

インドネシア国
森林・泥炭地火災に係る
情報収集・確認調査
(その2)

ファイナルレポート

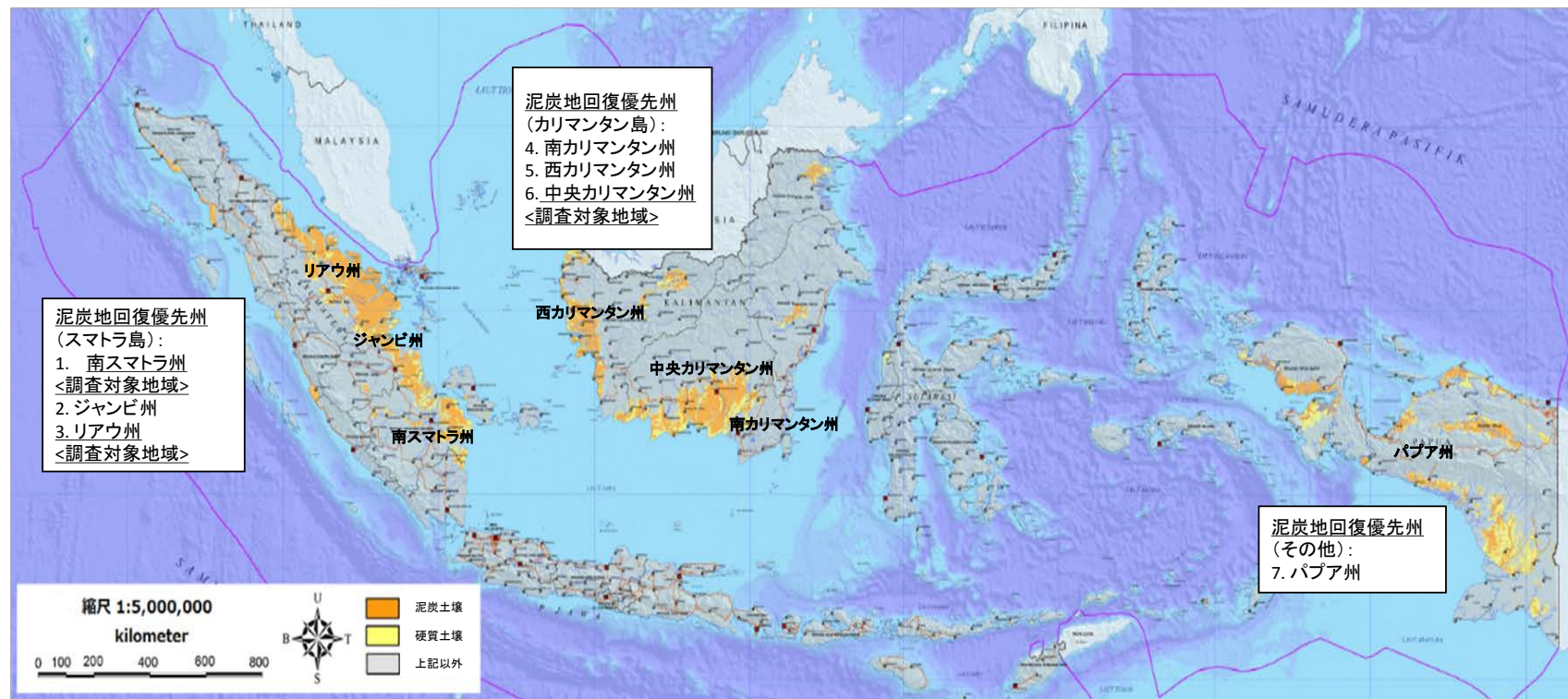
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独立行政法人
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日本工営株式会社

環境
JR
17-117

調査対象州位置図



(基図の出展: インドネシア環境林業省-地理情報庁, 2015)

泥炭地回復庁の優先対象地概略計画図（優先調査対象地）



(1) リアウ州



(2) 南スマトラ州



出典 BRG作成の優先泥炭地地図(2016年8月時点)

略語集

略語	インドネシア語	略語	英語	邦訳例
-		AATHP	ASEAN Agreement on Transboundary Haze Pollution	越境へイズ害 ASEAN 条約
AAUI	Asosiasi Asuransi Umum Indonesia	-	Association of Indonesian General Insurance Companies	インドネシア一般保険協会
ADPI	Asosiasi Dana Pensiun Indonesia	-	Indonesian Pension Fund Association	インドネシア年金協会
ABLO	Agribisnis Berbasis Limbah Organik		Agribusiness-Based Organic Waste-based Agri-bsuness	有機廃棄物ベースアグリビジネス
		AEs	Accredited Entities	認証実施機関
AEKI	Asosiasi Eksportir Kopi Indonesia		Association of Indonesian Coffee exporters	インドネシアコーヒー輸出業者協会
AKKI	Asosiasi Kartu Kredit Indonesia	-	Indonesian Credit Card Association	インドネシアクレジットカード協会
APBN (D)	Anggaran Pendapatan dan Belanja Negara (Daerah)	-	National (Local) Budget	国家(地方) 予算
APEI	Asosiasi Perusahaan Efek Indonesia	-	Indonesian Securities Investor Association	インドネシア証券投資協会
-	-	APEX	Asian People's Exchnage (Japanese NGO)	日本の NPO の一つ
APHI	Asosiasi Pengusaha Hutan Indonesia	-	Association of Indonesian Forest Concessions Holders	インドネシア森林コンセッション協会
APRDI	Asosiasi Pengelola Reksa Dana Indonesia	-	Indonesian Mutual Fund Managers Association	インドネシア相互ファンド協会
APL	Areal Penggunaan Lain		Other Use Area	林地以外に利用される土地(国有林地以外)
ASEAN	-	ASEAN	Association of Southeast Asian Nations	東南アジア諸国連合
-	-	AWL	Automatic Water Logger	自動水位測定装置
B (B) KSDA	Balai (Besar) Konservasi Sumber Daya Alam	NRCC	Natural Resources Conservation Center	天然資源保護事務所: 林業省自然保護・森林保全総局の出先機関の一つ
Bap (p) eda	Badan Perencanaan (Pembangunan) Daerah	-	Regional (Development) Planning Agency	地方(開発) 計画局
Bappenas	Badan Perencanaan Pembangunan Nasional	-	National Development) Planning Agency	国家開発計画庁
BBSDLP	Balai Besar Litbang Sumberdaya Lahan Pertanian:	-	Center for Research and Development on Agricultural Land Resources	農地資源研究開発センター
BCA	Bank Central Asia	-	-	インドネシアの民間銀行の一つ
		BCR; B/S Ratio	Benefit-Cost Ratio	便益費用比率
BEI	PT. Bursa Efek Indonesia	-	Indonesian Stock Exchnage	インドネシア証券取引所
BI	Bank Indonesia	-	Indoneisian Central Bank	インドネシア中央銀行
BIG	Badan Informasi Geospasial	-	Geospatial Information Agency	土地空間情報局
BKPM	Badan Koordinasi Penanaman Modal	-	Investment Coordination Agency	投資調整庁
BLU	Badan Layanan Umum	-	Public Service Agency	公共サービス機関
BMKG	Badan Meteorologi, Klimatologi dan Geofisika	-	Meteorological, Climatological and Geophysical Agency	気象・気候・地物理庁(気象庁)
BNI	Banak Negara Indonesia	-	-	インドネシア国営銀行の一つ
BNPB	Badan Nasional Penanggulangan Bencana	-	National Disaster Management Agency	国家防災庁
BPBD	Badan Penanggulangan Bencana Daerah	-	Regional Disaster Management Agency	地方防災局
BPN	Badan Pertanahan Nasional:	-	National land Agency	国土庁
BPOM	Badan Pengawasan Obat & Makanan	-	-	薬品・食品監督庁
BPPT	Badan Pengkajian dan Penerapan Teknologi	-	Agency for the Assessment and Application of Technology	技術評価応用庁
BPPLHK; BP2LHK	Balai Penelitian dan Pengemangan Lingkungan Hidup dan Kehutanan	-	-	環境林業省研究開発所
BRG	Badan Restorasi Gambut	PRA	Peat Restoration Agency	泥炭地回復庁
BRI	Bank Rakyat Indonesia	-	People's Bank of Indonesia	インドネシア国営銀行の一つ
BTN	Bank Tabungan Negara	-	National Savings Bank	インドネシア国営銀行の一つ
BTPN	Bank Tabungan Pensiunan Nasional	-	National Pension Savings Bank	インドネシア国営銀行の一つ
(Perum) BULOG	(Perum) Badan Urusuan Logistik		Indonesian Burea of Logistic	食料庁(公社)
BUMDES	Badan Usaha Milik Desa		Village public enterprise	村落事業団
BUMN	Badan Usaha Milik National		National enterprise	国営企業
BUMD	Badan Usaha Milik Daerah		Local government enterprise	地方政府企業
-		CDM	Clean Development Mechanism	クリーン開発メカニズム
-		CH	Concession Holder	コンセッション所有者
-		CIMTROP	Center for International Cooperation in Sustainable Management of	熱帯泥炭地持続的管理国際協力センター

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CPO	-	CPO	Tropical Peatlands Crude Palm Oil	パーム原油
Daops	Daerah Operasi	-	Office of Forest Fire Control	官森林(保護林)消防事務所
Des	Desa	-	Village	村落
(Dis/B) LH(D)	Dinas/Badan Lingkungan Hidup (Daerah)	-	Environmental Service Agency	州/県環境局
Dishut	Dinas Kehutanan (Lingkungan Hidup)	-	Forestry (and Environmenta) Servcie	州林業(環境)局
Dus	Dusun	-	Hamlet	集落
-	-	ENSO	El Nino Southern Oscillation	エルニーニョ・南方振動
-	-	ESG	Environmental, social and governance	環境・社会・ガバナンス責任
-	-	EU	European Union	ヨーロッパ連合
-	-	FCP	Program of Community Development of Fires Control in Peat Land Area (MoF-JICA)	泥炭湿地林周辺地域における火災予防のためのコミュニティ能力強化プロジェクト(フェーズ4相当)
-	-	FDRS	Fire Danger Rating System	火災危険度区分システム
-	-	FFPMP (-1/2)	Forest Fire Prevention and Management Project (MoF-JICA) (Phase-1/Phase-2)	森林火災予防管理計画(過去の森林火災対策協力フェーズ1及び2)
-	-	FFPP	Forest Fire Prevention Project by Initiative of People in Buffer Zone (MoF-JICA)	森林地帯周辺住民イニシアティブによる森林火災予防計画(フェーズ3相当)
-	Diskusi Kelompok Terfokus	FGD	Focus Group Discussion	フォーカスグループディスカッション
GAPKI	Gabungan Pengusaha Kelapa Sawit Indonesia	-	Indonesia Oil Palm Business Union	インドネシアオイルパーム農園業連合
-	-	GCF	Green Climate Fund	緑の気候基金
-	-	GEF	Global Environment Facility	地球環境ファシリティ
-	-	GGGI	Global Green Growth Institute	
GRK	Gas Rumah Kaca	GHG	Green House Gas	温室効果ガス
HD	Hutan Dea	VF	Village Forest	村落林
HHBK	Hasil Hutan Bukan Kayu	NTFP	Non Timber Forest Product	非木質林産物
HKm	Hutan Kemasayarakatan	-	Community Forest-	社会林業スキームの一つ
HL	Hutan Lindung	PF	Protection Forest	保安林
HPH	-	-	Logging concession	伐採コンセッション
HTI	-	-	Industrial Forest Plantation Concession	産業植林コンセッション
HTR	Hutan Tanaman Rakyat	-	Community Plantation Forest	社会林業スキームの一つ
-	-	JICA	Japan International Cooperation Agency	国際協力機構
HGU	Hak Guna Usaha	-	Business use right	事業使用権(農園コンセッション)
-	Titik panas	HS	Hotspot	ホットスポット(衛星画像で判定される高温地点/土地・森林火災発生の可能性を推測)
-	-	ICCTF	Indonesia Climate Change Trust Fund	インドネシア気候変動信託基金
-	-	IDH	Dutch Sustainable Trade Initiative	オランダの持続可能な貿易を推進する団体
-	-	IFAD	International Fund for Agricultural Development	国際農業開発基金
-	-	IC	Investment Committee	投資委員会
IMTA	Izin Mempekerjakan Tenaga Asin	-	-	外国人雇用許可
INPRES	Instruksi Presiden	-	Presidential Instruction	大統領指導
INPARA	Inbrida Padi Raya	-	-	コメの品種の一つ
IPB	Institut Pertanian Bogor	-	Bogor Agricultural University	ボゴール農科大学
IPM	Indeks Pengembnagan Manusia	HDI	Human Development Index	人間開発指標
-	-	JCM	Joint Crediting Mechanism	二国間クレジット制度
LPHD	Lembaga Pengelolaan Hutan Desa	-	Village Forest Management Board	村落林管理評議会
-	-	IRR	Internal Rate of Return	内部収益率
IUPPHK-HT/HA	Izin Usaha Pengelolaan Hasil Hutan Kayu Hutan Tanaman/Hutan Alam	-	Nature/ Plantation Forest Timber Forest Product Management Business Permit	天然/人工林 木質林産物管理事業許可(森林コンセッション)
IUP-P	Izin Usaha Perkebunan untuk Pengolahan	-	Certificate for plantation cultivation business for processing business	加工用エステート作物栽培許可
Kab.	Kabupaten	District	District, Regency	県
Karhutla	Kebakaran Hutan dan Lahan	-	Forest and (farm) land fires	土地(農地)・森林火災/国有林以外・国有林火災
Kalteng	Kalimantan Tengah	CK	Central Kalimantan	中央カリマンタン

