁷² KLHK, 2021. Dua Dasawarsa Indonesia Memantau Kebakaran Hutan dan Lahan: Penghitungan Luas Kebakaran Hutan dan Lahan Tahun 2000 – 2020. Direktorat Jenderal Penanggulangan Perubahan Iklim. KLHK

carried out by IPSDH team of supervisors. Quality assurances (QA)were carried out by a team of expert outside the assessment team from various universities, and experts.

After removing the overlapping samples, we have 1427 assessed samples, which include samples that fall into subcategories other than the 15 key subcategories (see column "Samples within 24 subcategories). This number of assessed samples are the maximum samples can be allocated in each stratum, since adding more sample will not improve the accuracy further. However, after revision of the GHG accounting using the new EF from the 2nd FRL, there were only 13 key categories from the land cover change. Two of the previous key categories was then excluded from further analysis, including Other land to Cropland and Other Land to Grasslands.

Strata (i)	Area (ha)	Wi	Ui	Si	ni, Prop1	Sampel 24 Stratum	Final Sampel (15 KCA)
1 FL_FL	1,260,723	0.48	0.80	0.40	559	555	548
2 CL_FL	9,152	0.00	0.40	0.49	50	50	35
3 GL_FL	11,039	0.00	0.40	0.49	50	50	41
4 OL_FL	11,286	0.00	0.40	0.49	50	50	42
5 SL_FL	117	0.00	0.40	0.49	50	15	5
6 WL_FL	202	0.00	0.40	0.49	50	23	14
7 FL_CL	346,626	0.13	0.40	0.49	154	131	84
8 FL_GL	227,048	0.09	0.40	0.50	101	88	57
9 FL_OL	152,803	0.06	0.40	0.50	68	64	63
10 FL_SL	349	0.00	0.40	0.50	50	26	6
11 FL_WL	427	0.00	0.40	0.50	50	36	29
12 OL_CL	10,357	0.00	0.40	0.50	50	50	15
13 OL_GL	8,973	0.00	0.40	0.50	50	49	23
14 CL_GL	531,596	0.20	0.40	0.50	236	191	14
15 CL_SL	42,024	0.02	0.40	0.50	50	49	8
Total	2,612,722	1.00			1,616	1427	984

Table A9- 1. Allocated samples for each subcategory

		Reference 15 Subcategories											Reference Outside 15 Key Subcategories	Grand Total					
		1 FL_FL	2 CL_FL	3 GL_FL	4 OL_FL	5 SL_FL	6 WL_FL	7 FL_CL	8 FL_GL	9 FL_OL	10 FL_SL	11 FL_WL	12 OL_CL	13 OL_GL	14 CL_GL	15 CL_SL	Total1	Total2	
	1 FL_FL	526		1	L		6	4	5	1		5					548	7	555
	2 CL_FL	28	0	2	2 1			2	1	1							35	15	50
	3 GL_FL	34		4	1		1	1									41	9	50
	4 OL_FL	26		1	l 11								4				42	8	50
	5 SL_FL	3				0							1	1			5	10	15
	6 WL_FL	14					0										14	9	23
_	7 FL CL	15						65	3				1				84	47	131
Aap	8 FL GL	12						8	30	3				4			57	31	88
~	9 FL_OL	14						38	8 4	7							63	1	64
	10 FL SL	2		1	1		1				1						6	20	26
	11 FL WL	5					2		4	14		4					29	7	36
	12 OL CL	4						3					8				15	35	50
	13 OL GL	1		1	2			7	1				5	6			23	26	49
	14 CL GL	3		1				2	1	1			5		1		14	177	191
	15 CL SL			-												8	8	41	49
	Total	687	0	11	16	0	10	130	49	27	1	9	24	11	1	8	984	443	1427

Table A9- 2. Confusion matrix

Forest Land remaining Forest Land (FL_FL) has the largest correct samples, with 526 correct samples out of 548 total samples. Only seven samples fall into subcategories other than the 15 key subcategories. Similarly, samples from subcategory of Forest Land to Cropland (FL_CL) shared large portion of correct samples (65 out of 84 samples). However, some samples of this subcategories are misclassified as other subcategories outside the 15 key subcategories (47 samples). Only half of total samples from the Forest land to Grassland (FL_GL) subcategory are correct, while most of the rest subcategories have very little or without correct samples. There are three subcategories that do not have correct samples, i.e. cropland to forest land (CL_FL), settlement to forest land (SL_FL) and wetland to forest lands (WL_FL).

We selected the assessed samples that fall only within the 15 subcategories. We ended up with total sample of 984 that can be used for further analysis. The confusion matrix between mapped subcategories and reference data is provided in the table below.

Strata									Refe	rence									
Kelas F	erubahan	FL-FL	CL-FL	GL-FL	OL-FL	SL-FL	WL-FL	FL-CL	FL-GL	FL-OL	FL-SL	FL-WL	OL-CL	OL-GL	CL-GL	CL-SL	Total	Am,j (ha)	Wi
	FL-FL	0,4632	0,0000	0,0009	0,0000	0,0000	0,0053	0,0035	0,0044	0,0009	0,0000	0,0044	0,0000	0,0000	0,0000	0,0000	0,483	1.260.723	0,483
	CL-FL	0,0028	0,0000	0,0002	0,0001	0,0000	0,0000	0,0002	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,004	9.152	0,004
	GL-FL	0,0035	0,0000	0,0004	0,0001	0,0000	0,0001	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,004	11.039	0,004
	OL-FL	0,0027	0,0000	0,0001	0,0011	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0004	0,0000	0,0000	0,0000	0,004	11.286	0,004
M a	SL-FL	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,000	117	0,000
p	WL-FL	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,000	202	0,000
	FL-CL	0,0237	0,0000	0,0000	0,0000	0,0000	0,0000	0,1027	0,0047	0,0000	0,0000	0,0000	0,0016	0,0000	0,0000	0,0000	0,133	346.626	0,133
	FL-GL	0,0183	0,0000	0,0000	0,0000	0,0000	0,0000	0,0122	0,0457	0,0046	0,0000	0,0000	0,0000	0,0061	0,0000	0,0000	0,087	227.048	0,087
	FL-OL	0,0130	0,0000	0,0000	0,0000	0,0000	0,0000	0,0353	0,0037	0,0065	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,058	152.803	0,058
	FL-SL	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,000	349	0,000

Table A9- 3.	Confusion	matrix based	on the r	proportion	of each	subcategory
10010703-3.	comasion	matrix buseu	on the p	si opor tion	or cuch	Jubcutchory

Strata		Reference																	
Kelas P	erubahan	FL-FL	CL-FL	GL-FL	OL-FL	SL-FL	WL-FL	FL-CL	FL-GL	FL-OL	FL-SL	FL-WL	OL-CL	OL-GL	CL-GL	CL-SL	Total	Am,j (ha)	Wi
	FL-WL	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,000	427	0,000
	OL-CL	0,0011	0,0000	0,0000	0,0000	0,0000	0,0000	0,0008	0,0000	0,0000	0,0000	0,0000	0,0021	0,0000	0,0000	0,0000	0,004	10.357	0,004
	OL-GL	0,0001	0,0000	0,0001	0,0003	0,0000	0,0000	0,0010	0,0001	0,0000	0,0000	0,0000	0,0007	0,0009	0,0000	0,0000	0,003	8.973	0,003
	CL-GL	0,0436	0,0000	0,0145	0,0000	0,0000	0,0000	0,0291	0,0145	0,0145	0,0000	0,0000	0,0727	0,0000	0,0145	0,0000	0,203	531.596	0,203
	CL-SL	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0161	0,016	42.024	0,016
	Total	0,5721	0,0000	0,0163	0,0017	0,0000	0,0054	0,1849	0,0734	0,0267	0,0000	0,0044	0,0775	0,0070	0,0145	0,0161	1,0000	2.612.722	1,000

The overall accuracy of the activity data was 65%. The subcategories with the highest user's accuracy are Forest Land remaining Forest Lands (FL_FL), Forest Land to Croplands (FL_CL), and Forest Land to Other Land (FL_OL) with accuracy of 96%, 77% and 60%, respectively. Unfortunately, the rest of subcategories have user's accuracy of less than 50%. Some of them have user's accuracy of 0%, including Cropland to Forest Land (CL_FL), Settlement to Forest Land (SL_FL), Wetland to Forest Land (WL_FL), Forest Land to Settlement (FL_SL), Forest Land to Wetland (FL_WL) and Cropland to Settlement (CL_SL).

While for the producer's accuracy, the subcategories with the largest accuracy are FL_FL (81%), OL_FL (68%), FL_CL (56%), FL_GL (62%), FL_SL (100%), CL_GL (100%) and CL_SL (100%). The rest of subcategories have producer's accuracy of less than 50%. The producer's accuracy of two subcategories, CL_FL and SL_FL cannot be estimated due to error division, which was the results of land cover maps misclassification. Neither these subcategories have correct samples, nor any samples from other subcategories falls into these subcategories. In addition, standard error of the CL_SL subcategory cannot be estimated, because most of the samples fall into other subcategories apart from the 15 key subcategories. Therefore, these three subcategories are excluded in the assessment of overall accuracy of the estimated emissions.

Code	Map Area (Ha)	User Accuracy	Producer Accuracy	Adjusted Area (Ha)	SE for the Estimate d Area (Ha)	CI (95%)	U (%)
1 FL_FL	1,260,723	0.96	0.81	1,494,753	64,850	127,107	8.50
2 CL_FL	9,152	0.00	#DIV/0!	-	-	-	#DIV/0!
3 GL_FL	11,039	0.10	0.03	42,589	38,049	74,576	175.11
4 OL_FL	11,286	0.26	0.68	4,325	1,018	1,994	46.11
5 SL_FL	117	0.00	#DIV/0!	-	-	-	#DIV/0!
6 WL_FL	202	0.00	0.00	14,160	5,616	11,008	77.74
7 FL_CL	346,626	0.77	0.56	482,995	56,032	109,824	22.74
8 FL_GL	227,048	0.14	0.62	191,765	42,072	82,461	43.00

Table A9- 4. User's and producer's accuracies, and uncertainties of adjusted areas

Code	Map Area (Ha)	User Accuracy	Producer Accuracy	Adjusted Area (Ha)	SE for the Estimate d Area (Ha)	CI (95%)	U (%)
9 FL_OL	152,803	0.60	0.24	69,667	39,119	76,672	110.06
10 FL_SL	349	0.00	1.00	58	58	114	196.00
11 FL_WL	427	0.00	0.01	11,562	5,126	10,046	86.89
12 OL_CL	10,357	0.20	0.03	202,555	70,786	138,741	68.50
13 OL_GL	8,973	0.30	0.13	18,297	7,796	15,280	83.51
14 CL_GL	531,596	0.14	1.00	37,971	37,971	74,423	196.00
15 CL_SL	42,024	0.00	1.00	42,024	-	-	-
	2,612,722	Overall Accuracy: 0.65		2,612,722			

9.2. Monte Carlo Simulation

We estimated the overall uncertainty of the baseline estimates using Monte Carlo simulation combined with error propagation approach. The mean and standard error related to activity data were identified from sample-based area estimation, except for peat fires which used original mapped areas. The mean and trandard error of emission factors were derived from reported from the original data sources. The uncertainty estimates for emission calculation were performed using Monte Carlo simulation with 10,000 iterations and confidence level of 90%. We used a simple spreadsheet template for uncertainty analysis using Monte Carlo simulation⁷³. The activity data used for this analysis was generated from two monitoring points, i.e. 2006/2009 and 2017/2018, following the data used in the uncertainty analysis of land cover change maps.

No	Parameters	Unit	Mean	SE	Distribution^
1	Carbon fraction	tC/ tdm	0.47	0.01	uniform
2	Ratio of molecular weight	tCO2/tC	3.67	fixed	fixed
3	Number of iteration	times	10,000		
4	Confidence level	%	90		
5	AGB of natural forest classes	tdm/ha	Table A6-6	Table A6-6	fixed, normal or truncated normal
6	BGB of non-natural forest classes	tdm/ha	Table A6-6	Table A6-6	fixed, normal or truncated normal
7	AGB+ BGB of non forest classes	tdm/ha	Table A6-6	Table A6-6	fixed, normal or truncated normal
8	EF of peat decomposition	tCO2/ha	Table A6-9	Table A6-9	normal

Table A9- 5. Uncertainty analysis of land cover change maps

⁷³ https://www.fao.org/redd/information-resources/tools/en/

No	Parameters	Unit	Mean	SE	Distribution^
9	EF for peat fires	tCO2/ha	Table A6-10	Table A6-10	normal or truncated normal
11	DOM	tdm/ha	Table A6-8	Table A6-8	fixed, normal or truncated normal
12	Activity data of forest and land cover change	ha/year	Adjusted areas from sample based estimation	Uncertainty from sample based area estimation	normal or truncated normal
13	Activity data of peat decomposition	cy data of peat decomposition ha/year from sample based estimation		Uncertainty from sample based area estimation	normal or truncated normal
14	Activity data of peat fires	ha/year	mapped areas	SE of the mapping accuracy	normal or truncated normal

^ data distribution was defined based on the standard error values of the mean. If the SE is lower than two times mean, then the data is normal distribution, otherwise truncated normal distribution.

The spreadsheet used a combination of approach 1 and approach 2 to quantify the uncertainty of each category and overall emissions. Approach 2 was used to estimate the uncertainty of each activity data and individual carbon pool's emission factor. Approach 1 was used to combine uncertainties of the combined carbon pools and overall uncertainties from all activities, based on error propagation. These uncertainty estimates were combined using two convenient rules for combining uncorrelated uncertainties under addition and multiplication.

Furthermore, we performed Monte Carlo Simulation using the following steps. First, we generated the mean and standard deviation or standard error of all ADs and EFs (from each pool and gas). The means of AD for each activity were data taken from the adjusted area of forest and land cover change uncertainty analysis (Table A.9-3). Standard error of AD was estimated based on the approach suggested by Olofsson *et al*. (2014) and Probability Density Function (PDF) was defined to estimate the 5% and 95% quantiles that define the lower and upper uncertainties of the total emissions from a category. Therefore, we assumed that all ADs and EFs have a normal distribution and used a 90% confidence level for estimating the random values of ADs and EFs.

The Central Limit Theorem from statistics states that the distribution for sample means tends toward a Normal (Gaussian) distribution regardless of the distribution of the underlying variables. Since both activity data estimates and emission factor estimates are means based on samples, it is reasonable to assume that they will be Normally distributed. Truncating the Normal distribution is a reasonable approach for handling large variation because it prevents highly unlikely values in the simulation (for example negative EFs where positive are expected, e.g. deforestation). IPCC Good Practice Guidance and Uncertainty Management A1.2.5 endorses the choice of a Normal distribution unless evidence exists to suggest some other distribution. Please see the annex document on the data distribution analysis based on the NFI data in Sumatra Island. In addition, to define the data distribution, we did some analysis based on the NFI data of Sumatra Island. However we found that not all data is normal distribution. Therefore we use normal and truncated normal distribution for the MCS. We define normal ditribution if Mean is greater than 2x SE, and truncated normal distribution if Mean is less than 2x Standard Error.

For both AD and EF the use of stratified sampling reduces the potential for meaningful correlation in the results.Based on the selected random values of ADs and EFs, the annual emissions of each activity were estimated, and the process was repeated with 10,000 iterations. More detail analysis of the uncertainty can be found in a separate excel file (*MC Simulation - BioCF_20230918b.xlsx*).

9.3. Baseline and Uncertainty Estimates

Total baseline emissions from landcover change and peat disturbance was 33.3 MtCO2e (Table A.9-6). The largest source of emissions was from land cover change with net emissions of 25.9 MtCOe2. Emissions from peat fires and peat decomposition were 6.2 MtCO2e and 1.1 MtCO2e, respectively. The largest emission and removal from land cover change were from subcategory Forestland to Cropland and Grassland to Forestland, with total of 13.4 MtCO2e and -0.9 MtCO2e, respectively.

The overall accuracy of the emission estimates was 43.3%, the largest uncertainty was contributed by the emissions from land use change, with 55.8% of uncertainty. The uncertainty of emission estimates from peat fire and peat decomposition were relatively low, with uncertainty of 31.5% and 23.4%, respectively.

Subcategories	Mean Emissions (tCO2e/yr)	SE (tCO2e/yr)	Lower bound 90% C.I.	Upper bound 90% C.I.	Half width 90% C.I.
Nett Emissions from Landuse Change	19.010.781	2.349.377	15.178.314	22.879.626	20,3%
Forest Land remaining Forest land	2.540.843	1.801.994	(419.750)	5.470.403	115,9%
Cropland converted to Forest land (#DIV/0!)					
Grassland converted to Forest Land	(40.781)	35.994	(100.335)	18.598	-145,8%
Other Land converted to Forest Land	(79.362)	15.966	(105.783)	(53.084)	-33,2%
Settlement converted to Forest Land (#DIV/0!)					
Wetland converted to Forest Land	(185.331)	62.824	(289.497)	(82.344)	-55,9%
Forest Land converted to Cropland	10.181.868	1.136.189	8.305.807	12.064.158	18,5%
Forest Land converted to Grassland	4.746.715	918.397	3.207.219	6.282.543	32,4%
Forest Land converted to Other Land	1.343.512	361.636	750.570	1.937.978	44,2%
Forest Land converted to Settlement	2.512	792	1.224	3.795	51,2%
Forest Land converted to Wetland	500.806	158.636	236.361	767.389	53,0%
Emission from Peat Decomposition (2006/2018)	1.579.166	288.666	1.107.287	2.055.140	30,0%
Emission from Peat Fire	6.174.541	1.183.563	4.237.598	8.148.294	31,7%
Total emissions from LUC and peat degradation	26.764.488	2.665.332	22.393.434	31.114.380	16,3%

Table A9- 6. Overall accuracy of the baseline estimates based on Monte Carlo Simulation

In order to manage the uncertainty of the baseline estimates to the lower level, it is crucial to address the uncertainty of activity data, in particular on forest and land cover change data. Based on Monte Carlo simulation, improvement of accuracy of some subcategories from the land use change category, needs to be carried out through the improvement the accuracy of the data. Several subcategories that need attention for the improvement include Forest Land remaining Forest Land, Cropland to Settlement, and Forest Land to Settlement. However, the last two subcategories may not be included into the baselines since their relatively small contribution to the overall emission after the adjustment of the map areas.

Accuracy improvement of the activity data of the land cover change maps could be done annually, in parallel to map production and the accuracy assessment. Improved capacity building for the operators is crucial to ensure the standardized approach of image classification. The training needs to involve operators from BPKH who conduct the

image interpretation. Implementation of QC and QA processes is also important to ensure the quality of the mapping, involving IPSDH and Jambi MAR team.

Annex 10: Data and parameters to be monitored

Data:	Annual forest and land cover changes
Description:	Activity data for emissions and removals from land cover change. The annual forest and land cover maps are generated using medium resolution satellite imageries.
Data unit:	Hectares
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	National Forest Monitoring System (NFMS) under directorate of forest inventory and monitoring of MoEF generates the annual forest and land cover maps for whole Indonesia. The maps are generated using visual classification by the regional forest mapping agency (BPKH) of Landsat imageries compiled by LAPAN (Indonesian Space Agency). For Jambi province, BPKH Wilayah VIII at Pangkal Pinang is responsible for generating the land cover map of Jambi province as well as field validation.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored annually
Quality Assurance/Quality Control procedures to be applied:	 QA/QC procedures will include: Training on visual interpretation for operators for consistent methodology. Validation of each land cover classes using ground thruthing Validation of changes in forest and land cover and estimate uncertainties. Accuracy assessment of annual land cover maps are performed by IPSDH. These figures are used for the estimation of uncertainty analysis for the previous version of GHG accounting. Uncertainty analysis are carried out for each forest and land cover changes using the approach suggested by Ollofson et al, 2014.
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	The main source of uncertainties is misinterpretation of land and forest classes due to: -cloud existence in the satellite imageries, -in availability of clear satellite imageries

Table A10- 1. Data and parameters to be monitored

Process for managing and reducing	- Training of visual interpretation for the operators
uncertainty associated with this parameter	- Cloud-free image composites
	- Additional sources of satellite imageries, e.g. sentinel

Data:	Burned areas in peatlands
Description:	Burned areas maps are required for estimating the emissions from fires. The maps are used as activity data of peat fire and biomass burning emissions.
Data unit:	hectares/year
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	The maps are generated through visual interpretation of medium resolution satellite imageries, such as Landsat or Sentinel. The maps should be generated annually covering whole Jambi province. Currently, there is a regular mapping of burned areas under DG of Climate Change of MoEF. The data should be available annually and relevant for this analysis.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Monitored annually
Quality Assurance/Quality Control procedures to be applied:	 QA/QC procedures will include: Develop standardized protocol for satellite interpretation Develop protocol for validating the interpreted results with ground truth data.
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	 Misinterpretation of burned areas Unavailability of clear satellite imageries
Process for managing and reducing uncertainty associated with this parameter	 Training for operators on interpreting satellite imageries using the standardised protocol. Additional remote sensing data, such as high-resolution imageries from satellites of drone

Data:	Peatland distribution map
Description:	The peatland distribution map provides information on the extent of peatland in Indonesia. The map was generated based on analysis using satellite imageries and ground validation.

Data unit:	Maps covering Jambi province (hectares)
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	The map was provided by the Ministtry of Agriculture who is the data custodian of the peatland map. The map was derived from visual interpretation of satellite imageries combined with the ground truthing data of soil surveys. Definition of peatland was applied which defining threshold of peat depth (minimum 0.5 m), and carbon content (minimum of 50%). The mapping scale of the map is 1:50,000.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed values during the ERPA terms. The peatland map is, relatively less dynamic compared to land cover map. There is no specific timeline for peatland map revision. Therefore it may not be updated within the proposed ERPA period (2020-2025).
Quality Assurance/Quality Control procedures to be applied:	QA/QC has been done by the provider
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	 Sources of uncertainties: Visual interpretation of peatlanbd boundary using satellite imageries Sampling design of ground thruthing point
Process for managing and reducing uncertainty associated with this parameter	 Training of operators for boundary identification following the standard that has been developed for consistency. More training data or ground thruthing data to improve the model accuracy.

Data:	C Stock of forest cover class							
Description:	C stock values for each forest cover class are required for generating emission and removal factors for forest cover changes. Current dataset is still using the compilation of aboveground carbon stocks from national level datasets and root shoot ratio from IPCC guideline for estimating BGB.							
Data unit:	Ton CO2 per hectare (tCO2/ha)							
Source of data or measurement/calculation methods and procedures to be applied (e.g. field	Current C stock values for forest classes are derived from national NFI dataset for Sumatra Island. Total NFI plots for Sumatra Island used for estimating carbon stock values are 700 plots distributed unevenly throughout forest types and measurement year (see table below).							
measurements, remote sensing data, national data, official statistics, IPCC	Measure ment year	Primary dryland forest	Secondary dryland forest	Primary swamp forest	Secondary dryland forest	Total		
Guidelines, commercial and	<u>1990 1 2 3</u>							
scientific literature), including	1991		7	1	5	13		

the (loca inte

spatial level of the data II, regional, national, national)	1992	1	12		9	22	
	1993	4	15		2	21	
	1994	5	17	1	8	31	
	1995	1	25	1	19	46	
	1996		17		21	38	
	1997	6	22	2	13	43	
	1998	5	21	2	14	42	
	1999	9	32		7	48	
	2000	3	10	1	2	16	
	2002		2		6	8	
	2003	2	6		3	11	
	2004	1	7	2	2	12	
	2005	1	5			6	
	2009		2	1	3	6	
	2010	1	5			6	
	2011	2	4			6	
	2012	11	17	1	17	46	
	2013	39	13		2	54	
	2014	8	13	1	8	30	
	2015	26	35		3	64	
	2016	20	13	1	3	37	
	2017	11	12		4	27	
	2018	11	28	1	2	42	
	2019	8	9		5	22	
	Total	176	351	15	158	700	

The largest number of NFI plots is from secondary forest class with total plot of 351. Mangrove forests were represented by the least number of plots, with only 15 plots.

NFI plots are distributed systematically with 20km x 20km, or 10km x 10km grids, therefore the number of plots for each forest cover class is not optimum.

Manuri et al, 2017 equations were used to converting the biomass from the NFI plot data measurement. For mangrove plots, Chave, et al, 2005 mangrove equation was used to estimate AGB. The NFI data measured tree DBH and recorded tree species. Wood density of each species was derived from the wood density database compiled from various sources including from wood density database from Forest Research, Development and Innovation Agency (FORDIA) and ICRAF.

Root shoot ratio was used to estimate the belowground biomass (BGB) from the AGB. The ratio was derived from the 2^{nd} FRL. To convert from biomass to carbon (C) and from C to carbon dioxide (CO2) we used carbon fraction of 0.47 and 44/12, respectively.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed value for the current ERPA phase	
Quality Assurance/Quality	QA/QC procedures will include:	
Control procedures to be applied:	Develop standardized protocols for field measurements.	
	• Develop calibration approach for compilation of c stocks values from existing studies	
Identification of sources of uncertainty for this parameter following approaches from the	 Sampling design (Number of plots, plot size, minimum diameter measured, etc) is too complicated and difficult to implement. Since 1990, complete measurement of NFI plots have never been conducted in 5 year cycle. 	
most recent IPCC guidance and guidelines.	- The old NFI was focusing on timber rather that complete carbon pool measurement.	
	 Inacccurate tree species identification is unlikely due to limited botanist for field survey. 	
	- High uncertainty of tree height measurements, due to limited visibility to see tree canopy in the tropical forests.	
Process for managing and reducing uncertainty associated with this	 Appropriate sampling design for Jambi forest and land cover classes, which aligned with the new design of NFI. The intensification of NFI plots should be applied for Jambi Province. 	
parameter	 A redesign of NFI is underway, the new NFI design will allow simpler field implementation but sufficient to achieve expected accuracy at national level. Furthermore, the new NFI will allow the detailing of accuracy at sub national level, through intensification of plot network. The new NFI will include DOM measurement and optionally soil organic carbon. 	
	 Accurate tree height measurement in the tropical forests will require high- technology equipment such as ultrasound and laser hypsometer. 	
	- Appropriate allometric equations for Jambi forest and land cover may required, especially for mangrove species.	
	 Development of tree species database is important to ensure accurate identification of tree species and wood density. The process will include the herbarium collection for unidentified tree species. 	
	 C stock value for each new land cover classes need to be compiled from c stock measurement in Jambi province, which required intensive and laborious field campaign. 	
	 Integration with compilation of other similar studies conducted in the province will be required to ensure representativeness of the land cover 	

Data:	C Stock of non-forest cover class	
Description:	C stock values for each land cover class are required for generating emission and removal factors for non-forest related land cover changes. Current dataset is still using the compilation of aboveground carbon stocks from existing studies in Indonesia and root shoot ratio from IPCC guideline for estimating BGB. The compilation is in progress to improve the GHG estimation for the 2 nd FREL.	
Data unit:	Ton CO2 per hectare (tCO2/ha)	
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	Current c stock values for non-forest classes are derived from the compilation of literatures from national studies. These datasets were compiled for the 2 nd FREL. If not available, root shoot ratio was used to estimate the belowground biomass (BGB) from the AGB. The ratio was derived from the 2 nd FRL. To convert from biomass to carbon (C) and from C to carbon dioxide (CO2) we used carbon fraction of 0.47 and 44/12, respectively.	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed values for the current ERPA phase	
Quality Assurance/Quality Control procedures to be applied:	 QA/QC procedures will include: Develop standardized protocols for literature selection. Develop calibration approach for compilation of c stocks values from existing studies 	
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	 Limited studies or number of plots representing non forest class. The old NFI is targeting forested areas. The old NFI was focusing on timber rather than complete carbon pool measurement. 	
Process for managing and reducing uncertainty associated with this parameter	 Appropriate sampling design is required for Jambi forest and land cover classes to measure AGB and DOM. The new NFI will include DOM measurement and optionally soil organic carbon. The intensification of NFI plots should be applied for Jambi Province. The new NFI will include plots measurement related to trees outside forests (ToF). Appropriate allometric equations for Jambi forest and land cover. C stock value for each new land cover classes need to be compiled from c stock measurement in Jambi province, which required intensive and laborious field 	

Data:	C Stock of non-forest cover class		
	 Integration with compilation of other similar studies conducted in the province will be required to ensure representativeness of the land cover 		

Data:	Emission factor for peat decomposition
Description:	Emissions from peat decomposition occur due to the drainage of the peatlands. Deforested or degraded peat swamp forests are assumed to be drained or canalized for better access.
Data unit:	Ton CO2 per hectare (tCO2/ha/year)
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	The emission factors used in this analysis are based on Novita etal, 2021 which was used in the 2 nd FRL document. The compiled emission factors were derived from studies in Indonesia.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed values as long as no new better data available
Quality Assurance/Quality Control	QA/QC procedures will include:
procedures to be applied:	• Peer review process by the IPCC team of authors
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	 Sampling design (Number of studies, measurement methods (Separation of emission whether including autotrophic respiration or just heterotrophic emission)
Process for managing and reducing uncertainty associated with this parameter	 Increase number of measurements representing all forest and land cover classes. Compile measurement results from existing studies

Data:	Emission factor for peat fires
Description:	Emissions from peat fires occur due to the burned organic soils of the peatlands. The emission factor (<i>EF</i>) for peat fires was derived from the computation of various parameters including depth of burnscar (<i>D_b</i>), peat bulk density (BD) and emission factor (<i>gEF</i>) using below equation.