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KBRI	Kedutaan Besar Republik Indonesia	-	Embassy of Republic of Indonesia	インドネシア大使館
Kec.	Kecamatan	-	Sub-district	郡
KEHATI	Keanekaragaman Hayati Indonesia	-	-	インドネシアの NGO の一つ
KEK	Kawasan Ekonomi Khusus	SEZ	Special Economic Zone	経済特区
Kemenkeu	Kementerian Keuangan	MoFi	Ministry of Finance	財務省
Kemendagri	Kementerian Dalam Negeri	MoHA	Ministry of Home Affairs	内務省
Kemendes	Kementerian Desa, Pembangunan Daerah Tertinggal dan Transmigrasi	MoDDRT	Ministry of Village, Disadvantage Region and Transmigration	村落、後進地域、移住省
Kemenkoperekonomian	Kementerian Koordinator Bidang Perekonomian	-	Coordinating Ministry of Economic Affairs	経済部門調整大臣府
Kementan	Kementerian Pertanian	MoA	Ministry of Agriculture	農業省
KH	Kawasan Hutan	SF	State Forest	国有林
KHG	Kesatuan Hidrologis Gambut	PHU	Peatland Hydrological Unit	泥炭地水理単位
KK	Kawasan Konservasi	-	Conservation Areas	保護地域
KK	Kepala Keluarga	HH	Household	世帯
KKP	Kementerian Kelautan dan Perikanan	-	Ministry of Marine Affairs and Fisheries	海洋水産省
KLHK	Kementerian Lingkungan Hidup dan Kehutanan	MoEF	Ministry of Environment and Forestry	環境・林業省
KLN	Biro Kerjasama Luar Negeri	-	International Cooperation Bureau	海外協力局
KJRI	Konsulat Jenderal Republik Indonesia	-	Consulate of Republic Indonesia	インドネシア領事館
KoENIG-Merah Putih	Kawasan Ekonomi Restorasi Gambut	-	Peatland Restoration Economy Special Zone	泥炭地回復のための経済特区(提案)
KPBU	Kerjasama Pemerintah dan Badan Usaha	PPP	Public Private Partnership	官民連携
KPEI	PT Kliring dan Penjaminan Efek Indonesia	-	Indonesian Clearing and Guarantee Corporation	インドネシア清算・決済保証会社
KPH P/L/K	Kesatuan Pengelolaan Hutan Produksi/ Lindung/ Konservasi	Prod./Prot./Conser. FMU	Production/ Conservation Forest Management Unit	森林管理ユニット 生産林/保安林/保護林
KSEI	PT Kustodian Sentral Efek Indonesia	-	Indonesian Central Security Depository	インドネシア中央証券預託会社
-	-	LDC	Least Developed Countries	後発開発途上国
LPS	Lembaga Penjamin Simpanan	-	Indonesia Deposit Insurance Corporation	インドネシア預金保険機構
-	-	LULUCF	Land Use, Land Use Change, Forestry	土地利用、土地利用変化及び林業部門
MA	Mangala Agni	-	MoF's Forest Fire Brigade	官森林(保護林)消防隊
-	-	MEL	Midori Engineering Laboratory Co., Ltd.	株式会社 みどり工学研究所 (SESAME 製造者)
-	-	MDB	Multilateral Development Banks	国際開発金融機関
-	-	SLM-MDTF	Indonesia Sustainable Landscapes Management Multi Donor Trust Fund	インドネシア持続的ランドスケープマネジメントマルチドナー信託基金
MPA	Masyarakat Peduli Api	-	Fire Care Community Group	火災対策コミュニティグループ
MUBA	Musi Banyuasin	-	-	南スマトラ州の県の一つ
-	-	Norfund	The Norwegian Investment Fund for Developing Countries	ノルウェーの国営投資会社
-	-	NDA	National Designated Authority	国家指定機関
-	-	NGO	Non Governmental Organization	非政府組織
NKB	Nilai Kini Bersih	NPV	Net Present Value	正味現在価値
-	-	NPO	Non Profit Organization	非営利組織
OJK	Otoritas Jasa Keuangan	FSA	Financial Services Authority	金融庁
OKI	Ogan Komering Ilir	-	-	南スマトラ州の県の一つ
Pemda	Pemerintah Daerah	-	Local government	地方政府
Pemkab/Pemprov.	Pemerintah Kabupaten/Provinsi	-	District/ Provincial government	県/州政府
Permen	Peraturan Menteri	-	Ministerial Regulation	大臣令
Perdirjen.	Peraturan Dirjen.	-	Director General's Regulation	総局長令
Perpres	Peraturan Presiden	-	Presidential Regulation	大統領令
PKE	Paket Kebijakan Ekonomi	-	Economic Policy Package	経済政策パッケージ
PKG	Direktorat Pengendalian Kerusakan Gambut	PDC	Directorate of Peat Damage Control	泥炭荒廃対策局
PKH (L)	Direktorat Pengendalian Kebakaran Hutan (dan Lahan)	FLFC	Directorate of Forest and Fire Control	森林(土地)火災対策局
PLTB	Persiapan/Pembukaan/ Pengolahan Lahan Tanpa Bakar	-	Land Preparation/Clearing/Handling without Burning	火入れなし地拵え/開墾/土地処理
POKJA	Kelompok Kerja	-	District Working Group	ワーキンググループ
PP	Peraturan Pemerintah	-	Government Regulation	政令
PPI	Direktorat Jenderal Pengendalian Perubahan Iklim	CCC	Directorate General of Climate Change	気候変動対策総局
Prop./Prov.	Propinsi/ Provinsi	-	Province	州
Pulpis	Pulang Pisau	-	-	中央カリマンタン州の県の一つ
PU-PR	Kementerian Pekerjaan Umum dan Perumahan Rakyat	PU-PR	Ministry of Public Works and People's Housing	公共事業・国民住宅省

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Puskemas	Pusat Kesehatan Masyarakat	-	Community Health Center	コミュニティ保健センター
RAKORNIS	Rapat Koordinasi	-	Coordination Meeting	調整会議
RCR	-	RCR; RC Ratio	Revenue Cost Rate	売上原価率
REDD+	-	REDD+	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries Pulus	森林減少・劣化の抑制や森林保全による温室効果ガス排出量の減少に、資金などの経済的なインセンティブを付与することにより、排出削減を行おうとするもの（森林保全、持続可能な森林経営および森林炭素蓄積の増加に関する取組を含む）
Renstra	Rencana Strategis	-	Strategic Plan	5ヶ年計画
RKM	Rencana Aksi Masyarakat	-	Community Action Plan	コミュニティアクションプラン
RPJM	Rencana Pembangunan Jangka Menengah	-	Mid-term Development Plan	中期開発計画
-	-	RINH	Research Institute for Humanity and Nature (Japanese National Institute)	総合地球環境学研究所
RoD	Rekaman Diskusi Kerjasama Teknis JICA	R/D	Record of Discussion	実施協議録
Satgas	Satuan Kerja	TF	Task force	タスクフォース
SATREPS	-	-	Science and Technology Research Partnership for Sustainable Development	地球規模課題対応国際科学技術協力プログラム
SDGs	-	SDGs	Sustainable Development Goals	持続可能な開発目標
SESAME	-	SESAME	Sensory data transmission Service Assisted by Midori Engineering	株式会社 みどり工学研究所によるセンサーデータ伝送システム
-	-	SIDS	Small Island Developing States	小島嶼開発途上国
SIG	Sistem Informasi Geografis-	GIS	Geographic Information System	地利情報システム
SKPD	Satuan Kerja Pemerintahan Daerah	-	Local Government's Work Unit	地方政府行政機関
SMBC	-	SMBC	Sumitomo Mitsui Banking Corporation	住友三井銀行
Sosek	Sosial Ekonomi	-	Social economy	社会経済
SPBK	Sistem Peringatan Bahaya Kebakaran	-	-	火災危険警戒システム
-	-	SRI	Social and Responsible Investment	社会・責任投資
Sumsel	Sumatera Selatan	SS	South Sumatra	南スマトラ
STD-B	Surat Tanda Daftar Usaha Perkebunan untuk Budidaya	-	Registration of Plantation Business	
STD-P	Surat Tanda Daftar Usaha Perkebunan untuk Industri Pengolahan Hasil Perkebunan	-	Certificate for registration for processing business for plantation cultivation business	
-	-	TAU	Technical Assistance Unit	技術支援ユニット
TJSL	Tanggung Jawab Sosial dan Lingkungan	-	-	環境・社会責任
TN	Taman Nasional	NP	National Park	国立公園
ToT	-	ToT	Training of Trainers	トレーナー研修
TPD	Tim Pendamping Desa Pencegahan Karhutla	VFT	Village Facilitation Team for Land and Forest Fire Prevention	土地・森林火災予防村落ファシリテーションチーム
TRGD	Tim Restorasi Gambut Daerah	-	Local Peatland Restoration Team	州泥炭回復チーム
-	-	UK	United Kingdom	イギリス王国
-	-	UN	United Nation	国際連合
-	-	UNDP	United Nation Development Programme	国連開発計画
-	-	UNFCCC	United Nations Framework Convention on Climate Change	気候変動枠組条約
UNPAR	-	UNPAR	University of Palangka Raya	パランカラヤ大学
-	-	USA	United Nations of America	アメリカ合衆国
UU	Undang-undang	-	Law	法律
-	-	VCS	Verified Carbon Standard	
-	-	ZMEI	PT. Zenbi Machinery and Electronics Indonesia	株式会社全備インドネシア現地法人（SESAMEの専一販売代理店[2017年10月までの代理店契約]）

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第1章 序論

1.1 背景

1.1.1 調査の背景

インドネシア国は世界第3位の熱帯林面積を有し、野生動植物の主な生息地として、世界的にも貴重な生物多様性を支えている。また、近年では、気候変動対策の観点からもその保全と回復の重要性が国際的に注目されている。しかしながら、森林火災や農地開発、オイルパームプランテーション造成等のための土地利用転換、違法伐採等による森林減少・劣化の圧力は高く、その対応は喫緊の課題となっている。

また、熱帯泥炭には多量の炭素が蓄積されており、世界の約7割が東南アジアに分布し、そのうちの大部分がインドネシア国の低湿地に広範に存在している。しかしながら、20世紀末の大規模なプランテーション開発のための水路掘削と熱帯泥炭林の伐採の結果、火災や微生物分解による大気中への炭素放出が急速に進んでおり、特に泥炭地火災は消火が困難であるため、長期間にわたる延焼に伴い大量の二酸化炭素が排出されているといわれている。

国際協力機構/JICA（JICA）は2010年から2015年7月までの5年間にわたり技術協力プロジェクト「泥炭湿地林周辺地域における火災予防のためのコミュニティ能力強化プロジェクト（FCP）」を実施し、対象州のリアウ州と西カリマンタン州において消防隊（MA）や住民グループ等で構成される村落ファシリテーションチーム（TPD）による村落火災予防活動を複合的に展開し、住民による火入れおよびホットスポット数の減少に貢献した。また、2009年12月から4年4か月にわたり、北海道大学を国内協力機関とする科学技術協力（SATREPS）「インドネシア国泥炭・森林における火災と炭素管理プロジェクト」を実施し、泥炭森林管理手法の構築に向け、成果毎に現場での測定やリモートセンシング、シミュレーションモデル等を活用した基礎データを蓄積し、火災検知システムと炭素評価モデルを作った。

2015年に発生したエルニーニョの影響により大規模な森林・泥炭地火災が発生し、ドイツの約1年分（試算）に匹敵する膨大な量の温室効果ガスの排出に加え、火災の煙霧（ヘイズ）による周辺住民の呼吸器疾患の発生率の上昇や航空機の運航阻害による欠航等、経済的に大きな損失が招いたほか、隣国への被害も及ぼし外交問題にも発展している。こうした課題に対応するため、インドネシア政府は、2015年11月の気候変動枠組条約第21回締約国会合（COP21/UNFCCC）において、森林火災予防及び温室効果ガス排出削減のために、泥炭地回復庁（BRG）の設置を発表し、2020年までに200万ha（北海道面積の1/4）以上の泥炭荒廃地を水位維持や植林・経済作物の栽培などにより回復・有効利用する方針が打ち出され、BRGは2016年1月に設立された。

一方、2015年度の要望調査において、FCPの協力成果を活用した森林・土地火災対策にかかる中央/地方政府の体制構築・強化、政策支援までの包括的な技術協力「インドネシア国森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」が要請された。

これを受けて2016年1月にインドネシア森林・泥炭地火災実態把握調査団を派遣後、同年5月から、インドネシア国「森林・泥炭地火災に係る情報収集・確認調査」（以下、「先行調査」）を実施し、同国環境林業省や関係省庁、州/県政府、他ドナー、民間セクター等を訪問し、森林・泥炭地火災対策および泥炭地回復関連の情報収集と分析を行った。また同年9月にインドネシア国「森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」詳細計画策定調査団を派遣し、要請元であるインドネシア環境林業省と「インドネシア国森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」の協力枠組みについて基本合意がなされたが、インドネシアでは新たな取り組み

となる泥炭地のモニタリング業務については、関係省庁間の役割分担や連携体制が十分に機能しているとは言えず、引き続き関係者への技術的なインプットや協議の支援が必要な状況にあることが見出された。

2016年9月の詳細計画策定調査においてBRG長官より、緊急対応が必要な3州4県を対象とした泥炭地回復に係るプロファイル調査、また、試験目的の小規模な泥炭モニタリングシステムの構築等の緊急調査の実施に係る要請を受けた。環境林業省及び関係する機関とも意見交換をした結果、泥炭地回復の取り組みへの支援は重要な課題であり、今後更なる協力の可能性を検討することで一致したため、本調査を追加的に実施することとなった（以下、プレF/Sまたは緊急調査）。

BRGは2016年10月、追加調査についてBRG文書による提案書¹をJICAに提出した。その追加調査の提案内容は下表に示すとおりである。その後、2016年11月追加調査内容の骨子について、BRGとJICAはインドネシア国泥炭地回復に係る基礎調査に関するミニッツ²を締結した。第1段階として同国での泥炭モニタリング実施に係る一部支援（南スマトラ州における泥炭地モニタリング装置4基の設置とその関連業務など）を先行調査（その1）の中で実施した。上記の残りのプレF/Sに対応するため、本調査（その2）はJICAとの業務実施契約により実施するものである。

表 1.1.1.1. BRG 最優先 3 州 4 県の泥炭地回復に係る追加調査の計画内容

BRG最優先3州4県の泥炭地回復のための調査内容の概要			
No.	骨格	概要	備考
1.	名称	インドネシア国優先4地域における泥炭回復投資プレF/S調査	
2.	期間	2016年11月-2017年10月	
3.	上位目標	泥炭回復による気候変動対策経済開発モデルを開発する	
4.	目的	優先4県における泥炭回復投資計画オプションを開発する	
5.	主要コンポーネント	1. 対象地泥炭水理状態のベースライン測定(及びモニタリング)の試行 1.1. モニタリングの調和試行 1.2. 詳細モニタリング計画の合意 1.3. ステークホルダーの研修 1.4. 水理計測装置の設置	a) 第1期: 1.4.の南スマトラ州4基分(MUBA県1KHG,OKI県1KHG) b) 第2期: 残り/全体 *機材は調査機材としてJICA-インドネシア事務所が一時所有、調査終了時にBRGに引き渡す
		2. 対象地のプロファイル調査及び民間ビジネス投資による泥炭回復のための緊急妥当性予備調査 2.1.生物・物理的、経済的緊急妥当性調査 2.2. 泥炭環境にやさしい種の植栽と付随するポテンシャルのビジネス開発にかかるマーケット調査・収支分析 2.3. ポテンシャル投資計画オプションの適地地図の作成 2.4. ビジネス・ポテンシャルのデモンストレーションプロットの設計・作成	第2期
		3. 民間ビジネス投資促進のためのステークホルダー調整会議等 3.1.定例調整会議の開催(3回以上) 3.2.BRG国際シンポジウムへの支援(2016年12月) 3.3.泥炭回復投資Tokyoセミナー(2017年4月) 3.4.泥炭回復投資ビジネスモデル開発Jakartaワークショップ(2017年7月)	a) 第1期: 3.1.の第1回と3.2. b) 第2期: 残り
6.	対象地	1. 南スマトラ州Musi Banyuasin (MUBA)県のうち1KHG(KHG S.Air Hitam Laut-S. Buntu Kecil) 2. 南スマトラ州Ogan Kemering Ilir (OKI)県のうち3KHG(KHG S. Sugihan-S. Lumpur, S. Sibumbang-S. Batok, S. Sugihan-S. Saleh) 3. 中央カリマンタン州Pulang Pisau県のうち2KHG(KHG S. Kahayang- S. Sebanggau, S.Kahayang-S. Kapuas/S. Katingan-S. Sebanggau) 4. リアウ州Kepulauan Meranti県のうち1KHG(KHG Pulau Tebing Tinggi)	

出所: インドネシア国森林・泥炭地火災に係る情報収集・確認調査(JICAミッション(その2))

出典: 2016年10月28日付けBRG要請添付のWork Plan提案³をもとに進捗に応じて修正

注

1) ミニッツ署名後、JICAの内部検討結果、情報収集・確認調査全体を2つの契約（「その1」：2016年

¹ BRG Letter No. S.167/BRG-KB/10/2016 Subject: Proposal of Urgent Cooperation Action 2016-2017 between BRG-JICA (28 Oct. 2016)

² Minutes of Meetings between Peatland Restoration Agency of the Government of Republic of Indonesia and Japan International Cooperation Agency for Basic Information Survey on Peatland Restoration in Indonesia (11 Nov. 2016)

³ BRG (Deputy 4) . 2016. BRG-JICA Urgent Cooperation Action Plan (2016-2017) : Pre-feasibility Study for Peatland Restoration Investment in Four Most Prioritized Areas in Indonesia TOR