	$EF = D_b \times BD \times$	Cf × gEF	× GWP >	< 10			
	where	e :					
	D_b	: aver	age bur	nt peat d	epth (m),		
	BD	: soil	bulk der	sity (t.m ⁻	³),		
	Cf	: com	bustion	factor			
	gEF	: emis	ssion fac	tor (g kg ⁻¹	¹)		
	GWP	= Global	Warming	g Potentia	al (1 for C	:02)	
Data unit:	Ton CO2 per hectare (tCO2/ha)						
Source of data or	The emission factors used in this analysis are based on the						
measurement/calculation methods and procedures to be applied (e.g. field	computation of in Indonesia for	of various or the dev	; parame /elopme	eters com nt of Indo	piled froi onesia 2 ⁿ	m various stu ^d FREL.	ıdies
measurements, remote sensing data,	Darameter	Moon	CE	Max	Min	Unit	
national data, official statistics, IPCC	Parameter	wean	SE	wax	IVIIN	Unit	
literature), including the spatial level of the data (local, regional, national,	Db	0.29	0.12	0.51	0.12	m	
international)	BD	0.12	0.01	0.17	0.09	t m ⁻³	
	Cf	0.82	0.02	0.89	0.72		
	G _{ef} CO ₂	1673	38.6	1831	1564	g/kg CO₂	
	G _{ef} CH ₄	11.8	1.99	20.8	7.4	g/kg CH₄	
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed values as	s long as	no new	better da	ta availat	ble	
Quality Assurance/Quality Control	QA/QC proced	lures will	include	:			
procedures to be applied:	 Peer revi under co 	ew proce ordinatic	ess by th on of Mo	e nationa EF	l MRV te	am of expert	S
Identification of sources of uncertainty for	- Sampling	g design (number	of sample	es, repres	sentation of	peat
this parameter following approaches from	soil types	s and ext	reme yea	ars)			
guidelines.	 measurement methods (laboratory analysis, data collection etc.) 						
	- Burned peat depth measurement						
Process for managing and reducing uncertainty associated with this	 Increase number of measurements representing all peat soil types and burned depth. 			soil			
parameter	- Compile measurement results from existing studies						

Data:	Emission factor for biomass burning
Description:	The emission factors (<i>EF</i>) for biomass were derived from the computation of various parameters including dry matters and emission factors (<i>gEF</i>) for various gases
Data unit:	Ton CO2 per hectare (tCO2/ha)
Source of data or measurement/calculation methods and procedures to be applied (e.g. field measurements, remote sensing data, national data, official statistics, IPCC Guidelines, commercial and scientific literature), including the spatial level of the data (local, regional, national, international)	The emission factors used in this analysis are derived from various sources, including the NFI data for AGB and a studies in South Sumatra for DOM, which are computed to generate the dry matter that potentially burned. The fire emission factors of each gas were derived from IPCC default values.
Fixed value or monitored? If monitored, frequency of monitoring/recording:	Fixed values as long as no new better data available
Quality Assurance/Quality Control procedures to be applied:	 QA/QC procedures will include: Peer review process by the national MRV team of experts under coordination of MoEF
Identification of sources of uncertainty for this parameter following approaches from the most recent IPCC guidance and guidelines.	 Sampling design (number of samples, representation of peat soil types and extreme years) measurement methods (laboratory analysis, data collection etc.)
Process for managing and reducing uncertainty associated with this parameter	 Conduct studies on biomass burning emission factors for CO2 and non CO2 gases

Annex 11: Reversal Risk assessment tool for determination of Reversal Risk Set-Aside Percentage (ISFL Buffer Requirements, Version Agust 2022)

Risk factors	Examples of risk indicators	Level or risk	Reversal Set- Aside Percentage
A. Lack of long-term effectiveness in addressing the key drivers of AFOLU Emissions and Removals	 Lack of broad and sustained stakeholder support (indicated by for example lack of awareness of the program) Significant occurrences of conflicts over land and resources in the Program Area Lack of institutional capacities and/or ineffective vertical/cross sectoral coordination, indicated by for example a weak track record of cross- sectoral cooperation and key institutions working together within a landscape approach Lack of long-term incentives beyond climate finance to decouple deforestation and degradation from increases in agricultural production and other economic activities Lack of relevant legal and regulatory environment conducive to addressing key drivers of AFOLU Emissions and Removals or lack of progress in the implementation of that policy and legal framework 	Reversal Risk is considered high for all eligible subcategories; OR Reversal Risk is considered high for some eligible subcategories and or medium /low for others; OR Reversal Risk is considered low for all eligible subcategories	2%

Table A11- 1. Reversal Risk assessment tool

Risk factors	Examples of risk indicators	Level or risk	Reversal Set- Aside Percentage	
B. Exposure and vulnerability to natural disturbances	 Is the ISFL ER Program Area vulnerable to fire, storms, droughts, etc.? Are there capacities and experiences in effectively responding to natural disturbances or mitigating their impacts? 	Reversal Risk is considered high for all eligible subcategories; OR Reversal Risk is considered high for some subcategories and or medium /low for others; OR Reversal Risk is considered low for all eligible subcategories	5%	
Actual Reversal Risk Se	Actual Reversal Risk Set-Aside Percentage = Result A + Result B= 8.6%			

Annex 12: Institutional Mapping in Jambi

Ongoing partner activities in Jambi

Jambi has developed and facilitated a number of natural resource management community projects, including facilitation of indigenous people supported by CSOs and private sectors. The Government of Jambi Province confirmed that at least 7 CSOs⁷⁴ are actively implementing over 33 projects that are directly complementary to the objectives of the JERP. Some activities are closely related to addressing REDD+ issues in Jambi (Table 20). For example, Mitra Aksi Jambi (Jambi Action Partners) have facilitated 8 villages to increase carbon stocks through a community-based tree joint venture model in Kerinci District. The other example is KKI WARSI that has successfully facilitated the community to manage the landscape of the ecosystem of Bukit Panjang Rantau Bayur (BUJANG RABA) by protecting the area for conservation of endangered primary Sumatera Bukit Barisan's Forest⁷⁵. The project involves 5 indigenous communities in protecting tropical mountainous forests. Since 2016, 934 households have protected 5,339 hectares, verifiably preventing 227,460 tonnes of CO₂e emissions⁷⁶ The five communities have received benefits as incentives from environmental services (under Plan Vivo scheme). According to Bujang Raba Project Annual Report 2020 by KKI WARSI, the project requested for the issuance of 40,000 tonCO2e with the period of Reporting Period both from 2018 (1 Jan – 31 December 2018) and 2019 (1 Jan – 31 December 2019).

CSO	Summarized Objectives of CSOs Projects	CSOs activities link to addressing REDD+ issues in Jambi
Perkumpulan Alam Hijau (A-Hi)	 Forest and peatland restoration and management in National Park of Bukit Tigapuluh. Monitoring Illegal logging in National Park of Kerinci Seblat Monitoring illegal land clearing in Kerinci and Sarolangin District Capacity building for farmers on oil palm plantation in Buffer of National Park Berbak Facilitation of Social Forestry in the buffer area of Kerinci Seblat National Park 	 Combating illegal logging Peatland restoration Forest restoration Conservation Sustainable Livelihoods

Table A12-1. List of CSOs operating in Jambi and their activities related to addressing REDD+ issues

⁷⁴<u>https://docs.google.com/document/d/1B3vBpm6UGfxnviFXXGzgHJLrHoouizZn?rtpof=true&authuser=stepibuy%40gmail.com</u> <u>&usp=drive_fs</u>

⁷⁵https://drive.google.com/open?id=1Ar3EJs6vvmgVEukH-hZbvscgKhkKbSo3&authuser=stepibuy%40gmail.com&usp=drive_fs

⁷⁶Community Carbon - The Village Forest of Bujang Raba - YouTube

CSO	Summarized Objectives of CSOs Projects	CSOs activities link to
		addressing REDD+ issues in
Mitra Aksi Jambi Foundation (JI. Jambi-Muara Bulian Km 21 No. 45 RT 09 Kel. Pijoan Jambi Outside Jambi City.E-mail :mitraksi@gmail. com.) Website :www.mitraaksi. org Chairman: Hambali	 Community-based GHG emission reduction program in 8 villages Kerinci District Utilization of Landfill Liquid Waste to Support Environmentally Friendly Agriculture in Tanjung Jabung Barat District Peatland water management and restoration in Muaro Jambi District Sustainable Agriculture Learning Center Capacity Building on SME in Harapan Forest Ecosystem Restoration (private sector) Climate Smart Agriculture Facilitation in 6 villages in Kerinci District Village Land Use Planning Facilitation in Jangkat Highlands 	 Enhance Carbon stocks Peatland Restoration Landscape Restoration Sustainable Livelihoods
Pundi Sumatera/ Sumatra Fund (JI. Jendral A Thablib Rt. 26 Simpang IV Sipin Village, Telanaipura District, Jambi City) Chairman : Dewi Yunita Widiarti, SP	 Stakeholder capacity for Suku Anak Dalam (SAD/Indigenous people) and social inclusion Empowerment of Indigenous people Facilitating and TFCA Central Region Program Phase III (2022 – 2024) 	 Capacity Building and Empowement of Indigenous People
Setara Jambi (Villa Bukit Mayang Komplek Kehutanan Blok F No 13 Kel. Mayang Mengurai Kec. Alam Barajo) +62 741 5911449	 Empowerment of farmer groups and women, village government to achieve SDGs in Muara Jambi District Empowerment of independent smallholders to promote sustainable oil palm farming in Tebo District Capacity Building for small holders of oil palm plantation to meet RSPO-ISPO standards in Tebo, Tanjung Jabung Barat, and Sarolangun Districts) Regenerative agriculture and river conservation for sustainable independent smallholders in Tanjung Jabung Barat District 	 Capacity Building and Empowerment of vulnerable/marginalized groups Landscape restoration Avoided deforestation Sustainable Livelihoods

CSO	Summarized Objectives of CSOs Projects	CSOs activities link to
		addressing REDD+ issues in
		Jambi
Walestra (Wahana Pelestarian Alam dan Advokasi Sumatra/Conserv ation of Nature and Advocacy for Sumatran Forests)	 Community based Management in Kerinci – Seblat National Park and Development of Sustainable Community Enterprises in Non-Timber Forest Products Biodiversity Conservation in Priority Sumatran Landscapes project Community-Based Forest Conservation and Climate Change Mitigation of the Kerinci Seblat Landscape Community-Based Forest Conservation and Climate Change Mitigation Community Based Forest Management in Sarolangun and Kerinci Regencies 	 Sustainable Livelihoods Biodiversity Conservation Forest restoration Wildlife Protection
WALHI (The	 Community Empowerment through litigation 	 Capacity Building and
Indonesian	• Acceleration of Recognition of People's Rights on	Empowerment of
Forum for Environment)	Lands Community Empowerment to maintain their rights in	vulnerable/marginalized
Linvironmenty	forested areas	groups
KKI WARSI	 Strengthening of Timber Legality Verification System (SVLK) Implementation models at the Micro Scale in Jambi Province Low Carbon Emissions Development Program in Forests and Peatlands in the Jambi Region Industrial Plantation Forest Advocacy in Jambi Province Protection and Empowerment of the Orang Rimba and Talang Mamak in Forest Areas and Corporate Concessions Improve the quality of life of SAM communities by protecting their resources and facilitating health, education and empowerment programs from the government. Bukit Tigapuluh Protection Forum Concessionaire collaborative management maintains remaining forest cover, strengthening support for bidoiversity conservation in Kerinci Seblat Landscape Improvement of Community Based Forest Management and Livelihoods in Jambi and West Sumatra 	 Combating illegal logging Capacity Building and Empowerment of vulnerable/marginalized groups Sustainable Livelihoods Biodiversity Conservation Forest protection and restoration Landscape restoration
TOTAL	33 project activities	

There are two existing Ecosystem Restoration Licenses in Jambi, namely PT. REKI (Forest Hope/Hutan Harapan) founded by Burung Indonesia, Birdlife International and the Royal Society for the Protection of Birds), and PT Alam Bukit Tigapuluh, a joint activity of WWF, Frankfurt Zoological Society (FZS) and The Orangutan Project (TOP). The licenses operated by private companies are aimed to restore the biological elements (flora and fauna) and non-biological elements (soil, climate, and topography) in an area to the original species, so the biological balance and its ecosystem can be achieved (MoF's decree No. SK.159/Menhut-II/2004).