- 5月から2017年5月まで、「その2」：2017年2月から2017年11月まで）に分割し実施した。
- 2) BRG 文書による提案書に示唆されているように、水位測定装置の設置にあたって BRG から報告を受けける大統領府（KSP）では「リアルタイムのモニタリング」を指定、BRG 長官は泥炭環境の経験から「SESAME 製品」を指定するなど銘柄指定のニーズがある。また 2017 年は ENSO に伴う乾期の乾燥化が顕著になるとの予想もあり、火災危険時期が始まるまでに最低限の泥炭回復対象地（2015 年大規模火災跡地など）のリアルタイムモニタリング/早期警戒体制を構築したい緊急ニーズがあった。
 - 3) 先行調査（その1）の対象地について、2016年11月のBRGから南スマトラ州の緊急度がより高いとの提案⁴に基づいた。その背景として、中央カリマンタン州とリアウ州の対象地の泥炭地モニタリング装置設置優先箇所について、2016年11月インドネシア国技術評価応用庁（BPPT）より8基寄贈があったことが関係している。

1.1.2 調査の意義

本調査は、大きく分けて1) 泥炭回復における民間投資の促進、2) 泥炭地水位モニタリングシステムの開発の2つの要素からなる。

(1) 泥炭回復における民間投資の促進の準備

プロファイル調査により泥炭回復に寄与する新しいビジネスモデルの開発、ステークホルダー調整会議等の支援により新しいビジネスモデルに対する投資環境を整備することに資する。

BRG の泥炭回復対象地の大半は民間コンセッション地域で、こうした民間の管理地の泥炭回復に対して国家予算を執行できないため、BRG でも投資の促進に関して戦略的に取り組むことが重要になっている(下表参照)。さらに、2017年2月発布の一連の環境林業大臣令により保全ゾーンに分布する既往コンセッションはビジネスモデルの転換をせまられる。これに対応できず企業経営が悪化する民間企業はコンセッション権の返還などを行い、事実上のオープンアクセスが生じるリスクがある。

民間コンセッション地域以外の BRG の泥炭回復対象地では、社会林業などコミュニティによる回復となり、流通・加工などを担う民間企業と連携しないと成功しない。そのため、泥炭地で高地下水位を維持できるサゴなどの代替作物を主体とした土地セクタービジネスモデル及びその下流産業の育成、これらに対する投資促進策の開発が急がれている。

表 1.1.2.1. BRG の投資促進ニーズの概要（2017年9月迄の収集分）

年	政策	要点/特徴
2016	2016-2020 BRG Strategic Plan ⁵	<ul style="list-style-type: none"> ● 国有林内の生産林、保安林と国有林外で事業権が設定されていない箇所が対象 ● 耕作ゾーンから保全ゾーンに変更になった箇所について、生態系回復事業による投資スキーム、地域住民による管理を可能にする法制度整備が必要。 ● 投資家による実施を想定。NGO やコミュニティとの協力による実施も可能。

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）（2017年9月現在）

一方、下表に示すように、他ドナーの協力は泥炭回復に付随して求められる課題、火災予防領域に関する技術協力に偏る傾向にあり、直接的に BRG の泥炭回復対象地、特に民間による泥炭回復の支援に貢献していない傾向にある。将来的には、民間資金から

⁴ BRG Letter No. S.011/BRG-4/11/2016 Subject: Proposed Priority Location for Peatland Monitoring (30 Nov. 2016)

⁵ Peraturan Kepala Badan Restorasi Gambut Republik Indonesia Nomor P.5/KB BRG-SB/11/2016 tentang Rencana Strategis Badan Restorasi Gambut 2016-2020 (30 November 2016)

の投資による民間による泥炭回復の促進が重要になってくる。

表 1.1.2.2 BRG の Potential Donor（2017 年 9 月迄の収集分）

Source	Potential Amount (US\$)	Area of Interest/ Project Type
Norway	88,000,000	<ul style="list-style-type: none"> ● Protection ● Mapping ● Economic analysis
USA	35,225,000	<ul style="list-style-type: none"> ● Mapping ● Governance ● Prosperity
UK	13,000,000	<ul style="list-style-type: none"> ● Forest fires ● Climate change
Germany	10,285,279	<ul style="list-style-type: none"> ● Strategic plan ● Capacity building
UN	7,500,000	<ul style="list-style-type: none"> ● Palm oil ● Fire management
EU	6,000,000	<ul style="list-style-type: none"> ● Hazse mitigation
Australia	3,025,220	<ul style="list-style-type: none"> ● Forest fire ● Climate change
Denmark-Norway	190,000	<ul style="list-style-type: none"> ● Joint project ● Technical assistance
Total	163,225,499	

出典：2017 年 4 月 BRG 主催開発パートナー調整会議での BRG Deputy1 の発表資料⁶

(2) 泥炭地水位モニタリングシステムの開発の準備

また、本調査を通じて、リアルタイム方式の泥炭地水位測定装置の設置を試行し、泥炭地回復の定量的な評価のために重要な適正な泥炭地水位モニタリングシステム開発の準備を進めることに資する。

1.2 調査の目的と範囲

1.2.1 調査の目的

2016 年 5 月から実施している先行調査（その1）の成果を踏まえつつ、インドネシア国の泥炭地回復に関する現状と課題、ニーズ等の情報を収集・分析し、今後の協力の可能性の検討を行う。具体的には、以下の3点を目的とする。

表 1.2.1.1. インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）の目的

No.	目的
1.	【泥炭地モニタリングのための水位測定装置の管理体制構築】 対象3州4県の計14箇所において、水位測定装置を設置し、試行的にモニタリングを行い、水位測定装置の管理体制構築を支援する。
2.	【対象地域プロファイル調査】 対象3州4県において、民間企業の参画による泥炭地回復の適地およびビジネスモデルを提示する。
3.	【協力プログラムの検討】 JICAの今後の協力可能性を検討する

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

⁶ BRG. 2017. Struktur Fasilitas Investasi Restorasi Gambut. Presentasi Fasilitator Diskusi Kelompok di Diskusi Terfokus Merancang Skema Fasilitas dan Insentif Investasi Swasta dalam Restorasi Gambut (23 Mei 2017). (FGD (Deputy Bidang Perencanaan dan Kerjasama))

1.2.2 調査の範囲

調査対象地域は、2016年第1号大統領令⁷の第4条に規定されているインドネシアのBRGの対象地域のうち優先3州4県（リアウ州Kepulauan Meranti [Meranti]県、南スマトラ州Ogan Komering Ilir (OKI) 県およびMusi Banyuasin [MUBA]県、中央カリマンタン州Pulang Pisau [Pulpis] 県）である。

本調査の関係機関は、インドネシア国 BRG、環境林業省の泥炭荒廃対策局 (PKG) などの泥炭地回復部署、優先3州を中心とした州・県政府の泥炭地回復関係機関、民間セクター、ドナー等を含む。

表 1.2.2.1 インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）の業務概要

段階	派遣時期	主要な業務	備考
準備作業	日本国内作業	a) インセプションレポート (Ic/R) の作成	
第1段階	2017年2月中旬～4月上旬	a) 泥炭水位測定装置設置前の支援(南スマトラ州、リアウ州、中央カリマンタン州) b) 南スマトラ州ステークホルダー泥炭水位モニタリング研修(第2/2回)開催 c) 泥炭回復投資促進ステークホルダー調整会議(第1回全体会合、経済系官庁小会合)の開催 d) 泥炭回復投資促進東京セミナーの開催に係る調整	2017年4月上旬: JICA 本部で進捗報告
第2段階	2017年4月中旬～5月末	a) プロファイル調査の開始 b) 泥炭水位測定装置設置前の支援(リアウ州) c) 泥炭回復投資促進ステークホルダー調整会議(第2回全体会合)の開催 d) 泥炭回復投資促進ジャカルタの開催に係る調整	a) 2017年5月下旬: JICA 本部、JICA 事務所で進捗報告 b) 第1回変更契約: 機材設置費(2017年6月1日)
第3段階	2017年6月上旬～2017年7月下旬	a) 泥炭水位測定装置に係る村落レベル説明会/研修会の実施(南スマトラ州、中央カリマンタン州、リアウ州) b) 泥炭水位測定装置設置(南スマトラ州、中央カリマンタン州、リアウ州) c) 泥炭水位測定を活用したモニタリング計画策定の支援 d) 泥炭回復投資促進ステークホルダー調整会議(インセティブWG会合)の開催 e) 泥炭回復投資促進ジャカルタの開催	a) 第2回変更契約: セミナー費、期限延長、業務量追加(2017年7月14日) b) 2017年6月下旬: JICA 本部で進捗報告 c) 2017年7月上旬: JICA 事務所で進捗報告
整理作業	日本国内作業	ドラフトファイナルレポート (Df/R) の作成	2017年8月下旬: JICA 本部に Df/R 提出
第4段階	2017年9月中旬～10月上旬	a) Df/R の報告・協議 b) 泥炭回復投資促進ステークホルダー調整会議(第3回全体会合等)の開催	2017年9月中旬
整理作業	日本国内作業	a) 最終報告書 (F/R) の作成	2017年10月中旬: JICA 本部にて F/R の提出

出典: インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション (その2)

⁷ Peraturan Presiden Republik Indonesia Nomor 1 Tahun 2016 tentang Badan Restorasi Gambut (6 Januari 2016)

1.3 調査のフレームワーク

1.3.1 調査の担当機関

本調査の中央レベルの担当機関は、泥炭地回復庁（BRG）であるが、対象地域での活動については、BRG だけでなく、州の泥炭地回復チーム（TRGD）の協力を得た。

これらの機関は、中央レベル及び地方レベルでの活動にあたって、関連組織と調整を行い、調査先や調査団を積極的に支援した。

1.3.2 調査団の構成

下表に示すように、調査団は、3名の日本人コンサルタントで構成された。

表 1.3.2.1. インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）
 JICA ミッション

分野	氏名	所属	派遣期間
総括/泥炭地回復	久納 泰光	(一社) 日本森林技術協会	2017年2月22日～4月6日 2017年4月12日～5月31日 2017年6月1日～6月23日 2017年7月2日～7月31日 2017年9月15日～24日; 9月29日～10月13日
民間投資促進	櫻井 彰人	日本工営 (株)	2017年3月12日～3月30日 2017年4月16日～5月13日 2017年7月11日～7月29日
業務調整/民間投資促進補助 (日本投融資者情報) <自社負担>	相川 真一	(一社) 日本森林技術協会	2017年7月20日～7月29日

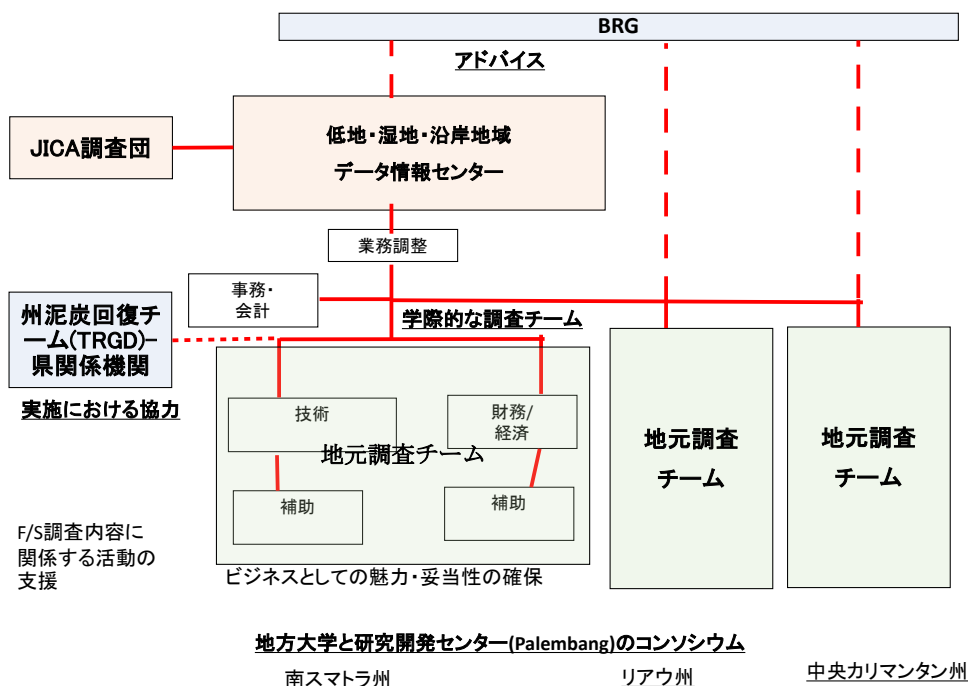
出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

1.3.3 調査体制

本調査の骨格を担う対象地域のプロファイル調査（泥炭水位測定装置に係る村落レベル説明会/研修会の実施を含む）は、現地再委託調査により BRG の Deputy 4 の調査研究への支援を通じて実施することになっている。BRG と協力 MOU を締結している南スマトラ州スリウィジャ大学（UNSRI）、リアウ州のリアウ大学（UNRI）、中央カリマンタン州のパランカラヤ大学（UPR）、環境林業省研究開発庁の南スマトラ研究所の3大学1研究機関の共同実施コンソシウム（以下、コンソシウム；契約者は南スマトラ州 UNSRI⁸）での実施といった BRG Deputy 4 の提案を考慮し2月より、以下のような共同調査実施体制の構築を試みてきた結果、再委託契約を2017年5月2日に締結した。

⁸ UNSRI は農学部到低湿地の修士・博士プログラムで「低地・湿地・沿岸データ・情報センター」を設置し、モニタリング・回復を含む泥炭地に係る調査研究も実施してきた。特に、同センターが、同州の Banyuasin 県で実施したアクションリサーチでは、泥炭地の水理管理を適正に行いながら、水稻を中心とした農業生産性を向上させた県レベルでのグッドプラクティスを創造した経験を有する。同センターの調整役は、この経験を生かし、これまで州内の他県だけでなく、内務省地方開発総局、他州の県知事などに対するアドバイザーを務めている。

対象地域のプロフィール調査 共同調査実施コンソシウム



出所: インドネシア国森林・泥炭地火災に係る情報収集・確認調査JICAミッション(その2)

図 1.3.3.1. 対象地域のプロフィール調査における共同調査実施コンソシウム

表 1.3.3.1. インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）における共同調査に係る協議概要

日時（場所）	主催	会議・協議等	備考
2017年3月23日 (UNRI 会議室)	BRG	地方大学・研究機関代表者による共同調査実施体制の検討会議	Consortium の組織化
2017年5月4日 (BRG Imam Bojol 会議室)	Consortium	BRG-Consortium 定例調整会議 Kickoff Meeting	BRG Deputy 4 議長
2017年6月12日 (UNRI 病院セミナー室)	UNRI	UNRI-京都大学系研究者グループ・APEX 意見交換会	調査対象地域での連携模索
2017年6月14日 (Hotel Morrissy)	Consortium	第2回 BRG-Consortium 定例調整会	BRG Deputy 1 及び 4 議長
2017年7月14日 (リアウ州知事庁舎)	UNRI	UNRI-京都大学研究者-地元 NGO 意見交換会	調査対象地域での連携模索
2017年7月21～23日, 25～26日 (Hotel Grand Zuri Palemanbang, Hotel Oria Jakarta)	Consortium	Consortium 合同作業	報告内容の重要点の検討
2017年10月4日 (BRG Imam Bojol 会議室)	BRG	BRG-Consortium 定例調整会議最終会合	BRG Deputy 4 の WG 長が議長

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

また、上記の日本人専門家の補助として、円滑な情報収集・確認を支援するために、民間

投資促進担当メンバーの補助を兼ねるインドネシア人事務補助（1名）及び民間投資促進セミナーを担当するインドネシア人専門家（1名）を雇用した。

1.3.4 調査活動

JICA からの特記仕様書に基づき、下表に示す調査活動（下表の1a）及び2）と技術協力的な活動（下表の1b）～e）及び3）を主に行った。会議、セミナーを含む調査以外の活動の概要については、各章で示す⁹。

表 1.3.4.1. インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）の活動概要

No.	調査項目	調査内容
1.	泥炭地水位モニタリングの試行実施	
a)	泥炭地水位モニタリング業務に関する現況把握	関連法令の制定状況及び関係省庁間の調整状況について情報を更新する。
b)	詳細モニタリング計画策定支援	インドネシアの水位測定装置の管理体制(案)に関連して、技術的なガイダンス、具体的な方法、関係機関の役割分担・連携体制について提案を行い、関係者間の協働体制の構築を支援する。
c)	ステークホルダー向け研修の実施	対象 4 県の対象者向けに水位測定モニタリング手順等に関する研修を実施する。
d)	泥炭地水位測定装置設置位置の選定に係る地権者等の情報収集・確認の支援	設置候補箇所の地権者等の情報収集を支援し、BRG および地方ステークホルダーによる設置箇所の確定を促進する。
e)	泥炭地水位測定装置の設置・運用および設置された泥炭地水位測定装置の管理体制の構築	BRG の依頼に基づき、携帯電話回線を利用してリアルタイムに観測データをサーバーに転送するフィールドデータ伝送機器「SESAME」を設置する。 2016年12月のJICAインドネシア事務所の現地調達による計4基の先行導入を補足し、対象3州4県のうち3県について計10基のSESAMEの追加設置と運用にかかる業務を行い、水位測定装置の管理体制構築支援を行う。
2.	対象地域プロフィール調査	
a)	対象地域の現況把握	基礎的なデータを収集・整理する。
b)	泥炭地の環境に適応する商品作物の市場調査分析	水位回復後の泥炭地の環境に適応し、ビジネスとして成り立ちうる商品作物を洗い出し、当該商品の市場について分析を行う。

⁹ 本調査のその1において下表に示すような会議・セミナー等の活動を行っている。

日時（場所）	主催	会議・セミナー等	備考
2016年12月15-16日 (Hotel Borobudur)	BRG-KLHK	国際シンポジウム「国家レベルの泥炭回復総合アクションに向けて」	UNDP等との協賛
2017年2月3日	BRG	泥炭地モニタリングシステム開発に関する調整会議	
2017年2月7日	BRG	第1回泥炭回復投資者促進調整会議	
2017年2月9-10日	BRG-南スマトラ州 TRGD	第1回州泥炭水理モニタリング ToT 研修	

2016年12月15-16日BRGと環境林業省による国際シンポジウム開催を支援にあたって、BRG及びUNDPに設置されている国際シンポジウム事務局と、スピーカーの選定やプログラムの検討支援、セミナー開催のロジスティック業務等の調整・協働を行った。

No.	調査項目	調査内容
c)	民間投資計画の候補地マップ・プロファイルの作成	民間コンセッションを発給可能な候補地のリスト・地図及びプロファイル（土地利用現況、土壌、候補作物等）を作成し、民間企業の参画による泥炭地回復の適地を提示する。
d)	デモンストレーションプロットの情報収集	デモンストレーションプロットを特定するための情報収集を行い、民間企業の参画による泥炭地回復のビジネスモデルを提示する。
3.	民間投資促進のためのステークホルダー調整会議等の支援	
a)	定例調整会議の開催支援	上記調査及び将来の民間投資を円滑に進めるため関係する省庁と定期的な会合の開催を支援する。
b)	泥炭地回復投資セミナー（ジャカルタ及び東京）開催支援	BRG が予定している東京、ジャカルタの計 2 回の泥炭地回復投資セミナーについて、スピーカーの選定、プログラムの検討を支援し、ロジスティック業務に加え、スピーカーおよび参加者からの情報収集やセミナーの成果の取りまとめを行う。
c)	民間企業の参画による泥炭地回復ビジネスモデルの提示及び民間投資促進制度設計の検討支援	グリーンボンド等を適用したファイナンスに繋がる具体的な投資ポテンシャル案件の発掘、既存のファイナンス制度及び優遇税制等の情報収集を行う。投資を促進するインセンティブ制度（優遇税制等）設計の検討を支援する。
4.	協力プログラム案の提案	
a)	協力プログラム案の提案	泥炭地回復において、期待される支援内容を整理、中期的な協力について提案する。

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

調査活動にあたっては、ステークホルダーの新規協力内容に対するオーナーシップ向上¹⁰を促進するとともに、技術協力の姿勢にも配慮し¹¹、ステークホルダー間のブレインストーミングの促進に焦点を置いた協働作業に重点を置いた。

1.3.5 本報告書の構成

下表のように、第5章の本文と付属資料から構成される。

表 1.3.5.1. インドネシア国森林・泥炭地火災に係る情報収集・確認調査（その2）
 ファイナルレポートの構成

章	主な内容	備考
第1章	序論	コンソシウムに関する活動概要を含む
第2章	対象地の泥炭地モニタリングの試行	a. 泥炭地回復に係る法令に係る最近の動向の

¹⁰ 以前、林業大臣通達（S.328/Menhut.II/2010）「海外援助資金の管理について」が發布されている。3条b.において、2国間、多国間、非政府（NGO、民間）による海外援助プロジェクトの協力に係る提案について（多くは気候変動課題）、大部分の協力フレームが支援側のイニシアティブ（Partner Driven）になっていることをあげている。

¹¹ 日本の開発協力大綱の最新版（2015年11月）の基本方針にあるように、自助努力支援と日本の経験と知見を踏まえた対話・協働による自立的発展に向けた協力に向けて配慮した。そのため、技術協力として、以前のような日本の知識や技術を移転することを主体とするのではなく、アクションリサーチなど現場実践における日本とインドネシア側関係者の協働を通じた広い意味での能力向上、その成果として課題解決モデルの開発に焦点を置いた技術協力に貢献できるように調査活動にあたって配慮した。

章	主な内容	備考
	実施	変化を含む b. 会議を含む試行に関する活動概要を含む
第3章	対象地域プロフィール調査	
第4章	民間投資促進のためのステークホルダー調整会議等の支援	b. 会議を含む試行に関する活動概要を含む c. 国際協力連携にかかる最近の動向の変化を含む
第5章	協力プログラム案の提案	a. 2017年9月22日のDfR説明・協議時において、BRG側から提案のあったことから「当調査の成果について3コンポーネント」の視点からのレビューを加えた。 b. 泥炭地火災および泥炭地荒廃問題のレビューを含む c. 新規要請ポテンシャルの技術協力素案、民間資金協力素案を含む
付属資料集 (英語のみ)	1. 本調査に関する資料 2. 泥炭の保全・管理に関する最新政令の英訳 3. 関係機関の組織図 4. プロファイル調査の補足資料 5. グリーンファイナンスの概要 6. 収集資料リスト 7. 面談者リスト	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

なお、本調査はコンサルタントにより編成された調査団により実施されたものであり、本レポートの内容は JICA および関係する JICA 専門家、さらに環境林業省や BRG の立場、考え方を表明するものではない。

第2章 対象地の泥炭地モニタリングの試行実施

2.1 泥炭地モニタリング業務に関する現況把握

2.1.1 泥炭地の水位モニタリングに関する法規制フレームの概要

泥炭地水位モニタリングに関する関係法規制の制定状況は、下表に示すとおりである。

2017年15号環境林業大臣令「泥炭生態系制御地点における水位測定法について（2017年2月9日付決定、2月27日付発布）」等泥炭管理に係る5種の環境林業大臣令が制定された。

表 2.1.1.1 泥炭地水位モニタリングに関する法規制フレームの概要

年	法規制名	要点/特徴	備考
2009	環境保全・管理に係る法律 ¹²	● 生態系荒廃品質基準に泥炭を含むことを規定（第21条）	
2014	泥炭地の保全と管理に係る政令 ¹³	● 泥炭生態系荒廃基準を規定（第23条） (1) 保全機能ゾーン a) 排水路がある b) パイライト/石英堆積の露出 c) 土地被覆面積/体積の減少	
2016	泥炭地の保全と管理に係る政令の改定に関する政令 ¹⁴	(2) 耕作機能ゾーン a) 泥炭地表下から0.4mより深くなる b) パイライト/石英堆積の露出	
2017	泥炭生態系での制御地点における水位測定方法にかかる環境林業大臣令 ¹⁵	● モニタリング地点を「制御地点」と呼ぶ（第2条）。制御地点は、以下の2種。 a) マッピング時の格子状サンプリング地点 b) 事業・活動地の監視地点 ● 制御地点の数量は、最低、主要作物地/生産ブロック数の15%（第2条） ● 測定の実施者は、民間事業地では事業・活動の責任者、それ以外は、KPHまたはコミュニティグループ（第3条） ● 制御地点は、ブロックの中央として、半径50mの代表とみなす（第4条）。 ● 制御地点における観測項目（第5条） a) 位置、座標、標高 b) 水位 c) 降水量 d) 測定日時 e) 沈降速度 ● 制御地点における観測頻度（第6条）	

¹² Undang-undang No.32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup（3 Oktober 2009）

¹³ Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut（15 September 2014）

¹⁴ Peraturan Pemerintah Republik Indonesia Nomor 57 Tahun 2016 tentang Perubahan atas Peraturan Pemerintah Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut（6 Desember 2016）

¹⁵ Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor P.15/Menlhk/Setjen/Kum.1/2/2017 tentang Tata Cara Pengukuran Muka Air Tanah di Titik Penaatan Ekosistem Gambut（27 Februari 2017）

年	法規制名	要点/特徴	備考
		a) マニュアル観測: 2週間に1回 b) 自動観測: 1日1回（水管理ゾーン当たり1点は設ける） ● 降水量は20制御地点に1点。1日1回測定でよい（第7条） ● PKG へのデータ報告はハード及びソフトコピー3ヶ月に一度。土地被覆、排水路の変化などその他の情報も（第8条） ● 費用の負担は、民間事業地では事業・活動の責任者、それ以外は、APBN、APBD で予算執行者は KPH またはコミュニティグループなど（第12条）	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）（2017年7月現在）

2.1.2 泥炭地水位モニタリングに関する調整状況

(1) 調整の概況

泥炭地水位モニタリングに関する調整状況の概況は下表に示すとおりである。2017年2月の一連の環境林業大臣令の発布後、環境林業省、BRGとも泥炭地水位モニタリングに関して省庁間の調整が活発に行われるようになってきた。

表 2.1.2.1 泥炭地水位モニタリングに関する調整に係る最近の概況（2017年前半）

日付	調整状況	要点/特徴	備考
2017年3月20～21日	環境林業大臣令の中央レベル説明会	BRGを含む関係省庁も招聘	
2017年3月24日	BRG 非公式会議	環境林業省泥炭荒廃対策局（PKG）局長のBRG訪問	
2017年4月5日、13日	BRG「水位制御地点の確定調査準備会議」	BRGの活動へPKGの関与の開始	
2017年5月5日	KLHK「泥炭地のオイルパーム農園事業者に対する泥炭生態系保全管理政策の実施に関する説明会」	PKGの活動へBRG長官及び農業省農園総局長の関与	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) 泥炭地水位モニタリングに関する情報システム開発の調整

下表に示すように、PKG、BRGを中心に泥炭地水位を含む泥炭地モニタリングに関する情報システムの開発がおこなわれている。下図に示すように、BRG内のDeputy 1計画・協力部門(DI)を中心にオペレーションルームの設置に向けて、ステークホルダー間のシステム間の相互関係の調整が始まっている。一方、泥炭地水位モニタリングに関する担当部署のPKGにある泥炭地水位モニタリング情報の国家データベースとの相互関係の調整はまだ始まっていないと推察される。

表 2.1.2.2 泥炭地水位モニタリングに関する情報システム開発の最近の概況（2017 年前半）

機関	情報システム状況	要点/特徴	備考
PKG	Reporting Service Server Water Table Monitoring	<ul style="list-style-type: none"> ● GIS Server ● Database server & application ● Web server ● Reporting by SMS ,Andoid, Excel/Email and Logger/Realtime 	
BRG (Deputy 1)	Peat Restoration Information Management System	<ul style="list-style-type: none"> ● Data collection and management: Data input, Validatator and verifiers, Executive report ● Spatial analysis: Produced monitoring maps <ul style="list-style-type: none"> a) Hydorological maps b) Restoration actions planning maps c) Restoratio performance/progress monitoring maps d) Land cover change maps ● User interface: Internal use & published by web based GIS 	For Operation Room
BRG (Deputy 4) -BPPT	Integrated realtime water table monitoring information	<ul style="list-style-type: none"> ● Integration system for monitoring all water table data of SESAME data and MORPAPALAGA data ● Modeling of water table prediction with SAR satellite data 	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

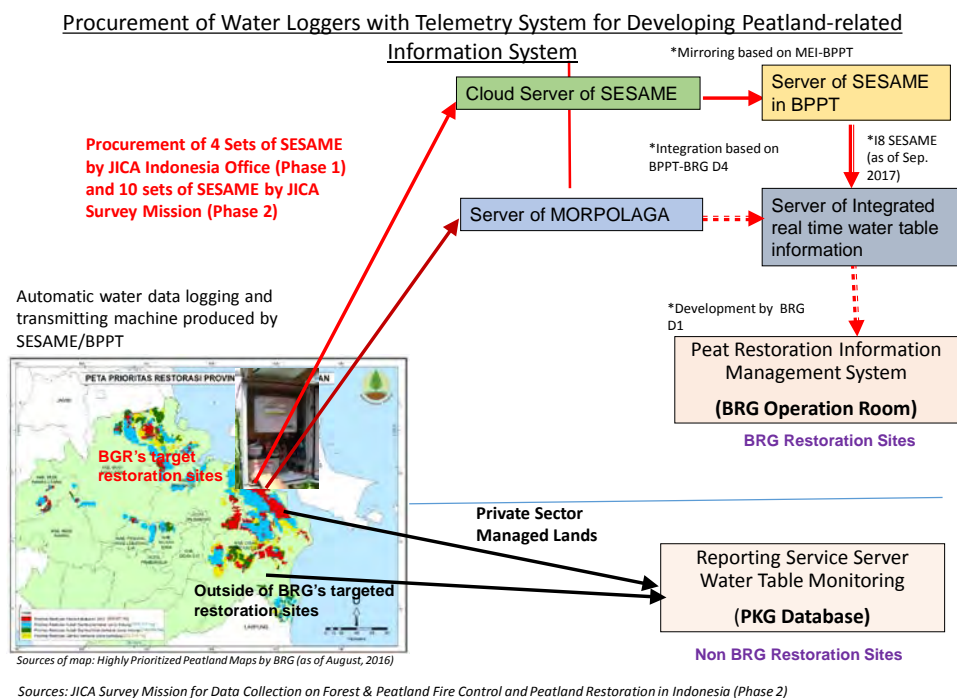


図 2.1.2.1 泥炭地水位モニタリングに関する情報システム開発の概況

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.2 詳細モニタリング計画策定支援

2.2.1 テレメトリー方式泥炭地水位測定装置の概要

インドネシア国で泥炭地での水位モニタリング試行実績を持つ水位測定装置として、BPPT 製の「MORPALAGA」（下図 2.2.1.1 参照）と「株式会社みどり工学研究所」製の「フィールドデータ伝送機器 SESAME II-2d」（下図 2.2.1.2 参照）がある。本章では、JICA から銘柄指定のあった SESAME の II-2d（水位測定センサーを主体としたタイプ）をもとに、装置の概要を検討する。