Annex 13: Key Coordination Meetings

No.	Related Institution/ Agency	Results of Coordination	Date & Time
1	Jambi's Bappeda	Policy: Preparation Project Arrangements	Mid May 2019
2	Jambi Forest Service (Dishut)	Policy: Preparation Project Arrangements; Secretariat of the Project's Office	Mid May 2019
3	Jambi Environmental Service (DLH)	How to proceed with safeguard preparation for BioCF- ISFL for Jambi, in which it was agreed that Provincial Environmental Services of Jambi will be responsible to host the safeguard business for BioCF-ISFL.	June 17 2019
4	Jambi Environmental Service (DLH)	Coordination in the formation of Safeguard and FPIC teams in Jambi including roles and responsibilities as well as draft workplans	October 11 2019
5	Ministry of Finance	The need for Policy and Regulation support on Benefit Sharing Plan (BSP)	May 2019
6	Jambi's Bappeda	Discussion on alternatives BSP	October 2019
7	The Ministry of Finance	Further discussion at Meeting of Pre Investment Grants Proposal for Biocarbon Fund Initiative Forest Landscape	September 24 2020, Santika Hotel Jakarta
8	Jambi Provincial Secretary (Sekda)	Discussion on the progress of the project particularly On-granting mechanism, i.e. Guidelines for Grant Forwarding	February 18-19 2021
9	All JERP IAs and PPIUs	GOI and WB Joint Implementation Mission BioCFplus ISFL's Jambi Sustainable Landscape Management Project (JSLMP): Agreed on the current progress and ways forward	May 3-7 2021
10	Jambi Environmental Service (DLH)	Progress of FPIC Implementation related to closing date of BioCF-ISFL project preparation	August 9 2021
11	Jambi's Provincial Government	High Level Meeting on Benefit Sharing Plan attended by Vice Governor of Jambi and Director General of Climate Change	December 10 2021

Table A13-1. Key Coordination Meeting	gs
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Annex 14: Stakeholder Consultation Process

NO	DATE &	ACTIVITY	NUME PARTIC	BER OF
	LOCATION		Male	Female
		NATIONAL LEVEL		
1	June, 13 ,2019 Jakarta	FGD on National concept and Implementation Mechanism for BSM of Emission Reduction Participants : Ministries (Home Affairs, Finance, Environment and Forestry /Directorate Mobilization), Universities (Research Center of University of Indonesia, Faculty of Forestry of Bogor Agricultural University/IPB, Institutions / donors(GIZ, USAid, UKAid, AUSAid)	25	7
2	June 14-15, 2019, Bogor	FGD Developing the monitoring and tracking systems on landscape emission. Participants: Directorate General Climate Change (Directorate Mitigation, GHG Inventory), Provincial Services, FMU (KPH, Tahura). National Park, Universities (University of Jambi, University of Lampung, Bogor Agricultural University), NGOs, ICs	24	9
3	August , 9, 2019, Bogor	FGD on Design of Benefit Sharing Mechanism for BioCF ISFL Participants : Ministries (Home Affairs, Finance, Village and Transmigration, Environment and Forestry), Universities (Research Center of University of Indonesia, Faculty of Forestry of Bogor Agricultural University/IPB, Institutions / donors(GIZ, USAid, UKAid, AUSAid, CIFOR< ICRAF), ICs, FIP Consultant	38	13
4	August, 13, 2019, Bogor	FGD on Data Analysis and Information for BSM of Emission Reduction Participants : Directorate General Climate Change (Directorate Mobilization), Provincial Services, FMU (KPH).,Universities (University of Jambi), ICs, NGOs	18	8
5	November, 7, 2019, Bogor	FGD on Data Analysis and Information for BSM of Emission Reduction Participants : Directorate General Climate Change (Directorate Mobilization), Provincial Services, FMU (KPH), Universities, ICs, NGOs	21	7
6	November, 8, 2019, Bogor	FGD on Private sector collaboration on reducing emissions in Jambi Provinces Participant: Forestry and Plantation Companies Non- Governmental Organization, LSM, Directorate General of Climate Change Control - Ministry of Environment and Forestry, Jambi Province Bappeda, Jambi Province Forestry Service, Jambi	56	38

Table A14- 1. Stakeholder Consultation Process

NO	DATE & ACTIVITY		NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Province Plantation Service, Jambi Province Agriculture Service, Jambi Provincial Research and Development Agency		
7	November, 25, 2019, Jakarta	FGD on Consultation on final draft BSM of Emission Reduction with Jambi Stakeholders Participants : Directorate General of Climate Change Control - Ministry of Environment and Forestry, Jambi Province Bappeda, Jambi Province Forestry Service, Jambi Province Plantation Service, Jambi Province Agriculture Service, Regional Financial Agency, KPH-KPH in Jambi Province, Jambi University, Forestry and Plantation Companies Non-Governmental Organization	23	9
8	November, 26, 2019, Jakarta	FGD on Private sector collaboration on reducing emissions in Jambi Provinces Participant: Forestry and Plantation Companies Non- Governmental Organization, LSM, Directorate General of Climate Change Control - Ministry of Environment and Forestry, Jambi Province Bappeda, Jambi Province Forestry Service, Jambi Province Plantation Service, Jambi Province Agriculture Service, Jambi Provincial Research and Development Agency	86	47
9	November, 27, 2019, Bogor	FGD on Consultation on final draft BSM of Emission Reduction with other relevant Ministries Participants : Directorate General of Climate Change Control - Ministry of Environment and Forestry, investment management system Directorate – Ministry of Finance, Regional Budget Directorate – Ministry of Internal Affairs	14	7
10	November, 28, 2019, Bogor	FGD on Consultation on final draft BSM of Emission Reduction with Expert/ Researcher Participants : Directorate General of Climate Change Control - Ministry of Environment and Forestry, Social Economic Forest Policy and Climate Channge Center, UI Researcher	17	8
11	September 24 2020, Jakarta	Further Meeting on Pre Investment Grants Proposal for Biocarbon Fund Initiative Forest Landscape Participants : The Ministry of Finance's Director of Loans and Grants, director of state treasury management, director of special transfer funds, head of the planning bureau, head of the bureau of foreign cooperation, secretary of the directorate general of climate change control, Secretary of the Directorate General of Regional Secretary, the director of the greenhouse gas inventory, World Bank	26	14

NO	DATE &	ACTIVITY	NUME PARTIC	ER OF
	LOCATION		Male	Female
12	October 15 2020, Jakarta	Meeting to discuss the procurement of goods at the climate change mitigation directorate from the ISFL BioCF grant area Participants : Setditjen PPI, Head of sub BPO, Head of REDD+ Governance, Head of REDD Monitoring and Evaluation, Eko Nugroho, REDD+ Staff, Sofyan, Julius Rafles, Doso Sriraharjo, Hery Purnomo, Suyitno, Faisal Dahlan	11	8
13	November 17 2020, Jakarta	Jambi Province BSM Concept Refinement Workshop: Strengthening the Technical Aspects of Benefit Distribution to Central Government Institutions. Participants : Sekditjen PPI, Director of Fund Collection and Development - Environmental Fund Management Agency Hidup (BPDLH), Director of Conservation Area, Directorate General of KSDAE, Director of IGRK and MPV, Director of MPI, Director of MS2R, Head of the Center for PPI KHL Sumatra Region; the ICs	12	9
14	November 19 2020, Jakarta	 2nd Discussion on Preparation for the Implementation of BioCF- ISFL FPIC Pre Investment (Focus on Methodology and Design) Participants : Secretary of the Directorate General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub- Directorate for REDD, Head of B PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team,, UPTD KPHP and Tahura in Jambi, Balai KSDAE Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, UnJa (Faculty of Forestry), NGOs, WB, ICs. 	25	19
15	November 24 2020, Jakarta	Further Discussion of MAR Jambi Province: Preparation of Standard Operating Procedures (SOP) for MAR System Institutional within the framework of the BioCF-ISFL Program Jambi Province Pre-Investment Phase Participants : Offline: Secretary of the Directorate General of PPI, Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of IPSDH, Directorate General of PKTL, Head of BPPI KHL Region Sumatra.	29	16

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		On line: Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team MAR Jambi, UnJa (Faculty of Forestry), Secretary of PSDH, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, WB, ICs.		
16	November 26 2020, Bogor	 3rd Discussion on Finalization of Preparation for FPIC Pre Investment Implementation of BioCF-ISFL Jambi Participants : Offline: Secretary of the Directorate General of PPI, Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of KK, PI staff (Head of Sub-Directorate, Kasi, staff), ICs. On line: Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Head of the SNPMU Jambi Team, Head of the Sumatra Region KHL PPI Hall; Jambi Safeguard Team, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, UnJa (Faculty of Forestry), NGOs (Sekber PSDH, etc.), WB, ICs. 	43	19
17	December 1 2020 (Online)	Discussion on the preparation for the implementation of FPIC Participants : Online: Sekditjen PPI, Direktur MPI, Direktur IGRK dan MPV, Direktur MS2R, Kasubdit REDD, Kepala Balai PPI KHL Region Sumatra, Kasi lingkup Subdit REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Ketua Tim SNPMU BioCF ISFL, Tim Safeguard Jambi, , UPTD KPHP dan Tahura Lingkup Prov. Jambi, Balai KSDAE Prov. Jambi, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, UnJa (Fakultas Kehutanan), NGOs, WB, ICs.	27	16
18	December 22 2020, Jakarta	Discussion on the preparation for the implementation of FPIC Participants : Offline:	23	11

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Secretary of the Directorate General of PPI, Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of KK, PI staff (Head of Sub-Directorate, Kasi, staff), ICs. On line: Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Head of the SNPMU Jambi Team, Head of the Sumatra Region KHL PPI Hall; Jambi Safeguard Team, UnJa (Faculty of Forestry), Secretary of PSDH, ICs		
19	December 23 2020, Jakarta	Further Discussion on Standard Operating Procedures (SOP) and MAR System Implementation Guidelines to Support BioCF-ISFL Implementation in Jambi Province Participants : On line: Director of IGRK and MPV, Director of MPI, Director of IPSDH Directorate General of PKTL, Head of BPPI KHL Region Sumatra Staff of the Directorate General of PPI (Kasubdit, Kasi, staff); Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team MAR Jambi, UnJa (Faculty of Forestry), Secretary of the PSDH, YLBHI, ICS	26	13
20	March 3 2021, Bogor	 Follow-up Meeting on FPIC Preparation and Draft PKS and SPKS BioCF ISFL Preparation Activities Participant : Offline : Director of special transfer fund ministry of finance, Secretary of Directorate General Climate Change, Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Head of Sub REDD+ Directorate, Head of REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs. Online : Forestry Services of Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Safeguard, Head of MAR 	24	9
21	04 March 2021	Coordination of the implementation of the MAR Pre-Investment BIOCF ISFL system development activities Participants:	19	4

NO	DATE &	DATE & ACTIVITY		ER OF
	LOCATION		Male	Female
		Directorate of IGRK and MPV, Directorate of MPI, Directorate of IPSDH Directorate General of PKTL, BPPI KHL Sumatra Region, Bappeda Jambi Province, Plantation Services Jambi Province (Disbun), NGOs, ICs		
22	March 12 2021, Bogor	Coordination of Budget Revision Procedures For BIOCF-ISFL Pre- Investment Activities Participant : Offline : Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of KK, PI staff (Head of Sub-Directorate, Kasi, staff), ICs. Online : Sekditjen PPI, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, ICs	18	10
23	March 16 2021, Bogor	Coordination of the implementation of the uncertainty analysis discussion and the QA/QC process in the GHG Inventory (Series 1) Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Land-Based Registry, Head of Sub- Directorate of PSDH Director of IPSDH, Technical Team of MAR Jambi, Dr. Ir. Teddy Rusolono	14	9
24	24 March 2021	Coordination of Preparation for Implementation of Uncertainty Analysis Activities Changes in Land Closure and the QA / QC Process in GHG Inventory within the Framework of the Jambi Province BIOCF ISFL program series 2 Participants: Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, Head of Sub-Directorate IPSDH, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), Subarno (Data, System, and GHG Analyst), and staff from the DGCC, Staff of Balai PPIKHL Sumatera region, Jambi Province Carbon Calculation/MAR Technical Team, staf of P3SEKPI	14	9
25	30 March - 1 April 2021	Uncertainty Analysis and QA / QC in GHG Inventory within the framework of the BIOCF-ISFL, Jambi Province series 3 program Participants: Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for	18	13

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS		
	LOCATION		Male	Female	
		Mitigation Action and Registry of Land-Based Sectors, Head of Sub-Directorate IPSDH, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), Subarno (Data, System, and GHG Analyst), and staff from the DGCC, Staff of Balai PPIKHL Sumatera region, Jambi Province Carbon Calculation/MAR Technical Team, staf of P3SEKPI			
26	April 9 2021, Serpong	Workshop on the Procurement of Goods and Services for the ISFL BioCF Program Participant: Offline : Director of IGRK and MPV, Director of MPI, Director of MS2R, PI staff (Head of Sub-Directorate, Kasi, staff), ICs. Online : Sekditjen PPI, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, ICs	19	9	
27	12 April 2021, Jambi	Coordination of finalization of the preparation of MAR's institutional SOP in the BIOCF-ISFL program framework Participants: Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, MAR Jambi Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), Rina Wulandari (Forestry Specialist) and staff from the Directorate General of PPI, Jambi Province Carbon Calculation/MAR Technical Team, P3SEKPI staff	13	8	
28	12-14 April 2021, Bogor	Uncertainty Analysis and QA / QC IGRK BIOCF-ISFL series 4 program Participants: Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of REDD+, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, Head of Sub-Directorate IPSDH, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), Subarno (Data, System, and GHG Analyst), and staff from the DGCC, Staff of Balai PPIKHL Sumatera region, ambi Province Carbon Calculation/MAR Technical Team	13	5	
29	15 April 2021, Jakarta	Finalized MAR System Institutional Standart Operational Procedure Participants:	13	7	