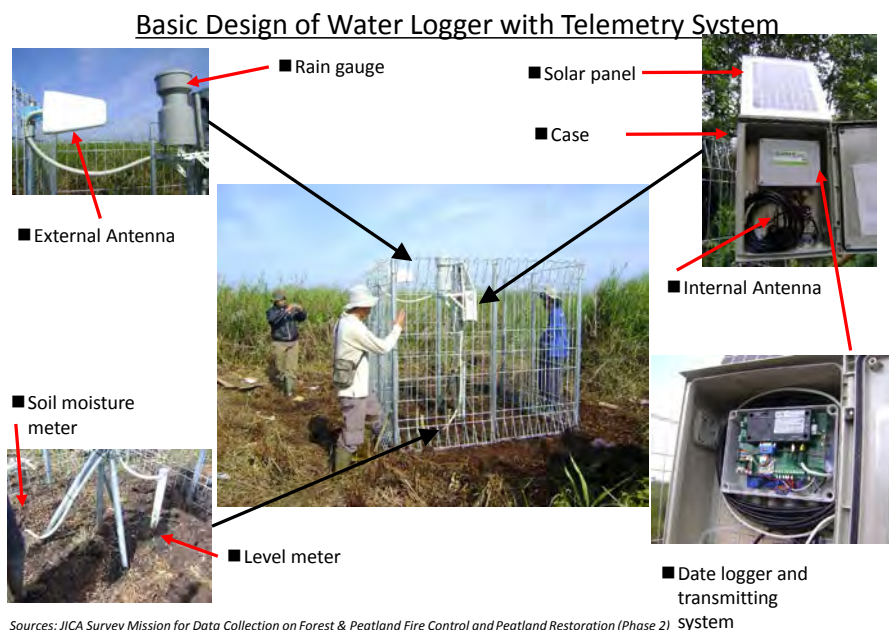
本装置は、既往の測定センサーのデータを一時保存するデータロガーから一般の電話回線の電波（携帯電話）を活用することによりデータを伝送するテレメトリー方式を採用している。その構成は下表に示すとおりである。



テレメトリー方式泥炭地水位モニタリング装置BPPT製MORPALAGA（Riau州Meranti県Tebing Tinggi Timu郡, Des.S.Tohor村郡長事務所宿泊所Sanggar Seni;2017年7月17日）

図 2.2.1.1. テレメトリー方式泥炭地水位測定装置 MORPALAGA の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration (Phase 2)

図 2.2.1.2. テレメトリー方式泥炭地水位測定装置 SESAME II-2d の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.2.1.1. テレメトリー方式泥炭地水位測定装置の構成

Basic Component of Procured Water Logger with Telemetry System

No	Goods	Part Code	Quantity (per set)	Specification
1	Automatic data logging and transmitting machine	SESAME II-02d	1 set	With ■ Circuit board (Standard SIM: M to M) ■ Communication module ■ Internal antenna ■ Made in Switzerland
2	Level meter (5m)	M86H-B type	1 piece	■ Pressure type ■ Adjusted ■ 10m cable
3	Rain gauge	OW-34-BP	1 piece	■ Made in Japan ■ Assembled
4	Soil moisture meter	SM150	1 piece	■ Made in UK ■ Assembled ■ 10cm depth based on BRG's instruction
5	Solar panel	10W	2 panels	■ Assembled ■ 1 panel for spare
6	Case		1 case	
7	Others			■ 1 bind of manual: II-2d and web site ■ CD program ■ Key for case ■ External antenna (optional)

Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration (Phase 2)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

BPPT 製のテレメトリー方式泥炭地水位測定装置 MORPALAGA との特徴的な相違として、水位測定センサーについて MORPALAGA は超音波式であるが、SESAME では圧力式を採用している。

Basic Design of Web-based Field Data Manager (BRG Specific web application)



図 2.2.1.3. SESAME 泥炭地データ BRG 専用 Web サイトの概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）（2017年10月4日現在）

2.2.2 テレメトリー方式泥炭地水位測定装置の管理体制構築の支援

(1) 泥炭地水位測定装置の管理体制構築の促進

BRG ではモニタリングの技術的側面にとらわれがちで、モニタリング計画の策定などモニタリングに関する社会的準備や保安確保などの検討を避ける傾向がある。そのため、以下のように段階を追った議論の促進を通じて、泥炭地水位測定装置の管理体制構築の支援を行った。その他、対象地域における TRGD、県関係機関との面談による調整支援も行った。

表 2.2.2.1 泥炭地水位モニタリングの試行に係る会議等の活動概要

日時（場所）	主催	会議等	備考
その1			
2017年2月3日（BRG Teuku Umar 事務所）	BRG	泥炭地モニタリングシステム開発に関する調整会議	IJREDD+参加
その2			
2017年3月31日（BRG Teuku Umar 事務所）	BRG	泥炭地での水位モニタリングシステム開発に関する技術協議	<ul style="list-style-type: none"> ● IJREDD+予算 ● 日本アカデミア（大崎氏参加）
2017年4月27日（BRG Imam Bonjol 事務所）	BRG	テレメトリー方式泥炭地水位モニタリング装置製造 TOT 準備に関する技術協議	主に BPPT
2017年7月7日（Hotel Oria）	BRG	テレメトリー方式泥炭地水位モニタリング装置管理の準備に関する技術協議	機材引渡し候補機関を含む

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



テレメトリー方式泥炭水位モニタリング装置製造 TOT準備に関する技術協議（ジャカルタBRG（Imam Bonjol）事務所;2017年4月27日）



テレメトリー方式泥炭水位モニタリング装置管理の準備に関する技術協議（ジャカルタHotel Oria;2017年7月7日）

図 2.2.2.1. 泥炭地水位モニタリングの試行に係る会議等の活動の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

当初の議論において、水位モニタリングは火災危険度区分（FDRS）モデルの開発により火災発生に対する早期警戒を図るという目的に重点がおかれていた。議論の結果、

短期的にはリアルタイム方式の水位測定装置によるモニタリング地点数の増加を図りながら、最終的には衛星データも活用したモニタリングシステムを開発することとなった。しかしその後の議論を経て、環境林業省の所管と整理するため、BRG が行う泥炭地水位モニタリング体制構築は『火災発生に対する初期警戒・火災予防』から、『泥炭回復の検証・評価¹⁶⁾』を重視する主目的へと推移してきている。

上記の協議の結果、JICA からの機材の所有権の引渡しは、水位モニタリングの現場マネージャーを機能する機関ではなく BRG へ行うこととなった。BRG 存続中は、BRG が維持管理の責任を負う（予算も BRG）。実質の管理者への引渡しができない背景として、2017 年発布の環境林業大臣令（No.15/2017 など）に基づくと、企業地以外の泥炭地管理（水位モニタリングを含む）実施者は、「森林管理ユニット（KPH）」と「コミュニティグループ」となる。その予算源は、中央・地方政府負担（環境業務は地方政府の義務業務）であるが、企業地以外の泥炭地管理については、地方行政としては具体的にはこれから対策を検討するということがあるためである¹⁷⁾。

(2) 泥炭地乾燥時の初期警戒・対応体制の検討

泥炭地水位モニタリングに対するアクションの視点からの泥炭地水位モニタリング装置の実管理者の検討が重要であるとの PKG 局長などの提案にも対処するため、泥炭地水位測定装置によるモニタリング結果に基づく水位が低くなった際、泥炭荒廃の予防、さらに火災発生に対する初期警戒・火災予防の対処手順を検討するための技術会議も 2017 年 10 月までに開催することで検討中である。

泥炭水位が低くなった時の対応体制として、下図のような体制が提案される。

- 装置の監視、不具合時の装置の点検は現場レベルで、装置の維持費の予算準備は州レベルで行うことが想定される。
- 関係機関は、現場レベルによるアクションに向けた指導・勧告を行うことになる。
- 泥炭が乾燥した場合、水位コントロールによる湿潤化の対応と火災への初期警戒としてパトロールの強化が考えられる。
- 初期警戒にあたっては、MPA などコミュニティグループにより火災危険警報板を村落の中心地だけでなく、火災頻発地にある乾燥した泥炭地付近に設置することが薦められる。

(3) 民間企業地以外の泥炭地における泥炭地水位測定装置の管理体制案

上記の検討を踏まえると、2016 年 9 月の「インドネシア国森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」の詳細計画策定調査時に先方政府と合意したミニッツの「Attachment 6. Draft Proposed Responsibility in Peatland Water Monitoring in Other Use Area/APL」についての改良案は、表 2.2.2.2 に提案するとおりである。

¹⁶⁾ KSP から求められているのは、「実際に泥炭回復した面積」、さらにヘイズ・火災予防面から「火災起源の GHG 排出軽減効果量」との情報がある。

¹⁷⁾ 以下のような事情から泥炭地水位モニタリング装置の実管理者候補は引渡しに消極的である。

- 泥炭地管理の基礎となる泥炭地水理単位（KHG）ごとの泥炭地生態系保全・管理計画がまだ策定されていないところが多い。
- 泥炭管理に関する予算の執行事例が乏しく、KPH 関係機関、地方政府（村落を含む）では当面、自信を持って負担できる可能性がない。
- BRG から、環境林業省や地方政府へ、中央政府機関資産の引き渡し事務がまだ確立していない

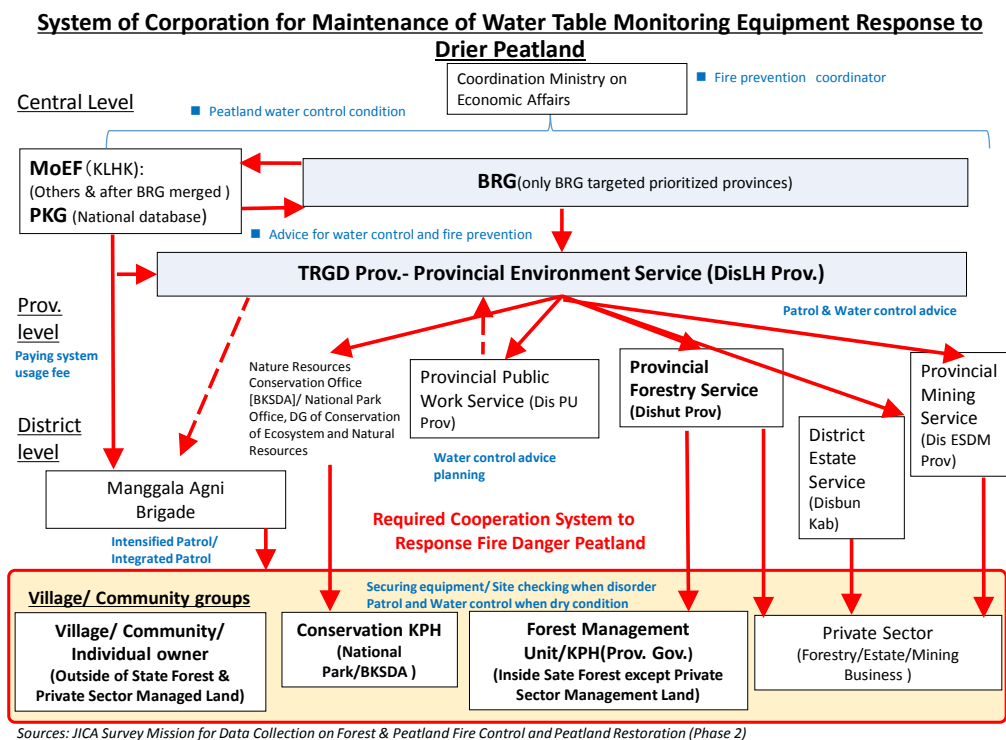


図 2.2.2.2. 泥炭地乾燥時の初期警戒・対応体制の提案

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

Proposed Patrol and Early Warning with Setting-up Warning Sign Board of Drier Peatland

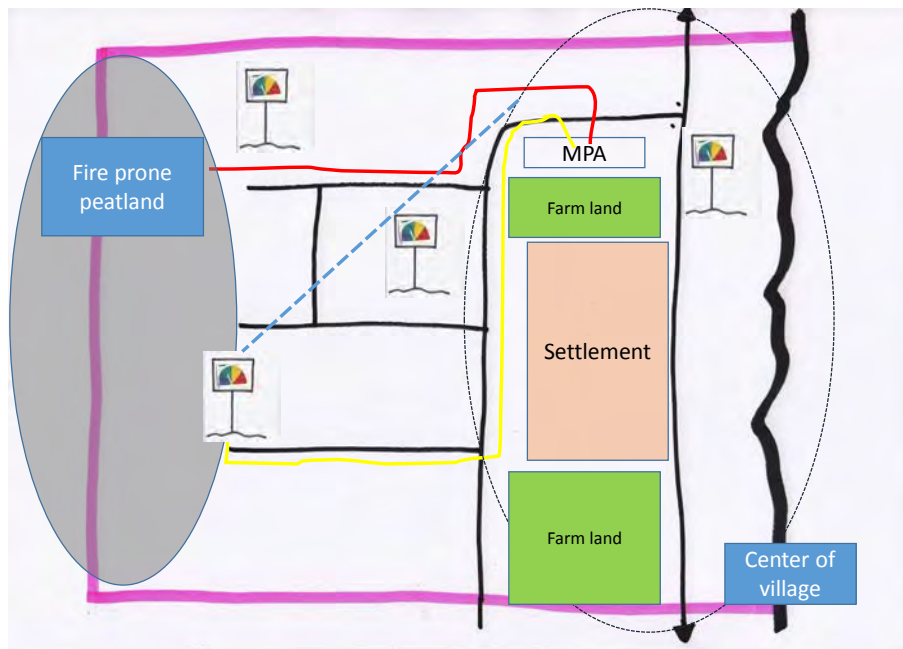


図 2.2.2.3. 泥炭地乾燥時の警報板設置のイメージ

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.2.2.2 民間企業管理地以外の泥炭地水位測定装置の維持・管理モニタリング上における役割分担の提案

Proposed Role Sharing in Maintenance/Management of Water Table Monitoring Equipment outside of Private Sector Managed Area

No.	Role	BRG	PKG	Prov./TRGD (KPH P/L)	Kab./LH (KPH P/L)	Desa	Remarks
I BRG Restoration Sites until 2020							
1	Planning	X					
2	Design & Management	X		X	X		Include. Installation location
3	Place arrangement			(X)		X	
4	Providing Equipment	(X)					Equipment received by BRG will be National Assets. And then the equipment will be handed over from BRG to local gov. as Local Gov. Assets.
5	Providing Training	X					
6	Maintenance of device and Payment for tele-communication (include. SIM - card and prepaid Pulsa)	X		(X)			BRG will allocate budget for maintenance and tele-communication for the first year. BRG will recommend the local government to allocate budget.
7	Security			X	(X)	X	
8	Reporting data to National Database (PKG)	X		(X)	(X)		
II Non BRG Restoration Sites and Whole KHG after 2020							
1	Planning		X				Non BRG target
2	Design & Management		X	X	X		Include. Installation location
3	Place arrangement		(X)	(X)	(X)	X	
4	Providing Equipment		(X)				
5	Providing Training		(X)				
6	Maintenance of device and Payment for tele-communication		(X)	X			
7	Security			X	X	X	By organizing/ strengthening village facilitators (and/or TPD) for peat management
8	Reporting data to National Database			X	X		
9	National Database Management		X				

Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration (Phase 2)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.2.3 コミュニティベース泥炭地水位モニタリング・管理促進策の検討

(1) コミュニティベース泥炭地水位モニタリング・管理促進ニーズ

上記のように、国有林外（企業管理地を除く）では、将来的にコミュニティグループが実質的な泥炭水位モニタリング・管理者となることが想定されている。

しかし、UNRI 調査チームから、これまでの経験・教訓に基づき、現場でのアクションの計画・実施にあたって、以下のような傾向が発生しており、その予防策を検討することの重要性が指摘されている。

- a) S. Tohor 村への大統領の視察後、当県に国内外のドナー、NGO、研究者など多くの外部者が訪問
- b) コミュニティによるイニシアティブの醸成のファシリテーションなしに外部支援により Canal Blocking、植林、生計向上活動などを実施
- c) その結果、泥炭回復に対するコミュニティの外部依存が高まり、外部からの無償支援が待っているだけで得られる、無償支援の過程で労賃や謝金などが収入源の一つとしてビジネス化している傾向にある。弊害として、施工箇所、植栽箇所を破壊して、また支援を得るのを待つ箇所もある。

上記は、BRG など泥炭回復に関係するステークホルダーによるコミュニティに対する無償支援が増加し、そのネガティブなインパクトとして土地管理に関するコミュニティ内の共同作業を拒むとともに、外部依存を求めることが顕著になるためと推察される。JICA 技術協力 FCP では自発的に購入・設置していた深井戸（Sumur Bor）も、泥炭回復では外部からの無償支援の対象となっている。その結果、揚水ポンプの稼働に必要な燃料も負担しなくなる恐れがある。BRG が中央カリマンタン州 Pulpis 県で試行してい

る水稻栽培における PLTB のデモンストレーションプロットでも、共同作業から離脱するコミュニティが増え、除草が疎かになり、栽培自体に必要な肥料や薬剤、さらに揚水ポンプ、その後はポンプの燃料費まで外部支援も求め始めるようになっていた（2017年6月現場調査時）。コミュニティベース泥炭地水位モニタリング・管理の促進策の検討が重要になると想定されている。

以下の制度の経験・教訓を活かして、コミュニティに対する泥炭水位モニタリング・管理の自発的なアクションプランの作成支援を検討することが重要と想定される。

(2) 環境林業省のコミュニティファシリテータ制度

環境林業省の PKG 局では、村落レベルの流域保全面から、環境愛護コミュニティ作業チーム（Tim Kerja Masyarakat Warga Cinta Lingkunga）を組織化した経験を活かし、「泥炭生態系回復のためのコミュニティ自立プログラム（Program Kemandirian Masyarakat untuk Pemulihan Ekosistem Gambut）」を開始している。以下の手順により、「コミュニティアクションプラン（Rencana Aksi Masyarakat [RKM]）」の作成を促進するものである。

- a) 大学との MOU
- b) 大学による対象村落へのファシリテーション
- c) ファシリテーター候補のトレーニング
- d) 村落レベル泥炭回復作業チーム組織化
- e) 問題の同定と状況分析書の作成
- f) コミュニティアクションプランの作成

(3) 泥炭保全村落（Desa Peduli Gambut）

BRG では、泥炭地域、特に泥炭回復地域内とその周辺の農村開発プログラムと連携するフレームを設定している。「泥炭農村地域」の設定により村落による泥炭管理に関する計画段階を開始し、さらに KHG 内の村落間の協力の強化を統合するアプローチである。以下のようなプロセスにおけるファシリテーション活動がある。

- a) 「泥炭農村地域」の設定
- b) 村落および泥炭農村地域の空間計画
- c) コンフリクトの同定と解決
- d) 水理と土地管理のための体制、権利、アクセスの認定と法定化
- e) 経済的なエンパワーメント
- f) 地域知識の強化
- g) 泥炭火災に対する村落コミュニティの備え

2.3 ステークホルダー向け研修の実施

以下のような活動を通じて、泥炭地水位測定装置を活用したモニタリングに関するステークホルダー研修が開催された。

表 2.3.1.1 対象地ステークホルダーに対する泥炭地水位モニタリングの研修活動の概要

日時（場所）	主催	会議・セミナー等
その1		
2017年2月9-10日	BRG-南スマトラ州 TRGD	第1回南スマトラ州泥炭地水位モニタリング ToT 研修
その2		
2017年3月22-23日	BRG-南スマトラ州 TRGD	第2回南スマトラ州泥炭地水位モニタリング ToT 研修

日時（場所）	主催	会議・セミナー等
2017年7月10-11日	BRG-UPR	中央カリマンタン州・リアウ州泥炭地水位モニタリング ToT 研修

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.3.1 南スマトラ州ステークホルダーに対する泥炭地水位モニタリング装置の活用・保全に関する研修

(1) 第1回

以下のようなカリキュラムと参加者で、泥炭地水位測定装置を活用したモニタリングに関するステークホルダー研修が2017年2月9～10日に南スマトラ州で実施された。

表 2.3.1.2 南スマトラ州泥炭地水位モニタリング研修（第1回）のカリキュラム概要

Time & Date (Day)	Curriculum	PIC	Remarks
9 Feb. 2017 (Thurs.) Hotel The 101 Palembang, South Sumatra Province			
8:00-8:30	Registration	Secretariat	
8:30-9:15	Progres Report on Peatland Water Table Monitoring System	Deputy for Research & Development, BRG	
	Remarks and Direction from Governor of South Sumatra Province	Coordinator of TRGD	
	Remarks, Direction and Opening from Head of BRG	Head of BRG	
9:15-10:15	Coffee Break	Secretariat	
10:15-10:55	Preparation of Peatland Water Table Monitoring System in Peatland Damage Control	Dir. PKG	
10:55-11:20	Session 1: Basic of peatland water control (Theory)	Head of Expert Group of TRGD	
11:20-11:50	Session 2: Basic of peatland water monitoring (Theory)	Head of National Research Council	
11:50-13:10	Discussion	BRG	
13:10-14:00	Luch Break	Secretariat	
14:00-15:20	Session 3: Method of Utilization, Maintenance of peatland water control monitoring equipment (Theory & Practice)	BPPT & ZMEI/MEI	
15:20-16:30	Session 4: Pealtland water control monitoring planning (Brainstorming)	BRG	
10 Feb. 2017 (Fri.) Hotel The 101 Palembang, South Sumatra Province			
8:00-9:00	Registration	Secretariat	
9:00-10:00	Group Discussion	BRG	
10:00-11:00	Presentation by Group & Plenary discussion	BRG	
11:00-11:30	Closing	<ul style="list-style-type: none"> ■ Acting Secretary of TRGD ■ Deputy for Research & Development, BRG BKSDA Sumsel 	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.3.1.3 南スマトラ州泥炭地水位モニタリング研修（第1回）参加者の概要

機関	人数	備考
州レベル	52人	中央レベルを含む
県・村レベル	25人	OKI 県、MUBA 県
民間企業	27人	
計	104人	州知事による祝辞の可能性も想定されたため、参加者が増加した。

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



第1回南スマトラ州ステークホルダー向け泥炭地モニタリング研修「開会セッション」
 (Palembang[Hotel 101]; 2017年2月9日)



第1回南スマトラ州ステークホルダー向け泥炭地モニタリング研修「SESAMEに関する講義」
 (Palembang [Hotel 101], 2017年2月9日)

図 2.3.1.1 南スマトラ州泥炭地水位モニタリング研修（第1回）の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

参加者からのニーズや提案などを考慮して、次回研修では、以下のような観点から改良を図ることになった。

- a. 各地での研修後、選抜された参加者に対して中央レベルの研修で ToT 研修を行う。
- b. 各地での研修では、県レベルステークホルダーに焦点を当てる。
- c. 各地での研修では、テキストの項目をそれぞれ学習できるように座学を増やす。装置の設置実習を組み合わせる。

(2) 第2回

以下のようなカリキュラムと参加者で、泥炭地水位測定装置を活用したモニタリングに関するステークホルダー研修が 2017 年 3 月 22～23 日に南スマトラ州で実施された。第2回目は、室内研修だけでなく、屋外研修（既設の泥炭地水位モニタリング装置[OKI-1]）の視察及び設置デモ/試行）を組み入れた。

表 2.3.1.4. 南スマトラ州泥炭地水位モニタリング研修（第2回）のカリキュラム概要

Time & Date (Day)	Curriculum	PIC	Remarks
22 Mar. 2017 (Wed.)	Hotel Aston Palembang, South Sumatra Province		
8:00-8:30	Registration	Secretariat	

Time & Date (Day)	Curriculum	PIC	Remarks
8:30-9:10	Remarks, Direction and Opening from BRG	Deputy for Research & Development, BRG	
9:10-9:40	Provincial policy concerned with Peatland monitoring	Coordinator of TRGD	
9:40-10:35	Update on Laws and Regulation concerned with Peatland Monitoring	Dir. PKG	
10:35-11:00	Work on Construction, Operation & Maintenance of BRG	Deputy for Construction, Operation & Maintenance, BRG	
11:00-11:15	Coffee Break	Secretariat	
11:15-11:45	Material 1: Important aspect in implementation in installation of peatland water table monitoring equipment	Head of WG of Date Developemnt of BRG	
11:45-13:00	Luch Break	Secretariat	
13:00-16:30	Session 2: Processing and analysis of water table data	BPPT	
23 Mar. 2017 (Thurs.)	Peat Forest Genetic Conservation Plot in Sepucuk Area, OKI District, South Sumatra Province		
8:00-16:30	Installataon of water table monitoring equipment (Practice)	ZMEI/MEI	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.3.1.5 南スマトラ州泥炭地水位モニタリング研修（第2回）参加者の概要

機関	人数	備考
州レベル	33人	中央レベルを含む
民間企業	16人	
計	49人	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



南スマトラ州ステークホルダー向け泥炭地モニタリング研修「開会セッション」（Palembang[Hotel Aston]; 2017年3月22日）



南スマトラ州ステークホルダー向け泥炭地モニタリング研修「室内演習」（Palembang [Hotel Aston], 2017年3月22日）

図 2.3.1.2 南スマトラ州泥炭地水位モニタリング研修（第2回）の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.3.2 中央カリマンタン・リアウ州ステークホルダーに対する泥炭地水位モニタリング装置の活用・保全に関する研修の合同開催

(1) 研修概要

以下のようなカリキュラムと参加者で、泥炭地水位測定装置を活用したモニタリングに関するステークホルダー研修が2017年7月10日～11日に中央カリマンタンで実施された。2017年3月開催の第2回南スマトラ州ステークホルダー向け研修に準じた内容としたが、研修前後に理解度確認テストの試行を行った。第1日目の室内研修では水位測定装置の基本構造についても含めた。室外研修はMantaren I村における新設水位装置の設置と併行して実施した。

表 2.3.2.1. 中央カリマンタン州・リアウ州合同泥炭地水位モニタリング研修のカリキュラム概要

Time & Date (Day)	Curriculum	PIC
10 Jul. 2017 (Sen.)	Hotel Luwansa Palangkaraya, Cenral Kalimantan Province	
8:00-8:30	Registration	Secretariat
Opening Material		
8:30-8:45	Remarks, Direction and Opening from BRG	Deputy for Research & Development, BRG
8:45-9:00	Overview of Trial of Peatland Water Control Monitoring Outside of Concession Area (Component 1)	JICA Survey Mission
9:20-9:40	Technics of field monitoring and data processing (Lessons learned from Jambi)	Head of Expert Group of TRGD Jambi
9:40-10:00	Discussion	BRG
10:00-10:15	Coffee Break	Secretariat
Core Material		
10:15-12:00	Assembling peatland water table monitoring equipment and discussion	BPPT
11:45-13:00	Luch Break	Secretariat
13:00-16:00	Assembling peatland water table monitoring equipment (Practice)	BPPT
16:00-16:20	Processing and analysis of water table data as well as preparation of design of satlite-baed peatland monitoring system	BPPT
16:20-16:40	Water table monitoring system	BPPT
16:40-17:00	Discussion	BRG
11 Jul. 2017 (Tue.)	KPH Kepahayang Hilir in Mantaren I Village, Pulpis District, Central Kalimantan Province	
8:00-16:30	Installataon of water table monitoring equipment (Practice)	ZMEI/MEI

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.3.2.2 中央カリマンタン州・リアウ州合同泥炭地水位モニタリング研修参加者の概要

機関	人数	備考
中央カリマンタン州・Pulpis 県・村レベル	32 人	中央レベルを含む
リアウ州 Meranti 県・村レベル	3 人	
南スマトラ州 OKI, MUBA 県・村レベル	5 人	
民間企業	0 人	
計	40 人	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



中央カリマンタン州・リアウ州ステーキホルダー向け合同泥炭地モニタリング研修「研修開始時の理解度テスト」（Palangkaraya[Hotel Luwansa]; 2017年7月10日）



中央カリマンタン州・リアウ州ステーキホルダー向け合同泥炭地モニタリング研修「野外演習」（中央カリマンタン州Pulang Pisau県生産林森林管理ユニットMT地点;2017年7月11日）

図 2.3.2.1 中央カリマンタン州・リアウ州合同泥炭地水位モニタリング研修の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) 課題と教訓

これまでの研修実施の経験から、次のような課題と教訓が得られている。

- a) 研修直前に大統領府の予定が入り満席となったため、中央カリマンタン行きのフライトの予約ができなかった研修参加候補者が多く、リアウ州ステーキホルダーからの参加者に限定された。BRG による類似の研修にあたって、リアウ州のステーキホルダーを巻き込むことが重要になる。
- b) 目標とする泥炭モニタリング実施者の KPH とコミュニティグループへの研修の対象者をリストアップして研修実施の全体設計を行い、研修に必要なトレーナーの要件を絞り込んでから、ToT 研修の設計を行うべきである。
- c) 目標とする研修対象者のうち、適正な水位モニタリングの実施者に求められる能力を再度検証し、必要な研修課題をカリキュラムに取り入れるべきである。

2.4 泥炭地モニタリング装置設置位置の選定に係る地権者等の情報収集・確認の支援

2.4.1 泥炭地水位モニタリング試行地の選定

先行調査において、BRG の研究・開発部門プログラム専門家と協力して、泥炭地水位モニタリング試行地の候補地が選定された。残り 10 箇所の泥炭地水位モニタリングの試行地の選定基準も、先行調査時に準じた。

表 2.4.1.1 BRG による泥炭地モニタリング装置の設置場所の選定基準

番号	基準
1	泥炭地であること。
2	コンセッション地などではなく、国有林、村落林、地方自治体の施設敷地など、公的な土地であること。
3	携帯電話のネットワークがあること。
4	2015 年の泥炭火災地であること。また比較対象として、2015 年の泥炭火災の被害を受けていない箇所も併せて選定する。

出典：BRGの担当者からの情報（2016年12月）の情報をもとに作成。

2.4.2 泥炭地モニタリング装置選定に係る地権者等の情報収集・確認のための現地調査

上記選定基準に基づき、南スマトラ州では州 TRGD で、中央カリマンタン州では BRG と郡長・村長で、リアウ州については主に県関係機関と村長とともに、設置場所の予備的選定を行った。

その後、現地再委託コンソーシアムのうち、構成チームの協力のもと地権者等の情報収集の支援を行い、BRG および州 TRGD（事務局）による設置箇所の確定までの一連の業務を促進した。現場での設置箇所の確認においては、州 TRGD、県関係機関、村役場関係者および地権者の関係者等が立ち合った。設置箇所の現場確認においては、小水路から約 500m 離れるように、設置箇所の検討を行った。

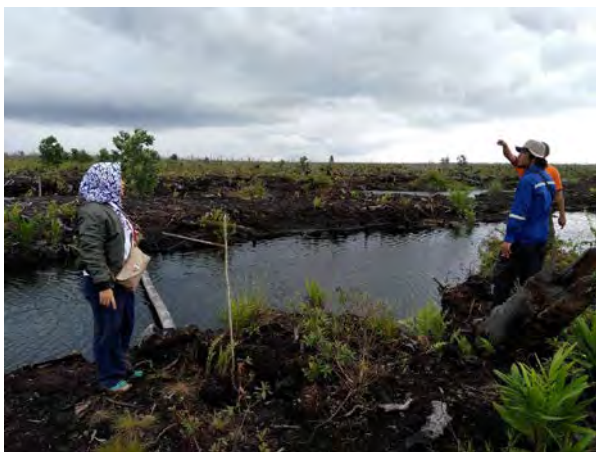
リアウ州については、州 TRGD 事務局と県、さらに設置候補箇所間の距離が遠く、アクセスが容易でないことから、設置候補箇所の地権者等の情報収集に時間を要した。そのため、以下のように情報収集及び設置箇所の確定を支援するため、設置候補箇所の現地調査を3回実施した。