NO	DATE &	DATE & ACTIVITY		BER OF IPANTS
	LOCATION		Male	Female
		Director of IGRK MPV Head of Sub-Directorate of IGRK for Land- Based Sector, Dr. Ir. Teddy Rusolono (IPB), Dr. Arief Darmawan (Unila), dan staff of the government of jambi province, staff of Balai PPIKHL Sumatera region, staf of DGCC, Jambi Province Carbon Calculation/MAR Technical Team, P3SEKPI staff.		
30	April 19 2021, Jakarta	C-Stock Data Measurement Coordination Workshop Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of REDD+, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, MAR Jambi Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), Rina Wulandari (Forestry Specialist) and staff from the Directorate General of PPI, Jambi Province Carbon Calculation/MAR Technical Team, P3SEKPI staff.	14	7
31	April 21-23 2021, Bogor	Uncertainty Analysis and QA / QC IGRK BIOCF-ISFL series 5 program Participants: Director of IGRK MPV, Head of Sub-Directorate for Land Based Sector IGRK, MAR Jambi Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri Ph.D. (MRV Specialist), Head of Sub- Directorate PSDH Directorate of IPSDH, staff of Directorate General of PPI and staff of the Directorate of IPSDH.	2	8
32	April 27 2021, Jakarta	Carbon Measurement Methodology Workshop Participant : Director of IGRK MPV, Head of Sub-Directorate for Land Based Sector IGRK, MAR Jambi Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri Ph.D. (MRV Specialist), Rina Wulandari (Forestry Specialist), Judin Purwanto (Directorate of IPSDH), Nurul Silva Lestari (P3SEKPI), P3SEKPI staff, PPI KHL Sumatra Regional staff, staff scope Directorate General of PPI and staff of the Directorate of IPSDH.	6	6
33	28-30 April 2021	Uncertainty Analysis and QA / QC IGRK BIOCF-ISFL series 6 Participants: Offline Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, Dr. Ir. Teddy Rusolono (IPB), and staff from the DGCC Online:	14	9

NO	DATE &	DATE & ACTIVITY		ER OF IPANTS
	LOCATION		Male	Female
		Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate IPSDH, Solihin Manuri (MRV Specialist), Subarno (Data, System, and GHG Analyst), , Staff of Balai PPIKHL Sumatera region, Jambi Province Carbon Calculation/ MAR Technical Team, staf of P3SEKPI		
34	April 29-30 2021, Bogor	Jambi Province Carbon Stock and Emission Factor Measurement Data Compilation Participant : Director of IGRK MPV, Head of Sub-Directorate for IGRK of Land- Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, Head of Sub- Directorate of PSDH Director of IPSDH, Technical Team of MAR Jambi, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri (MRV Specialist), Subarno (Data, System, and GHG Analyst), staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of 35the PPI KHL Center for Sumatra Region, and staff of P3SEKPI.	24	11
35	May 3-7 2021, Jakarta	The Government of Indonesia and The World Bank Joint Implementation Mission BioCarbon Fund Plus Initiative for Sustainable Forest Landscapes (BioCFplus ISFL) Jambi Sustainable Landscape Management Project (JSLMP) Participants : Offline : DLH Prov. Jambi, Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of KK, PI staff (Head of Sub-Directorate, Kasi, staff), National Park, ICs. Online : Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, WB, ICs	24	12
36	6-8 May 2021	Uncertainty Analysis and QA / QC IGRK BIOCF-ISFL series 7 program Participants: Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK for Land-Based Sector, Head of Sub-Directorate of MPV for Mitigation Action and Registry of Land-Based Sectors, Head of Sub-Directorate IPSDH, kehutanan, Kasi IGRK sektor pertanian, Kasi MPV dan Registri sector Kehutanan, Dr. Ir. Teddy Rusolono (IPB), Solihin Manuri (MRV Specialist), staff from the DGCC, staf IPSDH, Staff of Balai PPIKHL Sumatera region, Jambi Province Carbon Calculation/MAR Technical Team, staf of P3SEKPI	14	6
37	May 20-22 2021, Bogor	Implementation of Uncertainty analysis of changes in national forest and land cover and the QC process from the results of the	10	8

NO	DATE &	ACTIVITY	NUME PARTIC	BER OF
	LOCATION		Male	Female
		Jambi Province land cover assessment (Series 8) in the Pre- Investment phase Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK Land-Based Sector Director of IGRK MPV, Head of Sub- Directorate of MPV for Mitigation Action and Registry for Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of PSDH Dir IPSDH, Head of IGRK for the forestry sector, Head of IGRK for the agricultural sector, Head of MPV and Registry for the Forestry sector , Jambi MAR Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri (MRV Specialist), staff of the MPI directorate, staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope.		
38	May 27-29 2021, Bogor	Implementation of Uncertainty analysis of changes in national forest and land cover and the QC process as a result of the Jambi Province land cover assessment (Series 9) in the Pre-Investment phase Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK Land-Based Sector Director of IGRK MPV, Head of Sub- Directorate of MPV for Mitigation Action and Registry for Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of PSDH Dir IPSDH, Head of IGRK MPV, Head of Sub-Directorate of IGRK for the agricultural sector, Head of MPV and Registry for the Forestry sector , Jambi MAR Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri (MRV Specialist), staff of the MPI directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope.	12	8
39	May 28 2021, Serpong	Follow-up Meeting Joint Implementation Mission Biocarbon Fund Plus Initiative for Sustainable Forest landscape (BIOCF ISFL) Jambi Sustainable Landscape Management Project (JSLMP) Participants : Offline : Director of IGRK and MPV, Director of MPI, Director of MS2R, Director of KK, PI staff (Head of Sub-Directorate, Kasi, staff), ICs. Online : Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN	22	10

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
_	LOCATION		Male	Female
		Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, ICs		
40	June 07-09 2021, Bogor	Implementation of Uncertainty analysis of changes in national forest and land cover as well as the QC process from the results of the Jambi Province land cover assessment (Series 10) in the Pre- Investment phase Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK Land-Based Sector Director of IGRK MPV, Head of Sub- Directorate of MPV for Mitigation Action and Registry for Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of PSDH Dir IPSDH, Head of IGRK for the forestry sector, Head of IGRK for the agricultural sector, Head of MPV and Registry for the Forestry sector , Jambi MAR Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri, Ph.D. (MRV Specialist), staff of the MPI directorate, staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope	12	10
41	June 15-17 2021, Bogor	Implementation of Uncertainty analysis of changes in national forest and land cover and the QC process as a result of the Jambi Province land cover assessment (Series 11) in the Pre-Investment phase Participant : Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK Land-Based Sector Director of IGRK MPV, Head of Sub- Directorate of MPV for Mitigation Action and Registry for Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of PSDH Dir IPSDH, Head of IGRK for the forestry sector, Head of IGRK for the agricultural sector, Head of MPV and Registry for the Forestry sector , Jambi MAR Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri, Ph.D. (MRV Specialist), staff of the MPI directorate, staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope	10	4
42	21 June 2021, Jakarta	Meeting Reconfirmation of Funds Withdrawal Plans and Preparation of Annual Work Plan (AWP) Documents for JSLMP BioCF-ISFL Grants Participant : Director of MPI, Kasubdit REDD +, Head of Sub-Directorate for REDD +,Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda	23	10

NO DATE &		ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, Sekditjen PPI, Director of IGRK and MPV, Director of MS2R		
43	June 21-23 2021, Bogor	Implementation of Uncertainty analysis of changes in national forest and land cover and the QC process as a result of the Jambi Province land cover assessment (Series 12) in the Pre-Investment phase Participant (Online & offline) Director of IGRK MPV, Director of IPSDH, Head of Sub-Directorate of IGRK Land-Based Sector Director of IGRK MPV, Head of Sub- Directorate of MPV for Mitigation Action and Registry for Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of PSDH Dir IPSDH, Head of IGRK for the forestry sector, Head of IGRK for the agricultural sector, Head of MPV and Registry for the Forestry sector , Jambi MAR Technical Team, Dr. Ir. Teddy Rusolono (IPB), Solichin Manuri, Ph.D. (MRV Specialist), staff of the MPI directorate, staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope	5 (offline)	4 (offline)
44	June 23-24 2021, Bogor	Compilation of Carbon Stock Data and GHG Accounting Results Participant : Director of IGRK MPV, Head of Sub-Directorate of IGRK Land- Based Sector Director of IGRK MPV, Head of Sub-Directorate of MPV for Mitigation Action and Registry for Land-Based Sector Director of IGRK MPV, Head of Sub-Directorate Resource Mobilization, Head of BPDAS Batanghari, Jambi MAR Technical Team, staff of DG KSDAE, reps from National Park/ BKSDA, Dr. Ir. Teddy Rusolono (IPB), Dr. Eva Achmad (UnJa), Dr. Arief Darmawan (UNILA), Eri Indrawan (Deputy PC), Solichin Manuri, Ph.D. (MRV Specialist), staff of the MPI directorate, staff of the Directorate General of PPI, staff of the Directorate of IPSDH, staff of Balai PPI KHL Sumatra Region, and staff of P3SEKPI scope	36	17
45	July 2 2021 (Online)	Coordination of Carbon Stock Measurement Data with BPDASHL Batanghari and Forest Program II Participant (online): Kasubdit IGRK Sektor Berbasis Lahan, Kasi IGRK Sektor Kehutanan, Kepala Balai DASHL Batanghari, Forest Programme II, Konsultan FPII, Solichin Manuri (MRV Specialist), Teddy Rusolono (IPB), Rina Wulandari (Forestry Specialist, staf Direktorat IGRKMPV	10	6
46	July 16 2021 (Online)	Limited Coordination Meeting for Completion of BioCF-ISFL Program Benefit Sharing Plan Documents Online:	20	8

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Direktorat MS2R, Direktorat MPI, Direktur IGRK dan MPV, Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi		
47	Juli 23 2021, Jakarta	 Workshop on Pollution Prevention, Efficient Use of Resources, and Biodiversity Conservation in Jambi Province Emission Reduction Program Management Through BioCF-ISFL Participants (Online & offline) Sekditjen PPI, Direktur MPI, Direktur IGRK dan MPV, Direktur MS2R, Kasubdit REDD, Kepala Balai PPI KHL Region Sumatra, Kasi lingkup Subdit REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, Ketua Tim SNPMU BioCF ISFL, Tim Safeguard Jambi, Balai KSDAE Prov. Jambi, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, LSM, Related Company, ICs. 	47	15
48	Juli 30 2021 (Online)	Safeguard Workshop on Respect for Indigenous Peoples/Local Traditional Communities, Protection of Cultural Heritage and Stakeholder Involvement and Information Disclosure in the Safeguard Implementation Framework for the Jambi Sustainable Landscape Management Project (JERP) Participants : Online : Sekditjen PPI, Direktur MPI, Direktur IGRK dan MPV, Direktur MS2R, Kasubdit REDD, Kepala Balai PPI KHL Region Sumatra, Kasi lingkup Subdit REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, Ketua Tim SNPMU BioCF ISFL, Tim Safeguard Jambi, Balai KSDAE Prov. Jambi, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, LSM, Related Company, ICs.	51	13
49	August 6 2021 (Online)	Kick Off on Jambi ERPD Improvement Participants : Online : Kementerian Pertanian, Sekditjen PPI, Direktur MPI, Direktur IGRK dan MPV, Direktur MS2R, Kasubdit REDD, Kepala Balai PPI KHL Region Sumatra, Kasi lingkup Subdit REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, UPTD KPHP Tanjung Jabung Barat, Ketua Tim SNPMU BioCF ISFL, Tim Safeguard Jambi, Balai KSDAE	39	12

NO	DATE & ACTIVITY	NUMBER OF PARTICIPANTS		
	LOCATION	Prov. Jambi, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN	Male	Female
		Prov. Jambi, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, Universitas Jambi, ICs, NGOs.		
50	August 9 2021 (Online)	Progress of FPIC Implementation related to closing date of BioCF- ISFL project preparation Participants : Online: Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of PPI KHL Region Sumatra, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, World Bank, UNJA.	12	8
51	August 9 2021 (Online)	Discussion on the Follow-up of BioCF-ISFL Letter of Intent Participants : Secretariat General of PPI, Director of MPI, Bureau of KLN, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, World Bank, ICs.	9	4
52	August 12 2021 (Online)	Completion of Baseline and Design of GHG Emission Reduction Program Based on Jurisdiction of Jambi Province through BioCF- ISFL Participants (Online): Secretary General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of PPI KHL Region Sumatra, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, KSDAE Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, Related Companies, ICs.	32	16
53	August 16 2021 (Online)	further discussion on the implementation of FPIC Term II Participants (Online): Directorate of IGRK and MPV, Directorate of MS2R Climate Change Mitigation Directorate Team, Head of DLH Jambi Province, National Parks, BSDA, Jambi Province DLH Survey Team, Safeguards Team, ICs	27	14
54	August 19-21 2021, Bogor	Implementation of Uncertainty Analysis (Series 13) - QC Stage 2 Land Use and Forest cover data changes of National and Jambi Province in the Framework of the BIOCF-ISFL Program in the Pre- Investment Phase Participants:	19	9

NO	DATE & ACTIVITY		NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Direktorate of IGRKMPV, Direktorate of MPI, Direktorate of IPSDH, Technical Team MAR Jambi, Teddy Rusolono (Expert), IC MRV, staff of Directorate General PPI		
55	August 20 2021, Jakarta	Synergy Workshop among the Remaining Natural Forest Protection Programs by the Parties into the Design of the Jambi Province Jurisdiction-Based GHG Emission Reduction Program Through BioCF-ISFL Participant : Secretary General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of PPI KHL Region Sumatra, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, KSDAE Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, Related Companies, ICs.	38	19
56	August 25 2021, Bogor	Discussion on the Responsibility Cost of the Benefit Sharing Plan for the BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat MPI, BPDLH Online: Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi	25	14
57	August 25-27 2021, Bogor	Implementation of Uncertainty Analysis (Series 14) - QC Stage 2 changes in forest and Land Cover of National and Jambi Province data within the Framework of the BIOCF-ISFL Program in the Pre- Investment Phase	17	9
58	August 25 – 27 2021, Bogor	Technical Meeting for Emission Reduction Program Document for Jambi Province Jurisdiction Through BioCF-ISFL Participant : Secretary General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, SNPMU BioCF ISFL Team Leader, ICs.	32	15
59	September 3, 2021	Socialization of the Advance Draft Benefit Sharing Plan (BSP) for the BioCF-ISFL Program Offline:	27	12.