- a) BRG から最初に提案のあった泥炭地水位モニタリング試行地候補の3村（Des. Insit, Kota Selat Panjang, Des Banglas Barat）において、妥当性の高い設置候補箇所を探すことが難しく、他の3村（Des. Tenan, Des Alai, Des Lukun）で設置箇所を探した。
- b) この3村について、地権者が明確な設置候補箇所を探すことが難しく、2017年5月4日に BRG の研究・開発部門次官の指示により、S. Tohor 村と Lukun 村の村落林など村役場が提案する箇所から探すこととなった。

表 2.4.2.1 泥炭地水位測定装置の設置箇所の選定概要

Code	Province	District	Sub-district	Area/Village	KHG	Comparison	Land status (Land owner)	Remarks
Phase 1								
OKI-1	Sumsel	OKI	Kayu Agung	Sepucuk/Kedaton	S. Simbumbang-S.Batok	No Fire	APL (District)	
OKI-2	Sumsel	OKI	Tulung Selapan	Simpang Tiga	S. Sugihan-S. Lumpur	Fire 2015	APL (Puskesmas)	
MUBA-1	Sumsel	MUBA	Lalan	Sungai Merang/Bakung	S. Air Hitam-S.Batok	No Fire	KH (KPHP)	
MUBA-2	Sumsel	MUBA	Lalan	Kepayang	S. Air Hitam-S.Batok	Fire 2015	KH (KPHP)	
Phase-2								
PS-1	Sumsel	OKI	Pangkalan Lampam	Sebokor/Baru	S. Sugihan-S. Saleh	No Fire	KH (KPHK/BKSD A)	Lumpur2
PS2R	Sumsel	Banyu Asin	Muara Padang	PLG/Sidomulyo	S. Sugihan-S. Saleh	Alternative No Fire	KH (KPHK/BKSD A)	■Seleh2 ■Due to no accessibility of the first candidate site in the southern KHG.
AS1R	Sumsel	OKI	Pangkalan Lampam	Riding	S. Sugihan-S. Lumpur	Alternative Fire 2015	APL (Kadus /KaDAOPS MAIII)	■Lumpur1 ■Due to no accessibility of the first candidate site in the BRG first priority area
PT-1	Sumsel	OKI	Pedamaran Timur	Pulau Geronggang	S. Simbumbang-S.Batok	Fire 2015	KH (KPHP)	Seleh1
SJ	Kalteng	Pulpis	Sebangau Kuala	Sebangau Jaya	S. Katingan-S. Sebangau	Fire 2015	APL (Poktan/Family of Village Head)	Batok1
PM	Kalteng	Pulpis	Sebangau Kuala	Paduran Mulya	S. Katingan-S. Sebangau	Fire 2015	APL (Poktan/Family of Village Head)	Kecil1
BT	Kalteng	Pulpis	Kahayang Hilir	Buntoi	S. Kahayang-S.Sebangau	Fire 2015	KH (KPHP)	■Kecil2 ■Changed to outside of HD due to proposed by villagers in the socialization
M1	Kalteng	Pulpis	Kahayang Hilir	Mantaren I	S. Kahayang-S.Sebangau	Fire 2015	KH (KPHP)	■Batok2 ■Changed to outside of HD due to proposed by villagers in the socialization
ST	Riau	Meranti	Tebing Tinggi Timur	Sungai Tohor	Pulau Tebing Tinggi	No Fire	KH (LPHD)	Tinggi1
LK	Riau	Meranti	Tebing Tinggi Timur	Lukun	Pulau Tebing Tinggi	No Fire	KH (Des)	■Tinggi2 ■Difficult to look for clear land ownership information

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



泥炭水位測定設置候補箇所の現場確認調査（PT-1地点）（Pulau Geronggang Village, District OKI, Prov. Sumsel; 2017年2月21日）



泥炭水位測定設置候補箇所の地権者情報の収集（BT地点）（Buntoi Village, District Pulpis, Prov. Kalteng; 2017年3月9日）

図 2.4.2.1 泥炭地水位測定装置の設置箇所の選定の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.4.3 村落レベルの泥炭地水位モニタリングに係る説明会/研修会の開催

現地再委託コンソーシアムのうち、構成チームが州 TRGD や県関係機関を関与させて、村落レベル泥炭水位モニタリング説明会/研修会の開催を支援した。

表 2.4.3.1 村落レベル泥炭水位モニタリング説明会/研修会の概要

開催日	開催場所	対象箇所	備考 (主体チーム)
その1			
南スマトラ州			
2017年3月6~7日	OKI 県 Kayu Agung 郡 Kedaton 村	OKI-1	UNSRI
2017年3月26日	MUBA 県 Lalan 郡 Bakung 村	MUBA-1	UNSRI
2017年3月26日	MUBA 県 Lalan 郡 Kepayang 村	MUBA-2	UNSRI
2017年4月1日	OKI 県 Tulung Selapan 郡 Simpangtiga 村	OKI-2	UNSRI
その2			
南スマトラ州			
2017年6月13日	OKI 県 Pangkalan Lampan 郡 Riding 村	AS1R	BP2LHK
2017年6月13日	OKI 県 Pangkalan Lampan 郡 Perigi 村	PS1	BP2LHK
2017年6月14日	OKI 県 Pedamaran Timur 郡 Pulau Geronggang 村	PT1	BP2LHK
2017年6月19日	OKI 県 Pangkalan Lampan 郡 Sidumuluyo 20 村	PS2R	BP2LHK
中央カリマンタン州			
2017年6月20日	Pulpis 県 Kahayang Hilir 郡	Buntoi 村 Mantaren I 村	UPR
2017年6月22日	Pulpis 県 Subangau Kuala 郡	Subangau Jaya 村 Paduran Mulya 村	UPR
リアウ州			
2017年7月15日	Meranti 県 Tebing Tinggi Timur 郡 Lukun 村	Lukun 村	UNRI

開催日	開催場所	対象箇所	備考 (主体チーム)
2017年7月16日	Meranti 県 Tebing Tinggi Timur 郡 S. Tohor 村	S. Tohor 村	UNRI

出典：Tim Konsorsium UNSRI-UNRI-UPR-BP2LHK Palembang. 2017. Final Report BRG-JICA (Phase-II) Pra Studi Kelayakan Investasi pada Empat Wilayah Restorasi Lahan Gambut Prioritas di Indoensia Kab. OKI, MUBA, Kepulauan Meranti dan Pulpis



泥炭地水位測定設置に関する村落レベル説明会
 (MUBA-2 地点) (Kepayahang Village, District
 MUBA, Prov. Sumsel;2017年3月26日)



泥炭地水位測定設置に関する村落レベル説明
 会 (AS1R地点) (Ridng Village, District OKI, Prov.
 Sumsel;2017年6月13日)

図 2.4.3.1 村落レベル泥炭水位モニタリング説明会/研修会の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.4.4 泥炭地水位測定装置の設置合意確認の支援

同様に、構成チームが州 TRGD や県関係機関を関与させて、地権関係者の泥炭地水位測定装置の設置確認書の締結促進を支援した。

表 2.4.4.1 泥炭地水位測定装置の設置合意確認書の締結状況の概要

Code	Province	District	Area/ Village	Written confirmation for installation (TRGD)	Written Report of installation/ spare delivery (Vendor)
Phase 1					
OKI-1	Sumsel	OKI	Sepucuk/ Kedaton	<ul style="list-style-type: none"> ■ 7 Des. 2017 ■ BPPLHK Palembang ■ Bappeda Kab. OKI 	<ul style="list-style-type: none"> ■ 17 Des. 2017 ■ ZMEI-MEL ■ Bappeda Kab. OKI
OKI-2	Sumsel	OKI	Simpang Tiga	<ul style="list-style-type: none"> ■ 6 Des. 2017 ■ Kades Simpang Tiga ■ Bappeda Kab. OKI 	<ul style="list-style-type: none"> ■ 18 Des. 2017 ■ ZMEI-MEL ■ Bappeda Kab. OKI
MUBA-1	Sumsel	MUBA	Sungai Merang/ Bakung	<ul style="list-style-type: none"> ■ 14 Des.2016 ■ Bappeda Kab. MUBA ■ KPHP Lalan Mangasang Mendis 	<ul style="list-style-type: none"> ■ 20 Des. 2017 ■ ZMEI-MEL ■ TRGD/ Tim 9
MUBA-2	Sumsel	MUBA	Kepayang		<ul style="list-style-type: none"> ■ 20 Des. 2017 ■ ZMEI-MEL ■ TRGD/ Tim 9 ■ 21 Des. 2017

Code	Province	District	Area/ Village	Written confirmation for installation (TRGD)	Written Report of installation/ spare delivery (Vendor)
					<ul style="list-style-type: none"> ■ ZMEI-MEL ■ BAPPEDA kab. MUBA
Phase-2					
PS-1	Sumsel	OKI	Sebokor/ Baru	<ul style="list-style-type: none"> ■ 13 Jun. 2017 ■ Kades Perigi ■ BKSDA ■ Dis LH Kab. OKI 	<ul style="list-style-type: none"> ■ 21 Jun. 2017 ■ ZMEI ■ TRGD/ Tim 11
PS2R	Sumsel	Banyu Asin	PLG/ Sidomulyo	<ul style="list-style-type: none"> ■ 18 Jun. 2017 ■ Kades Sidomulyo ■ BKSDA ■ Bappeda Banyu Asin 	<ul style="list-style-type: none"> ■ 21 Jun. 2017 ■ ZMEI ■ TRGD/ Tim 11
AS1R	Sumsel	OKI	Riding	<ul style="list-style-type: none"> ■ 13 Jun. 2017 ■ Kades Riding ■ Dis LH Kab. OKI 	<ul style="list-style-type: none"> ■ 21 Jun. 2017 ■ ZMEI ■ TRGD/ Tim 11
PT-1	Sumsel	OKI	Pulau Geronggang	<ul style="list-style-type: none"> ■ 14 Jun. 2017 ■ KPH Mesuji ■ Dis LH Kab. OKI 	<ul style="list-style-type: none"> ■ 21 Jun. 2017 ■ ZMEI ■ TRGD/ Tim 11
SJ	Kalteng	Pulpis	Sebangau Jaya	NA	<ul style="list-style-type: none"> ■ 12 Jul. 2017 ■ ZMEI ■ TRGD/Dis LH Prov.
PM	Kalteng	Pulpis	Paduran Mulya	NA	<ul style="list-style-type: none"> ■ 12 Jul. 2017 ■ ZMEI ■ TRGD/Dis LH Prov.
BT	Kalteng	Pulpis	Buntoi	NA	<ul style="list-style-type: none"> ■ 12 Jul. 2017 ■ ZMEI ■ TRGD/Dis LH Prov.
M1	Kalteng	Pulpis	Mantaren I	NA	<ul style="list-style-type: none"> ■ 12 Jul. 2017 ■ ZMEI ■ TRGD/Dis LH Prov.
ST	Riau	Meranti	Sungai Tohor	NA	<ul style="list-style-type: none"> ■ 17 Jul. 2017 ■ ZMEI ■ Dis LH Kab.
LK	Riau	Meranti	Lukun	NA	<ul style="list-style-type: none"> ■ 17 Jul. 2017 ■ ZMEI ■ Dis LH Kab.

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.5 泥炭水位モニタリング装置の設置・運用および水位測定装置の管理体制の構築

2.5.1 先行調査で設置した装置の引き渡し

既設南スマトラ州泥炭地水位測定装置（4箇所）（2016年12月JICA事務所調達分）について、すでにデータ送信及びスペアパーツの引渡文書等の確認がすべて終了しており、機材の所有権の引渡の準備を支援し、下記4.4に記載する泥炭投資セミナー（ジャカルタ）（付属資料1.3.2参照）のクロージングにおいて書類の署名を行った（2017年7月27日）

下表の4箇所のうち、2016年12月の設置時に電話回線が不安定なためデータの送信ができなかった、南スマトラ州MUBA県Kepahyang村MUBA-2については、地元で調達可能な八木式外部アンテナを追加設置して対応した。

なお、実質の管理者への引渡しが整備されるまでの暫定的な管理者として、上記の設置報告の署名時にスペアパーツ等は、引き渡している。機材の設置から機材の所有権の引渡しまでに時間を要するが、機材の設置後から現場から送信される測定データの所有権はBRGまたはBRGから指名を受けた行政機関になると想定している。

表 2.5.1.1 南スマトラ州（既設）泥炭地水位測定装置の設置箇所及び管理者の概要

Procured in Phase 1 by JICA Indonesia Office
 (South Sumatra installed in December 2016)

No.	Code	Goods/ Jenis (Inspection Date)	Specification/ Spesifikasi	Location/ Lokasi	Temporarily Manager/ Pengelola Sementara	Proposed Field Manager/ Calon Pengelola
S1	OKI-1	Data transmission system SESAME II-02d AWLRS With Fence (17 Dec. 2016)	With ■Initial setup fee ■System usage fee (1 year)	<ul style="list-style-type: none"> ■ S3° 25'25.82", E104° 52' 41.87" (Logger) ■ Kebun Konservasi Genetik Hutan Gambut BPPLHK di Tanah Kabupaten (Outside of State Forest) ■ Kelurahan Kedaton, Kecamatan Kayu Agung, Kab. OKI ■ KHG Sungai Sibumbang – Sungai Batok 	Tata Ruang (Bappeda/P U Kab.) OKI	Dis LH Kab. (District Env. Office)
S2	OKI-2	Data transmission system SESAME II-02d AWLRS With fence (18 Dec. 2016)	With ■Initial setup fee ■System usage fee (1 year)	<ul style="list-style-type: none"> ■ S3° 19'58.60", E105° 27' 33.22" (Logger) ■ Areal Penggunaan Lain (Puskesmas) (Outside of State Forest) ■ Desa Simpangtiga, Kecamatan Tulung Selapan, Kab. OKI ■ KHG Sungai Sugihan – Sungai Lumpur 	Tata Ruang (Bappeda/P U Kab.) OKI	Community Group (MPA?)
S3	MUBA-1	Data transmission system SESAME II-02d AWLRS With Fence (20 Dec. 2016)	With ■Initial setup fee ■System usage fee (1 year)	<ul style="list-style-type: none"> ■ S2° 2'50.90", E104° 3' 4.29" (Logger) ■ Hutan Produksi KPH Lalan Mangsang Mendis (Production Forest Non Concession) ■ Desa Bakung, Kecamatan Lalan, Kab. MUBA ■ KHG Sungai Air Hitam Laut-Sungai Buntu Kecil 	Tata Ruang (Bappeda/P U Kab.) MUBA	KPH, Prov. Sumsel (FMU of Provincial Forestry Service)
S4	MUBA-2	Data transmission system SESAME II-02d AWLRS With Fence (19 Dec.2017)	With ■External Antenna (Temporarily from local market) ■Initial setup fee ■System usage fee (1 year)	<ul style="list-style-type: none"> ■ S2° 5'7.27", E104° 16' 2.34" (Logger) ■ Hutan Produksi KPH Lalan Mangsang Mendis (Production Forest Non Concession) ■ Desa Kepayang, Kecamatan Lalan, Kab. MUBA ■ KHG Sungai Air Hitam Laut-Sungai Buntu Kecil 	Tata Ruang (Bappeda/P U Kab.) MUBA	KPH, Prov. Sumsel (FMU of Provincial Forestry Service)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.5.2 本調査新設装置の設置・運用・引き渡し

新設の泥炭地水位測定装置設置対象地 10 箇所について装置の設置は、既設分に準じて、JICA より銘柄指定されている SESAME のインドネシアにおける唯一の代理店である PT. Zenbi Machinery and Electornics Indonesia（ZMEI 社）と機材調達契約を締結して、機材の納入・設置を行った（下表参照）。