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Direktorat MS2R, Direktorat IGRK MPV, BPDLH ,Direktorat MPI, BPDLH Online: Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi		
60	September 7 2021, Bogor	Coordination Meeting on Budget Revision Procedures for the Biocarbon Fund Plus Initiative For Sustainable Forest Landscape (BioCF-ISFL) Jambi Sustainable Landscape Management Project (JSLMP) Grant Activities Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, SNPMU BioCF ISFL Team Leader, IC.	18	7
61	September 8-10 2021, Bogor	Implementation of Uncertainty Analysis (Series 15) - QC Stage 2 changes in forest and Land Cover of National Data and QA Preparation of Data changes in forest and Land Cover of Jambi Province in the Framework of the BIOCF-ISFL Program in the Pre- Investment Phase Participants: Direktorate of IGRKMPV, Direktorate of IPSDH, BPPI KHL Sumatera Region, Technical Team MAR Jambi, Teddy Rusolono (Expert), IC MRV, staff of directorate General PPI, SN PMU	16	8
62	9 September 2021 (Online)	Discussion on Labor and Working Conditions, Community Health and Safety and Land Acquisition, Restrictions on Land Use and Resettlement in the Implementation of the Jambi Sustainable Landscape Management Project Online Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of PPI KHL Region Sumatra, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, KSDAE Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, Related Companies, ICs.	43	19

NO	DATE &	ACTIVITY	NUME PARTIC	SER OF
	LOCATION		Male	Female
63	September 14- 16 2021, Bogor	Implementation of Uncertainty Analysis (Series 16) - QC Stage 2 Data Change of Forest and Land Cover National and Data Analysis of Changes for Forest and Land Cover in Jambi Province in the BIOCF - ISFL Program Framework Participants: Direktorate of IGRKMPV, Direktorate of IPSDH, BPPI KHL Sumatera Region, Technical Team MAR Jambi, Teddy Rusolono (Expert), ICs, staff of directorate General PPI, CCROM-SEAP IPB	16	7
64	September 16 2021, Bogor	Follow-up to the meeting on August 25 regarding the amount of the BPDLH fee for the Operational Cost of the BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat MPI, Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi Online: Direktorat IGRK MPV, BPDLH	12	8
65	September 17 2021, Serpong	Discussion on Development of Writing Project Implement Manual (PIM) Jambi Sustainable Landscape Management Project (BioCF- JSMLP) Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, SNPMU BioCF ISFL Team Leader, ICs.	13	6
66	October 1 2021, Bogor	Implementation of Uncertainty Analysis (Series 17) - Discussion of Uncertainty Analysis Documentation and QA Implementation Procedure Participants: Direktorate IGRK dan MPV, Direktorate MPI, Direktorate IPSDH, BPPI KHL Sumatera Region, IC MRV Specialist, Expert (Teddy Rusolono dan Gito Immanuel, Oktaviar R)	16	5
67	October 4 2021, Bogor	Discussion on the follow-up to the Benefit Sharing Plan (BSP) for the BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat MPI, Bappeda Prov. Jambi, Tim MAR Online: Direktorat MS2R, Direktorat IGRK MPV, BPDLH	22	16

NO	DATE & ACTIVITY	ACTIVITY	NUMBER OF PARTICIPANTS	
	LUCATION		Male	Female
68	October 13 2021, Jakarta	Implementation of Uncertainty Analysis (Series 18) - Documentation and Preparation for Implementation of Quality Assurance for calculating the accuracy and uncertainty of changes in forest and land cover within the framework of the Jambi Province BIOCF-ISFL program Participants: Direktorate IGRKMPV, Direktorate MPI, Direktorate IPSDH, Technical Team MAR Jambi, Expert (Teddy Rusolono, Gito Immanuel, Oktaviar R), IC MRV, Balai PPIKHL Region Sumatera	16	4
69	October 18 2021 (Online)	Technical Meeting in preparation for the implementation of Quality Assurance Participants: Direktorate IGRK dan MPV, Direktorate MPI, Direktorate IPSDH, BPPIKHL Region Sumatera, Pusfatja - LAPAN, BRIN, Bappeda Jambi Province, Environment Agency Jambi Province, Plantation Agency Jambi Province, Technical Team MAR Jambi, Jambi University, Lampung University, UGM, Diponegoro University, IC MRV Specialist, Expert, Puspics – UGM	21	11
70	October 21-22 2021, Yogyakarta	Implementation of Uncertainty Analysis (Series 19) - Quality Assurance for calculating the accuracy and uncertainty of changes in forest and land cover within the framework of the Jambi Province BIOCF-ISFL program Participants: Direktorate IGRK dan MPV, Direktorate IPSDH, IC MRV and Land Use Specialist, Expert NCS Data Analyst, Technical Team MAR Jambi, IT Consultant	39	17
71	October 21 2021, Bogor October 22 2021,	 SN-PMU Technical Team Training BSP Division (Benefit Sharing Plan) BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat MPI, Direktorat IGRK MPV, BPDLH Online: Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi Coordination Meeting for the Preparation of the Socialization of the Benefit Sharing Plan for the BioCF-ISFL Program: High-Level 	22 21	14
	Bogor	Meeting Offline: Direktorat MS2R, Direktorat MPI, BPDLH		

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Online: Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi, Tim Gubernur Jambi		
73	November 8 2021, Bogor	Coordination meeting on budget revision procedures for biocarbon fund grant activities plus the initiative for sustainable forest landscape (BioCF-ISFL) Jambi Sustainable Landscape Management Project (JSLMP) Participant : Secretariate General of PPI, Inspectorate general KLHK, Director of MPI, Directorate General of budget, Head of Sub-Directorate of REDD+, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, Head of SNPMU BioCF ISFL Team, ICs.	15	10
74	November 11 – 12 2021, Bogor	capacity building of environmental and social screening systems for emission reduction programs Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, KSDAE Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, ICs.	25	10
75	November 11- 12 2021, Bogor	Capacity building workshop for GHG Accounting (series 3) within the BIOCF-ISFL program framework, Jambi Province Participants: Direktorate IGRKMPV, Direktorate MPI, Direktorate IPSDH, Technical Team MAR Jambi, IC MRV Specialist, YLBHL, BPPI KHL Sumatera Region, Bappeda Jambi Province, Environmental Agency of Jambi Province, Forestry Agency of Jambi Province	16	8
76	November 15- 16 2021, Bogor	 Workshop and Further Training of the SN-PMU BSP Division (Benefit Sharing Plan) BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat IGRK MPV, Direktorat MPI, Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Tim Teknis SN-PMU Divisi BSP Online: 	21	12

NO	DATE &	DATE & ACTIVITY		BER OF
	LOCATION		Male	Female
		Direktorat MS2R, Direktorat MPI, Tim Teknis SN-PMU Divisi BSP, BPDLH, IC BioCF		
77	November 23- 24 2021, Bogor	Uncertainty Analysis seri 20 Discussion on the results of QA data on changes in forest and land cover in Jambi Province as well as documentation reports on the process of uncertainty analysis Participants: Direktorate IGRK dan MPV, Direktorate IPSDH, IC MRV and Land Use Specialist, Expert NCS Data Analyst, Technical Team MAR Jambi, IT Consultant	12	6
78	December 13 2021, Bogor	Uncertainty Analysis Seri 21 - Pembahasan hasil QA data perubahan penutupan hutan dan lahan Provinsi Jambi serta laporan dokumentasi proses kegiatan uncertainty analysis Participants: Direktorate IGRKMPV, Direktorate MPI, Direktorate IPSDH, Technical Team MAR Jambi, Expert (Teddy Rusolono, Gito Immanuel, Oktaviar R), IC MRV, BPPIKHL Sumatera Region	11	7
79	Desember 17 2021, Bogor	Discussion on the Development of Writing Project Implement Manual (PIM) Jambi Sustainable Landscape Management Project (JSLMP) – Result Based Payment Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, KSDAE Prov. Jambi, ICs.	18	7
80	December 27- 28 2021, Bogor	Uncertainty Analysis Seri 22 - Pengerjaan assessment sampel uncertainty data perubahan penutupan hutan dan lahan Provinsi Jambi menggunakan kelas perubahan IPCC Participants: Direktorate IGRKMPV, Direktorate MPI, Direktorate IPSDH, Technical Team MAR Jambi, Expert (Teddy Rusolono, Subarno, Rizaldi Boer), IC MRV, BPPIKHL Sumatera Region, SNPC, Bappeda of Jambi Province	20	8
81	Desember 28 2021, Serpong	Completion of Jambi Province Emission Reduction Program Document through BioCF-ISFL Participant: Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi,	17	5

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, KSDAE Prov. Jambi, ICs.		
82	April, 11-12 2022, Jambi	Join Implementation Mission the GOI and the World Bank Jambi /sustainable Landscape Management Project (JSLMP) Participan : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, KSDAE Prov. Jambi, ICs.	20	11
83	May 27, 2022, Bogor	Improving of Jambi Province Emission Reduction Program Document through BioCF-ISFL Participant: Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, KSDAE Prov. Jambi, ICs.	11	6
84	July 4-5, 2022, Jkt-Jambi	Technical Consultation with WB Seior Expert regarding ERPD Improvement Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, KSDAE Prov. Jambi, ICs.	21	7
85	March, 14, 2022, Jambi	Follow-up Meeting to Discuss BioCf-ISFL FPIC Preparation and Joint Mission Preparation Participants : Enviromental Directorate BAPPENAS, Directorate of Forestry And Water Resources Conservation, Ministry of Finance, Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Foreign Cooperation Bureau, Directorate General of Natural Resources and Ecosystem Conservation, National Parks (TNKS,TNBD,TNBT,TNBS), Jambi Province Natural Resources Conservation, Ministry of Agriculture, Jambi Province Bappeda, Jambi Province Environmental Service, Jambi Province Forestry Service, Jambi Province Plantation Service, Horticulture Food Crops and Livestock Service, KPHs in Jambi Province, Sub National Project Management Unit,World Bank Teams, Individual Consultant	25	20

	DATE &			ER OF
NO	LOCATION	ΑCTIVITY	Mala	IPANTS Fomalo
86	March, 24, 2022, Jambi	Emission Reduction Program Document Improvement Meeting Participants : Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate of Climate Change Resources Support), ISFL BioCF PMU Teams, Jambi Province Bappeda, Jambi Province Environmental Service, Jambi Province Forestry Service, Jambi Province Plantation Service, Horticulture Food Crops and Livestock Service, Sub National Project Management Unit,World Bank Teams, Individual Consultant	14	16
87	April, 5, 2022, Bogor	Emission Reduction Program Document Improvement Meeting Participants : Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Jambi Province Bappeda, Jambi Province Environmental Service, Jambi Province Forestry Service, Jambi Province Plantation Service, Horticulture Food Crops and Livestock Service, Sub National Project Management Unit,World Bank Teams, Individual Consultant	16	9
88	April, 12-14, 2022, Jambi	Joint Implementation Mission The Government of Indonesia and The World bank Jambi Sustainable Lanscape Management Project (JSLMP) Participants : Enviromental Directorate BAPPENAS, Directorate of Forestry And Water Resources Conservation, Ministry of Finance, Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Foreign Cooperation Bureau, Directorate General of Natural Resources and Ecosystem Conservation, National Parks (TNKS,TNBD,TNBT,TNBS), Jambi Province Natural Resources Conservation, Ministry of Agriculture, Jambi Province Bappeda, Jambi Province Environmental Service, Jambi Province Forestry Service, Jambi Province Plantation Service, Horticulture Food Crops and Livestock Service, KPHs in Jambi Province, Sub National Project Management Unit,World Bank Teams, Individual Consultant	26	24
89	May, 18-19, 2022, Jambi	Jambi Province ERPD Document Completion Follow-up Meeting Participations : Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Jambi Province Bappeda, Team Sub National Project Management Unit, World Bank Teams, Individual Consultant	14	16
90	May, 27, 2022, Bogor	Completion of the Jambi Province Emission Reduction Project Document through BioCF-ISFL; Follow-up on the results of the World Bank's Joint Mission Review	17	8

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION	OCATION		Female
		Participations : Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Jambi Provincial Government, Individual Consultant, World Bank Teams		
91	July, 4, 2022, Jakarta	Follow-up Meeting for the BIOCF-ISFL Program ERPD Discussion in Jakarta Participants : Ministry of Agriculture, Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization, Forest Resource Inventory and Monitoring), Individual Consultant, Expert Teams, World Bank Teams	15	10
92	July, 5, 2022, Jambi	BIOCF-ISFL Program ERPD Follow-up Meeting in Jambi Participants : Ministry of Agriculture, Directorate General Climate Change (Directorate Mitigation, GHG Inventory, Directorate Mobilization), Individual Consultant, Jambi Provincial Government , Jambi Province ERPD Contributor Team ,Jambi Province MAR Team, World Bank Teams	27	23
		SUB NATIONAL LEVEL (JAMBI PROVINCE)		
1	May, 8-9, 2019, Jambi	FGD on output of Preparation activites (PDO, MRV) Participants: Directorate General Climate Change (Directorate Mitigation, GHG Inventory), Provincial Services, FMU (KPH, Tahura). National Park, NGOs, ICs	39	10
2	May, 11-17, 2019, Jambi	Workshop on Joint Preparation BioCarbon Fund ISFL Participants: Ministry of Environment and Forestry (Directorate Mitigation, GHG Inventory, Mobilization, Forest Resource Inventory, Social and Economic Research of Forestry), Provincial Services, Agency Of MOEF in Province (BPDAS, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura). National Park, Academics of University of Jambi, NGOs, ICs	68	20
3	May, 23, 2019, Jambi	Workshop on Indentification of Developing Capacity for Calculating GHG Emission, REL and MRV System Participants : Ministry of Environment and Forestry (Directorate Mitigation, GHG Inventory) Universiites : (Lampung, Jambi, Bogor), Provincial Services, Agency Of MOEF in Province (BPDAS, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura), National Park, Forest Fire Task Force (Manggal Agni) NGO's, IC's	41	12
4	June 19-21, 2019, Jambi	FGD Land Tenure Conflict Resolution Participants : Ministry of Environment and Forestry (Directorate Mitigation), Provincial Services, Agency Of MOEF in Province (BPKH, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura), National Park, Concesion (Forest, Crop Estate), NGO's, District Conflict Resolution Task Force (Tim Terpadu Kabupaten Tebo, Sarolangun,	48	14

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION			Female
		Batanghari), University of Jambi, ICs, Joint Scretariat of Forest Resources of Jambi		
5	June 19-21, 2019, Jambi	FGD synchronize national policies and at the sub-national level in order to support the implementation of REDD Participants : Ministry of Environment and Forestry (Directorate Mitigation), Provincial Services, Agency Of MOEF in Province (BPKH, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura), National Park, University of Jambi, IC's, Joint Scretariat of Forest Resources of Jambi	34	11
6	June 21, 2019, Jambi	 FGD grant management mechanism and procedures for withdrawing grants to the regions Participants : Ministries (Bappenas, Finance, Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory), Provincial Services, Agency Of MOEF in Province (BPKH, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura), Berbak National Park, University of Jambi, ICs, Joint Scretariat of Forest Resources of Jambi 	20	12
7	June, 25, 2019, Aston Hotel, Jambi	Continued Workshop on Indentification of Developing Capacity for Calculating GHG Emission , REL and MRV System Participants : Ministry of Environment and Forestry (Directorate Mitigation, GHG Inventory, Forest Inventory) Universiites : (Lampung, Jambi, Bogor), Provincial Services, Agency Of MOEF in Province (BPDAS, BKSDA, BPHP, BPPIKL, FMU (KPH, Tahura), National Park, Forest Fire Task Force (Manggal Agni) NGOs, ICs	31	10
8	June, 26, 2019, Aston Hotel, Jambi	 FGD on Preparation of capacity building designs in the context of measuring the potential of forest carbon stocks Participants : Ministry of Environment and Forestry (Directorate Mitigation, GHG Inventory) Universiites : (Lampung, Jambi, Bogor), Provincial Forestry Service, Agency of MOEF in Province (BPDAS, BKSDA, BPPIKL), FMU (KPH, Tahura), National Park, NGOs, ICs 	18	6
9	July 2, 2019, Aston Hotel, Jambi	FGD BioCF ISFL Management Project Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory) Provincial Forestry Service, World Bank team, Joiint Secretariate for Forestry Resources of Jambi, ICs	16	4
10	July 3-4, 2019, Aston Hotel, Jambi	FGD on Forest and Land Cover Analysis for BioCF ISFL Participants : Ministry of Environment and Forestry (Directorate Mobilization, GHG Inventory, Social and Economic Research of Forestry) Provincial Forestry Service, FMU (KPH, Tahura), Forest	29	7

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS		
	LOCATION		Male	Female	
		Fire Task Force (Manggala Agni), National Park, NGOs, ICs, Technical Advisor of World Bank			
11	July 3-4, 2019, Aston Hotel, Jambi	FGD on Design of Benefit Sharing Mechanism for BioCF ISFL Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory) Provincial Forestry Service, FMU (KPH, Tahura), National Park, NGOs, ICs, Technical Advisor of World Bank	15	6	
12	July 3-5, 2019, Aston Hotel, Jambi	 FGD on the application of the tenure conflict resolution model by using a non-litigation approach in supporting the BioCF ISFL program Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory) Provincial Forestry Service, FMU (KPH, Tahura), National Park, NGOs, ICs 	29	4	
13	July 3-5, 2019, Aston Hotel, Jambi	FGD on Risk Management Team Work for BioCF ISFL Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation,) Provincial Forestry Service, FMU (KPH, Tahura), National Park, NGOs, ICs	29	7	
14	July 16-17, 2019, Bappeda, Jambi	FGD on Drafting of ERPD and PDO BioCF ISFL Program Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory) Provincial Forestry Service, FMU (KPH, Tahura), National Park, NGOs, ICs	28	10	
15	July 17-18, 2019, Jambi	FGD on GHG Reporting and Inventory for BioCF ISFL Participants : Ministry of Environment and Forestry (Directorate Mitigation, Mobilization, GHG Inventory) Provincial Services, FMU (KPH, Tahura), National Park, Agency of MOEF in Province (BPDAS, BKSDA, BPPIKL,Academics of University of Jambi, NGOs, ICs, Private companies, Private companies assosiation	16	5	
16	July 17-18, 2019, Jambi	 FGD on Safeguard and Other Issues Related to Social and Environmental Aspect Participants : Ministry of Environment and Forestry (Directorate Mitigation, Mobilization, GHG Inventory) Provincial Services, FMU (KPH, Tahura), National Park, Agency of MOEF in Province (BPDAS, BKSDA, BPPIKL, BPHP), Academics of University of Jambi, NGOs, ICs, Private companies, Private companies assosiation 	13	4	
17	July 17-18, 2019, Jambi	 FGD on Description on Feedback and Grievance of Redress Mechanism Participants : Ministry of Environment and Forestry (Directorate Mitigation, Mobilization, GHG Inventory) Provincial Services, FMU (KPH, Tahura), National Park, Agency of MOEF in Province 	15	7	
NO	DATE &	ACTIVITY	NUME PARTIC	NUMBER OF PARTICIPANTS	
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	LOCATION		Male	Female	
		(BPDAS, BKSDA, BPPIKL, BPHP), Academics of University of Jambi, NGOs, ICs, Private companies, Private companies assosiation			
18	July 18-19, 2019, Jambi	 FGD on Detailing of the main commodity value chain in the forestry and plantation sector Participants : Ministry of Environment and Forestry (Directorate Mitigation, Mobilization, GHG Inventory) Provincial Services, FMU (KPH, Tahura), National Park, Agency of MOEF in Province (BKSDA), Academics of University of Jambi, NGOs, ICs, Private companies, Private companies assosiation 	22	10	
19	July 23-25, 2019, Aston hotel, Jambi	Technical Guidance / FGD on non-land greenhouse gases inventory Participants : Ministry of Environment and Forestry (Directorate GHG Inventory) Provincial Services, District Agricultural Services, District Environment Services, IC	16	14	
20	August 5-6, 2019, Jambi	FGD on BioCF ISFL Management Project Participants : Ministry of Environment and Forestry (Directorate Mobilization, Mitigation, GHG Inventory) Provincial substance work team, World Bank team, ICs	22	6	
21	August 14-16, 2019, Jambi	FGD on Continued Drafting of ERPD and PDO BioCF ISFL Program Participants : Ministry of Environment and Forestry (Secretariate DG, Directorate : Mobilization, Mitigation, GHG Inventory), Provincial Services, Provincial substance work team, ICs	20	3	
22	August, 21, 2019, Jambi	Workshop on land greenhouse gases accounting Participants : Ministry of Environment and Forestry (Directorate GHG Inventory) Provincial Services, FMU (KPH), National Park, Agency of MOEF in Province (BKSDA, BPDAS), NGOs, ICs, Forest Fire Task Force (Manggala Agni)	30	6	
23	August 22-23, 2019, Jambi	FGD on Continued Drafting of ERPD and PDO BioCF ISFL Program Participants : Ministry of Environment and Forestry (Secretariate DG, Directorate : Mobilization, Mitigation, GHG Inventory), Provincial Services, National Park, FMU (KPH, Tahura), Agency of MOEF in Province (BKSDA, BPSKL, BPHP, BPPIKL), Provincial substance work team, ICs	32	9	
24	July 27-29, 2019, Jambi	Continued Technical Guidance / FGD on non-land greenhouse gases inventory Participants : Ministry of Environment and Forestry (Directorate GHG Inventory) Provincial Services, District Agricultural Services, District Environment Services, IC	14	13	

NO	DATE &	ACTIVITY	NUMB PARTIC	BER OF
	LOCATION		Male	Female
25	August 29-30, 2019, Jambi	 Workshop on compilation of emission factors for estimating greenhouse gas emissions and reference levels within the program framework of BioCF ISFL Participants : Ministry of Environment and Forestry (Directorate Mitigation, Mobilization, GHG Inventory) Provincial Services, FMU (KPH, Tahura), National Park, , Agency of MOEF in Province (BPDAS, BKSDA, BPHP, BPKH BPPIKL, Academics of University of Jambi, NGOs, Ics. 	25	6
26	September 18- 19, 2019, Jambi.	Capacity in order to Support the Implementation of Climate Change Mitigation Participants: Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), Central Management of Regional River Flow (BPDASHL), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), University of Jambi, NGOs, Ics.	30	5
27	October 08-11, 2019, Jambi	 FGD on capacity development in the framework of measuring forest carbon stock in the province of Jambi Participants: Pusat Penelitian dan Pengembangan Sosial, Ekonomi, Kebijakan dan Perubahan Iklim (P3SEKPI), Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), Central Management of Regional River Flow (BPDASHL), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), University (IPB). 	31	3
28	October 29-31, 2019, Jambi	Drone Operation Training for Mapping and Monitoring Forest Carbon Stocks Participants : CV. Galeri Angkasa Sejahtera, Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), IC's, University (Ibn Khaldun Bogor)	26	3
29	December 03 - 04, 2019, Jambi	Capacity building workshop in order to share the methodology for calculating GHG emission in Jambi Province (Land Cover Change Analysis) Participants :	25	5

NO	DATE &	ACTIVITY	NUME PARTIC	BER OF
	LUCATION		Male	Female
		Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), IC's, University (Unja)		
30	December 05 - 06, 2019, Jambi	Capacity building workshop in order to share the methodology for calculating GHG emission in Jambi Province (Baseline and FREL determination) Participants : Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), IC's, University (Unja, IPB, Unila)	24	6
31	December 09- 10, 2019, Jambi	Consignment of data analysis results from the survey Field Practice for Calculation of Forest Carbon Stock Participants : Pusat Penelitian dan Pengembangan Sosial, Ekonomi, Kebijakan dan Perubahan Iklim (P3SEKPI), Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER)	31	3
32	December 26 – 27, 2019, Jambi	Capacity in order to Support the Implementation of Climate Change Mitigation Participants : Directorate GHG Inventory, Directorate Mitigation, Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), University (UNJA)	22	7
33	February 18 2020, Jambi	Discussion Meeting on Preparation of FPIC and Draft of PKS and SPKS Preparation Activities for BioCF-ISFL Participant : Director of special transfer fund ministry of finance, Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs.	28	10

NO	NO DATE & ACTIVITY		NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
34	February 19 2020, Jambi	Coordination of the implementation of the forwarding grant BioCF ISFL Trust Fund Grant Agreement No.TF0B3897, and No.TF0B3999 for Jambi Sustainable Landscape Management Project Participant : Director of special transfer fund ministry of finance, Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs.	26	11
35	October 20, 2020, Jambi	MAR System Institutional Workshop: Development of mechanisms and institutional arrangements in the ISFL BioCF Program Framework in the Pre-Investment phase; Jambi Participants : Offline: Secretary of the Directorate General Climate Change Control, Director GHG Inventory, Director of Climate Change Mitigation, Director of MS2R, Director of IPSDH, Directorate General of PKTL, Head of the BPPI KHL Region Sumatra; Provincial Planning Services (BAPPEDA), Jambi Provincial Forestry Service (Dishut Prov. Jambi), Jambi Provincial Environment Service (DLH Prov. Jambi), Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team MAR Jambi, University (UNJA), Joint Secretary of PSDH, non-governmental organization, ICs. On line: UPTD KPHP and Tahura in Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, World Bank, ICs.	20	3
36	October 21, 2020, Jambi	Discussion on the Improvement of the Benefit Sharing Mechanism Concept for the BioCF-ISFL Jambi Program: integration of the MAR system and safeguard mechanisms into the initial draft of BSM Participants : Offline:	18	23

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Director General of Climate Change Control, Director of GHG Inventory, Director of Climate Change Mitigation, Director of MS2R, Directorate General of PKTL, Head of the BPPI KHL Region Sumatra; Provincial Planning Service (Bappeda Prov. Jambi), Provincial Forestr Service (Dishut Prov. Jambi), Provincial Environmental Service (DLH Prov. Jambi), Food Crops Service Prov. Jambi, Farm Service (Disbun Prov. Jambi), Balitbangda Prov. Jambi, Regional Financial Agency Prov. Jambi, University (UNJA), Joint Secretary of PSDH, ICs. On line: Director of Fund Collection and Development - Environmental Fund Management Agency Hidup (BPDLH), Head of KPHP 'TN, and BKSDA in Jambi Province.		
37	October 27 2020, Jambi	 Workshop on Initial Preparation for the Implementation of FPIC Participants : Offline: Director of MPI, Ksubdit REDD +, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, UnJa (Faculty of Forestry), Jambi NGO (Sekber PSDH etc), ICs. On line: Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura in Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, WB, ICs 	11	5
38	February 18 2021, Jambi	Discussion Meeting on Preparation of FPIC and Draft of PKS and SPKS Preparation Activities for BioCF-ISFL Participant : Director of special transfer fund ministry of finance, Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of	28	10

NO	DATE &	ACTIVITY	NUME PARTIC	BER OF
	LOCATION		Male	Female
		REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs.		
39	March 31 - April 1 2021, Jambi	Sub-National Focus Group Discussion Meeting (FGD) Completion of Benefit Sharing Plan (BSP) Document for BioCF-ISFL Program Participants: Offline: Director of MS2R, Director of MPI, Director of IPSDH, DG PKTL, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, Jambi MAR team, PSDH Joint secretariate, ICs, Bakeuda Prov. Jambi Online: Director of IGRK dan MPV, UPTD KPHP and Tahura within Jambi province, BKSDA Jambi province, BTN Berbak dan Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, WB, ICs	38	18
40	April 12 2021, Jambi	Preparation for Finalization of MAR System Institutional SOPs Participant : Director of IGRK MPV, Director of MPI, Head of PPI KHL Sumatra Region, Head of IGRK Forestry Sector, Head of IGRK Agricultural Sector, Head of Bappeda Jambi Province, Head of Economic Affairs, Jambi Province Bappeda, Jambi MAR Technical Team, Jambi Province Uncertainty Analysis Assessment Team, Individual BioCF-ISFL Project Consultants and Experts	13	8
41	April 15 2021, Jambi	Discussion of Pre Investment Jambi Sustainable Landscape Management Project Activities from Environmental and Social Aspects in the Framework of Safeguards Implementation in Jambi Province Participant : Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICS.	24	13
42	April 26 2021, Jambi	Preparation Meeting For Joint Implementation Mission World Bank : Biocarbon Fund Plus Initiative for Sustainable Forest Landscape (BIOCF ISFL) and East Kalimantan Jurisdictional Emission Reduction Program (EK-JERP)	21	11

NO	DATE &	ACTIVITY		BER OF
	LOCATION		Male	Female
		Participants : Offline: Director of MPI, Ksubdit REDD +, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +,Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, UnJa (Faculty of Forestry), Jambi NGO (Sekber PSDH etc), ICs. On line: Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, WB, ICs		
43	April 29 2021, Jambi	Socialization of the Emissions Reduction Program Document (ERPD) Jambi Sustainable Landscape Management Project (JSLMP) BioCF ISFL Participant : Offline: Director of MPI, Ksubdit REDD +, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +,Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, UnJa (Faculty of Forestry), Jambi NGO (Sekber PSDH etc), ICs. On line: Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, NGOs, WB, ICs	23	13
44	April 30 2021, Jambi	Sub-National Meeting for Completion of Benefit Sharing Plan (BSP) Documents for BioCF-ISFL Program Participants: Director of MS2R, Director of MPI, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Disbun Prov. Jambi, Jambi MAR team, PSDH Joint secretariate, ICs, Bakeuda Prov. Jambi Online: Director of IGRK dan MPV, BPDLH, WB	22	14
45	June 8-9 2021, Jambi	Sub-National Follow-Up Meeting on Completion of BioCF-ISFL Program Benefit Sharing Plan Documents	27	10

NO	DATE &	ACTIVITY	NUME PARTIC	BER OF
	LOCATION		Male	Female
		Offline: Direktorat MS2R, Direktorat MPI, Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Bakeuda Prov. Jambi Online: Direktorat IGRK MPV, BPDLH		
46	June 10 2021, Jambi	Preparation of Design Procedures for Handling Complaints and Feedback, Grievance, Redress Mechanism (FGRM) within the Framework of Jambi Sustainable Landscape Management Project (JERP) Participants : Offline: Director of MPI, Ksubdit REDD +, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, Jambi NGO (Sekber PSDH etc), ICs. Online : Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat, ICs	31	19
47	June 16 2021, Jambi	Discussion Meeting on Proposed Revision of Capital Expenditure for Fixed Assets for BioCF-ISFL Program Participant : Offline: Director of MPI, Kasubdit REDD +, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team, ICs. Online : Sekditjen PPI, Director of IGRK and MPV, Director of MS2R, UPTD KPHP and Tahura Scope Prov. Jambi, Balai KSDA Prov. Jambi, BTN Berbak and Sembilang, BTN Bukit Dua Belas, BTN Bukit Tiga Puluh, BTN Kerinci Seblat.	17	6
48	June 18 2021, Jambi	Discussion of Risk of Displacement and Risk of Reversal in BioCF- ISFL Management Participant :	19	11

NO	DATE &	ACTIVITY	NUMBER OF PARTICIPANTS	
	LOCATION		Male	Female
		Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs.		
49	June 23 2021, Jambi	Monitoring and Evaluation Results of BioCF FPIC Pre Survey Activities Participants:	30	12
		Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team Leader SNPMU BioCF ISFL.		
50	June 25 2021, Jambi	Performance Strengthening Meeting of Sub National Project Management Unit (SN-PMU) ERPD BioCF-ISFL 2021 in Preparation for Implementation of the 2022 BioCF-ISFL On Granting Scheme Participant : Secretary of the Directorate General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub- Directorate for REDD, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Balitbangda Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team.	26	10
51	Juli 1, 2021, Online	Provision of visits for the implementation of FPIC Participants : Directorate of IGRK and MPV, Directorate of MS2R Climate Change Mitigation Directorate Team, Head of DLH Jambi Province, National Parks, BSDA, Jambi Province DLH Survey Team, ICs	46	14
52	3 August 2021, Jambi	Free Prior Informed Consent (FPIC) Activities Bio Carbon Fund Plus Initiative Sustainable Forest Landscape (ISFL) Jambi Sustainable Landscape Management Project (JSLMP) Participant : Director of MPI, Head of Sub-Directorate for REDD, Head of Sub- Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi,	53	22

NO	DATE &	ACTIVITY	NUME PARTIC	IBER OF CIPANTS	
	LOCATION		Male	Female	
		DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team.			
53	16 August 2021	Further discussion on the implementation of FPIC in next term Participants : Directorate of IGRK and MPV, Directorate of MS2R Climate Change Mitigation Directorate Team, Head of DLH Jambi Province, National Parks, BSDA, Jambi Province DLH Survey Team, Safeguards Team, ICs	27	14	
54	22 September 2021, Jambi	Consultation on the Preparation and Implementation of Environmental and Social Safeguards in Jambi Province Participant : Secretary of the Directorate General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub- Directorate for REDD, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov. Jambi, Disbun Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team.	20	10	
55	September 22- 24 2021, Jambi	 Workshop Capacity building for GHG accounting in the framework of the BIOCF-ISFL program, Jambi Province Participants: Directorate of IGRKMPV, Directorate of IPSDH, BPPIKHL Sumatera Region, Bappeda Jambi Province, DLH, Disbun, Dishut, Dinas TPHP, Technical Tim MAR Jambi, IC MRV Specialist, Expert team, FMUs (UPTD Tahura Jambi Province, KPHP Merangin, KPHP Hilir Sarolangun, KPHP Tanjung Jabung Barat, BBTNKS, BTNBD, BTNBS), NGOs (Sekber PSDH, YLBHL, Warsi KKI) 	30	9	
56	September 23 2021, Jambi	Advanced Technical Meeting for Emission Reduction Program Document for Jambi Province Jurisdiction Through BioCF-ISFL Participant : Director of special transfer fund ministry of finance, Secretary of the Province of Jambi, Provincial Services (Bappeda Prov. Jambi), Finance Agency Jambi Province, Forestry Services of Jambi Provinces, DTPHP Prov. Jambi, Plantation Services Jambi Province, Environmental Services Jambi Province, Head of Sub National Project Management Unit, Head of Safeguard, Head of MAR, Secretary of Directorate General Climate Change, Head of Climate Change Control Sumatra Region, Haed of Planning Bereau, Head of Foreign Cooperation, Head of Sub REDD+ Directorate, Head of	24	13	

NO	DATE & ACTIVITY	NUMBER OF PARTICIPANTS		
	LOCATION		Male	Female
		REDD+ Governance, Head of Monitoring and Evaluation REDD+, ICs.		
57	September 24 2021, Jambi	Workshop "Jambi is Fun with Low Emissions" Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, SNPMU BioCF ISFL Team Leader, Universitas Jambi, Universitas Muhammadiyah Jambi, Universitas Batang Hari, ICs.	27	23
58	September 29 2021, Jambi	Lessons learned from the Preparation and Follow-up phase at JERP BioCF ISFL 2018-2021; Jambi 29 September 2021 Participants: Head of Sub-Directorate of REDD, Representatives from PPIUs (Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi), Head of SNPMU BioCF ISFL Team, ICs, Staffs of Secretariate Directorat General of PPI, Directorate of MPI, Directorate of IGRK and MPV, Directorate of MS2R,	24	11
59	October 6 2021, Jambi	Capacity building workshop for GHG Accounting (series 2) within the framework of the BIOCF-ISFL program, Jambi Province Participants: Directorate of IGRKMPV, Bappeda Jambi Province, DLH, Disbun, Dishut, Dinas TPHP, Technical Tim MAR Jambi, IC MRV Specialist, Expert team, FMUs (UPTD Tahura Jambi Province, KPHP Merangin, KPHP Hilir Sarolangun, KPHP Tanjung Jabung Barat, BBTNKS, BTNBD, BTNBS, BPPIKHL Sumatera Region, BKSDA), NGOs (YLBHL, Warsi KKI)	17	7
60	October 21-22 2021, Yogyakarta	Implementation of Uncertainty Analysis (Series 19) - Quality Assurance for calculating the accuracy and uncertainty of changes in forest and land cover within the framework of the Jambi Province BIOCF-ISFL program Participants: Directorate of IGRKMPV, Directorate of MPI, Directorate of IPSDH, BPPIKHL Sumatera Region, BPPIKHL JBN Region, Pusfatja - LAPAN, Bappeda Jambi Province, DLH Jambi Province, Disbun Jambi Province, Technical Team MAR Jambi, Academic Institution (Jambi University, Lampung University, UGM, Diponegoro University, IPB), IC MRV Specialist, Tim Expert, Puspics – UGM	39	17
61	October 27 – 29 2021, Jambi	Capacity building in handling forest tenure conflicts using the RaTA (Rapid Land Tenure Assessment) concept	17	9

NO	DATE &	ACTIVITY	NUME PARTIC	ER OF
	LOCATION		Male	Female
		Participants : Secretary General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD, Head of PPI KHL Region Sumatra, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, NGOs, IC.		
62	November 3 – 5 November 2021, Jambi	 Preparation for the implementation of the JERP On Granting Scheme by the Jambi Provincial Government Participant : Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub-Directorate of REDD+, Head of Sub-Directorate for REDD+, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Provincial Food Crops Office. Jambi, Disbun Prov. Jambi, Head of SNPMU BioCF ISFL Team, Jambi Safeguard Team, ICs. 	36	33
63	November 9 2021, Jambi	Continuing Training for the Sub-National Team-PMU Division of the BSP (Benefit Sharing Plan) BioCF-ISFL Program Offline: Direktorat MS2R, Direktorat MPI, Bappeda Prov. Jambi, Tim MAR, Dinas Perkebunan, Dinas Lingkungan Hidup, IC, Biro Hukum, SN PMU BioCF, Dinas Kehutanan, Sekber PSDH, DLH Prov. Jambi, Dinas Tanaman Pangan Prov. Jambi, Tim Teknis SN-PMU Divisi BSP Online: Direktorat MS2R, Tim Teknis SN-PMU Divisi BSP, BPDLH	20	11
64	November 30- December 2 2021, Jambi	Capacity building workshop for GHG Accounting (series 4) within the BIOCF-ISFL program framework, Jambi Province Partcipants: Directorate IGRK dan MPV, IC MRV and Land Use, NCS Data Analyst, Bappeda Jambi Province, DLH Jambi Province, Disbun Jambi Province, DTPHP Jambi Province, NGOs (YLBHL, KKI Warsi), Technical Team MAR Jambi, BPPI KHL Sumatera Region	13	6
65	December 14 2021, Jambi	Public Consultation on Jambi Province Emission Reduction Program, especially Updating Safeguard Documents; Participants: Secretary of the Directorate General of PPI, Director of MPI, Director of IGRK and MPV, Director of MS2R, Head of Sub- Directorate for REDD, Head of the Center for PPI KHL Sumatra Region, Head of Sub-Directorate for REDD +, Bappeda Prov. Jambi, Dishut Prov. Jambi, DLH Prov. Jambi, Food Crops Service Prov.	38	17

NO	DATE & LOCATION	ACTIVITY	NUMBER OF PARTICIPANTS				
			Male	Female			
		Jambi, Disbun Prov. Jambi, Team Leader SNPMU BioCF ISFL, Jambi Safeguard Team.					
SUB NATIONAL LEVEL (DISTRICTS)							
1	May, 23, 2019 Bappeda Tanjung Jabung Timur, Muara Sabak	Safeguard/ Risk Management (Workshop/ Public Consultation on Safeguard of BioCF ISFL (SESA and EMSF by Hatfield Indonesia) Participants: Directorate General Climate Change, Provincial Services, District Services, FMU (KPH, Tahura). National Park, Sub Districts (Camat), Forest Fire Task Force (Manggala Agni), ICs, NGOs	35	5			
2.	June, 20, 2019 Bappeda Merangin, Bangko	Safeguard/ Risk Management (Workshop/ Public Consultation on Safeguard of BioCF ISFL (SESA and EMSF by Hatfield Indonesia) Participants: Directorate General Climate Change, Provincial Services, District Services, FMU (KPH). National Park, Sub Districts (Camat), Forest Fire Task Force (Manggala Agni), ICs, NGOs, Univeristy of Jambi	39	9			
3	 Kab. Kerinci (06 – 15 November 2019) Kab. Merangin dan Bungo (06 – 15 November 2019) Kab. Sarolangun (06 – 15 Nov 2019) Kab.Tanjabbar (19 – 28 November 2019) Kab. Tebo (28 October - 06 November 2019) Kab. Tebo (28 October - 06 November 2019) Kab.Muaro Jambi (23 October - 01 	Survey Field Practice for Calculation of Forest Carbon Stock Participants : Provincial Services (BAPPEDA), Jambi Provincial Forestry Service, Forest Management Unit (KPH, TAHURA), Nature Conservation Agency (BKSDA), National Park, Local Fire Stations (Daops), Other Stakeholder (SEKBER), University (UNJA)	28	4			

NO	DATE & LOCATION	ACTIVITY	NUMBER OF PARTICIPANTS	
			Male	Female
	November 2019) 7. Kab. Batanghari (19 – 28 October 2019) 8. Kab. Tanjabtim (18 – 27 November 2019)			
4	June – November 2022	FPIC for 170 villages were carried out. Participants: 170 villages in 74 sub-districts within 10 districts/cities (namely Sorolangun, Merangin, Muara Bungo, Muara Tebo, Batanghari, Kerinci, Sungai Penuh, Tanjung Jabung Timur, Tanjung Jabung Barat, Muaro Jambi), with total of 8469 villages (5991 male and 2478 female).	5991	2478