- a) 南スマトラ州 OKI 県 4 箇所: 2017 年 6 月 10～18 日設置作業、6 月 13 日、18～19 日据付完了確認検査
- b) 中央カリマンタン州 Pulang Pisau (Pulpis) 県 4 箇所: 2017 年 7 月 7～11 日設置作業、7 月 9 日、10～11 日据付完了確認検査
- c) リアウ州 Kepulauan Meranti (Meranti) 県 2 箇所: 2017 年 7 月 14～17 日設置作業、7 月 16～17 日に据付完了確認検査

新設 SESAME 設置対象地 10 箇所(業務実施契約による調査機材[供与機材扱い])について、スペアパーツの引渡文書等の確認がすべて終了したことから、機材の所有権の引渡の準備を支援し、以下のような補修を行いながら、2017 年 10 月 4 日までにデータ送信の断続期間が 2 週間以上ないことを確認したことから、下記 4.4 に記載するステークホルダー調整会議の最終会合のオープニングにおいて書類の署名を行った（2017 年 10 月 5 日）。

- a) 中央カリマンタン州 Pulang Pisau(Pulpis)県の Sebangau Jaya 村(下表の ST 地点)について、

電話回線が不安定のためデータ送信が不可能なため、南カリマンタン州で適合する外部アンテナを調達して、8月に外部アンテナを設置した。

- b) データ送信が断続している期間が2週間以上の箇所が多い中央カリマンタン州 Pulang Pisau(Pulpis)県の4箇所について、製造者責任において標準の M To M SIM (インターネット専用)から Regular (通話用)の Kartu Halo (後払い方式)の SIM へ交換作業を2017年9月22日～24日に行われた。うち、Buntoi 村1箇所(下表の BT 地点)についてはバッテリーの点検を行い、配線ミスを補正した。

なお、実質の管理者への引渡しが整備されるまでの暫定的な管理者として、上記の設置報告の署名時にスペヤパーツ等は、引き渡している。機材の設置から機材の所有権の引渡しまでに時間を要するが、機材の設置後から現場から送信される測定データの所有権は BRG または BRG から指名を受けた行政機関になると想定している。

表 2.5.2.1 南スマトラ州（新設）泥炭水位測定装置の設置箇所及び管理者の概要

Procured in Phase 2 by JICA Mission (South Sumatra installed in June 2017)

No.	Code	Goods/ Jenis (Inspection Date)	Specification/ Spesifikasi	Location/ Lokasi	Temporarily Manager/ Pengelola Sementara	Proposed Field Manager/ Calon Pengelola
S5	PS-1	Data transmission system SESAME II-02d AWLRS With Fence (18 Jun. 2017)	With ■ External Antenna ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ S2° 57'49.69", E105° 7' 28.19" ■ Hutan Suaka Margasatwa Padang Sugihan (Conservation Forest) ■ Desa Baru, Kecamatan Pangkalan Lampam, Kab. OKI ■ KHG Sungai Sugihan – Sungai Saleh 	Tim 11 TRGD (Dishut Prov.) Sumsel	BKSDA Sumsel, KLHK (Branch of MoEF)
S6	PS-2R	Data transmission system SESAME II-02d AWLRS With fence (18 Jun. 2017)	With ■ External Antenna ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ S2° 43'9.06", E105° 7' 45.61" ■ Hutan Suaka Margasatwa Padang Sugihan (Conservation Forest) ■ Desa Sidomulyo, Kecamatan Muara Padang, Kab. Banyuasin ■ KHG Sungai Sugihan – Sungai Saleh 	Tim 11 TRGD (Dishut Prov.) Sumsel	BKSDA Sumsel, KLHK (Branch of MoEF)
S7	AS-1R	Data transmission system SESAME II-02d AWLRS With Fence (13 Jun. 2017)	With ■ External Antenna (Grant from ZMEI/MEI) ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ S3° 6'44.24", E105° 12' 49.29" ■ Areal Penggunaan Lain (Head of Dusun) (Outside of State Forest) ■ Desa Riding, Kecamatan Pangkalan Lampam, Kab. OKI ■ KHG Sungai Sugihan – Sungai Lumpur 	Tim 11 TRGD (Dishut Prov.) Sumsel	Community Group (MPA?)
S8	PT-1	Data transmission system SESAME II-02d AWLRS With Fence (19 Jun. 2017)	With ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ S3° 29'41.87", E104° 58' 2.04" ■ Hutan Produksi Terbatas Pedamaran Kayu Agung, KPH Wil. V Mesuji (Production Forest Non Concession) ■ Desa Pulau Geronggang, Kecamatan Pedamaran Timur, Kab. OKI ■ KHG Sungai Sibumbang – Sungai Batok 	Tim 11 TRGD (Dishut Prov.) Sumsel	KPH, Prov. Sumsel (FMU of Provincial Forestry Service)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

Overview of Water table Monitoring Equipment in South Sumatra installed in June 2017

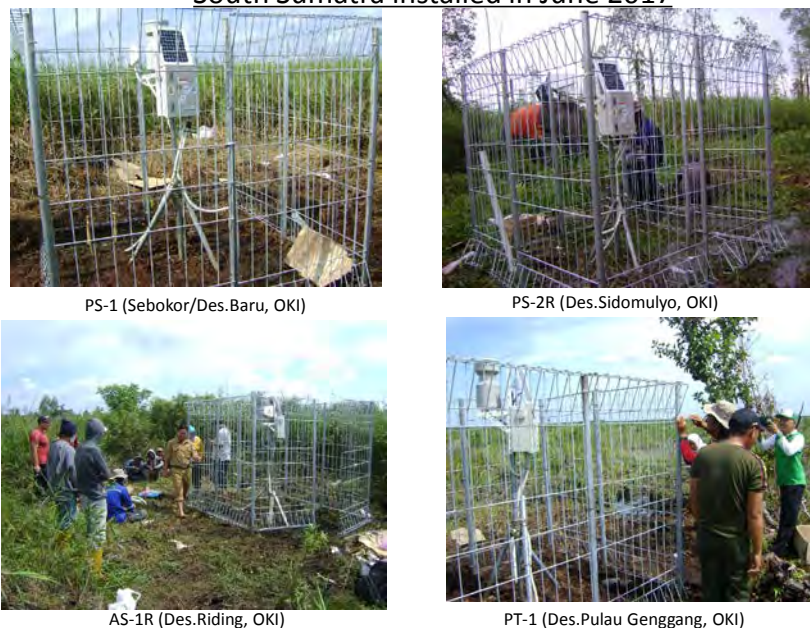


図 2.5.2.1 南スマトラ州（新設）泥炭水位測定装置の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.5.2.2 中央カリマンタン州（新設）泥炭水位測定装置の設置箇所及び管理者の概要

Procured in Phase 2 by JICA Mission (Central Kalimantan installed in July 2017)

No.	Code	Goods/ Jenis (Inspection Date/ Tgl. Inspeksi Terencana)	Specification/ Spesifikasi	Planned Location/ Lokasi Terencana	Temporarily Manager/ Pengelola Sementara	Proposed Field Manager/ Calon Pengelola
C1	SJ	Data transmission system SESAME II-02d AWLRS With Fence (9 Jul. 2017)	With ■ External Antenna (Temporarily from local market) ■ Initial setup fee ■ System usage fee (1 year) <Regular SIM>	■ S2° 53'12.95", E113° 50' 16.11" ■ Tanah Kelompok Tani (Demplot PLTB BRG D2), Areal Penggunaan Lain (Outside of State Forest) ■ Desa Sebangau Jaya, Kecamatan Sebangau Kuala, Kab. Pulang Pisau ■ KHG Sungai Katingan-Sungai Sebangau	TRGD (Dishut/DisL H Prov.) Kalteng	Community Group (MPA?)
C2	PM	Data transmission system SESAME II-02d AWLRS With fence (9 Jul. 2017)	With ■ Initial setup fee ■ System usage fee (1 year) <Regular SIM>	■ S2° 51'29.78", E113° 48' 25.44" ■ Tanah Kelompok Tani (Demplot PLTB BRG D2), Areal Penggunaan Lain (Outside of State Forest) ■ Desa Paduran Mulya, Kecamatan Sebangau Kuala, Kab. Pulang Pisau ■ KHG Sungai Katingan-Sungai Sebaangau	TRGD (Dishut/DisL H Prov.) Kalteng	Community Group (MPA?)
C3	BT	Data transmission system SESAME II-02d AWLRS With fence (10 Jul. 2017)	With ■ Initial setup fee ■ System usage fee (1 year) <Regular SIM>	■ S2° 49'48.96", E114° 10' 8.14" ■ Kawasan Hutan KPHP Unit 31 Kahayang Hilir (Production Forest Non Concession) ■ Desa Buntoi, Kecamatan Kahayang Hilir, Kab. Pulang Pisau ■ KHG Sungai Kahayang-Sungai Sebangau	TRGD (Dishut/DisL H Prov.) Kalteng	KPH, Prov. Kalteng (FMU of Provincial Forestry Service)
C4	MT	Data transmission system SESAME II-02d AWLRS With fence (11 Jul. 2017)	With ■ External Antena ■ Initial setup fee ■ System usage fee (1 year) <Regular SIM>	■ S2° 45'2.35", E114° 10' 40.72" ■ Kawasan Hutan KPHP Unit 31 Kahayang Hilir (Production Forest Non Concession) ■ Desa Mantaren I, Kecamatan Kahayang Hilir, Kab. Pulang Pisau ■ KHG Sungai Kahayang-Sungai Sebangau	TRGD (Dishut/DisL H Prov.) Kalteng	KPH, Prov. Kalteng (FMU of Provincial Forestry Service)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

Procured in Phase 2 by JICA Mission
 (Central Kalimantan installed in July 2017)



図 2.5.2.2 中央カリマンタン州（新設）泥炭水位測定装置の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

表 2.5.2.3 リアウ州（新設）泥炭水位測定装置の設置箇所及び管理者の概要

Procured in Phase 2 by JICA Mission
 (Riau installed in July 2017)

No.	Code	Goods/ Jenis (Planned Inspection Date)	Specification/ Spesifikasi	Planned Location/ Lokasi Terencana	Planned Temporarily Manager/ Pengelola Sementara Terencana	Proposed Field Manager/ Calon Pengelola
R1	ST	Data transmission system SESAME II-02d AWLRS With Fence (17 Jul. 2017)	With ■ External Antenna ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ N0° 50'4.39", E102° 56' 27.22" ■ Hutan Desa, Kawasan KPH Tebing Tinggi (Production Forest Non Concession) ■ Desa Sungai Tohor, Kecamatan Tebing Tinggi Timur, Kab. Kepulauan Meranti ■ KHG Pulau Tebing Tinggi 	TRGD (Dishut Prov.) Riau	Dis LH Kab. (District Env. Office)?
R2	LK	Data transmission system SESAME II-02d AWLRS With Fence (16 Jul. 2017)	With ■ Initial setup fee ■ System usage fee (1 year)	<ul style="list-style-type: none"> ■ N0° 55'52.10", E102° 48' 52.31" ■ Tanah Desa (untuk hibahkan kegiatan BRG-Walhi) di Kawasan KPH Kepulauan Meranti (Production Forest Non Concession) ■ Desa Lukun, Kecamatan Tebing Tinggi Timur, Kab. Kepulauan Meranti ■ KHG Pulau Tebing Tinggi 	TRGD (Dishut Prov.) Riau	KPH, Prov. Riau (FMU of Provincial Forestry Service)

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）



図 2.5.2.3 リアウ州（新設）泥炭水位測定装置の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

2.5.3 設置箇所における泥炭地水位測定装置の管理に関する課題

(1) 各対象地の将来の機材管理の展望と課題

各対象地における将来の機材管理の展望と課題の概要は以下のとおりである。

a) 南スマトラ州

州 TRGD のチームワークが活発である。

想定される実管理者は、環境林業省の出先機関の BKSDA が 2 箇所、州林業局の出先機関である KPH が 3 箇所、コミュニティグループが 2 箇所、県が 1 箇所と、国と州の出先機関が大部分である。

州 TRGD のイニシアティブを促進することに、実管理者による管理予算の計画・執行が可能になるポテンシャルがある。

b) 中央カリマンタン州

州 TRGD の事務局の活動が明確となったばかりである。

想定される実管理者は、州林業局の出先機関である KPH が 2 箇所、コミュニティグループが 2 箇所である。KPH も県政府から州政府への移行時期があり、2017 年 7 月から活動が再開したばかりである。

実管理者による管理予算の計画・執行が可能なるまで時間がかかると予想される。

c) リアウ州

州 TRGD の事務局が明確となったばかりである。

想定される実管理者は、州林業局の出先機関である KPH が 2 箇所であるが、KPH がまだ完全に州政府へ移行していない。また、1 箇所は村落林に指定されている。地方行政法改正後も県に林業局を配置しており、州 TRGD の事務局も KPH の管理に県環境・林業局の関与を想定している。

管理体制の確立に時間がかかると予想される。

(2) 機材管理全般に関係して予想される課題

a) BRG による維持・管理予算の確保・執行

引渡書類(BAST)をもとに、国家財産登録を BRG はこれから行う。その際に、14 箇所の設置箇所の現場へ出向き、国家登録番号を設置することが求められる¹⁸。この手続きが遅れると、BRG 予算において維持・管理予算を確保し、執行することができない恐れがある。

b) APL の地権者のフォローアップ

APL の地権者はコミュニティであり、SESAME の設置に合意していても、インドネシア国で通常行われているように、機材監視やパトロールに関する謝金などを支払ってくれることを期待してくると予想される。BRG は APL の地権者と維持・管理に係る協定などをまず検討することが重要になる。協定によっては、必要な謝金などを維持・管理予算から執行することが求められると予想される。

c) 通信料金の滞納

中央カリマンタン州では他州とは異なり、標準の M to M 型の SIM でデータ送信ができなかったため、通話用 (Regular) の SIM を設置している。通話用の SIM では、代理店を通じて料金支払いを毎月行う必要がある。

d) Web 上位置情報と現場の位置情報との相違

南スマトラの当初 4 基の位置情報について、Web 上の位置と設置機材から送信されてくる位置情報の差が認められたことがあった。原因として、Google Map の Distortion 処理の関係で、送信されてくる位置情報では Map 上違和感を感じた MEL 社が変更したためと推測している。先方との引渡し書類における表記は、装置機材から送信される位置情報で統一することとした。

e) 法的係争に対する脆弱性

装置の基本構造が、既往の製品のアセンブリーで、製造者に知的所有権がない。また、データのそのものをデータ所有者へ引き渡すプロセスがなく、BRG への引渡し後も BRG は所有したことを実感できない。

オリジナルデータは製造者のサーバーで保管される。サーバーのセキュリティによるデータの漏洩、誤用が生じて係争が生じた場合、BRG はオリジナルデータ保管する製造者に対して法的手段をとらざるを得ない可能性もある。

f) 高価格による財務上の脆弱性

装置の価格から、固定資産化して償却が難しい資産となる。一方、IT の進歩のスピードは速く、将来、更新が求められてくる。しかし、固定資産的であるため、容易に更新できない制約が生じる可能性がある。

¹⁸ 2016 年 BPPT から寄贈を受けた MORPOLAGA について、BAST の締結が行われておらず、国家財産登録手続きができないため、BRG による維持・管理が実施できない(2017 年 10 月引き渡し準備における BRG の Deputy4 からの情報による)。

第3章 対象地域のプロファイル調査

3.1 対象地域の現況把握

3.1.1 対象地域の概況

BRGの要請（2016年10月28日）、その後のBRGと締結したインドネシア国泥炭地回復に係る基礎調査に関するミニッツ（2016年11月11日）に基づき、緊急の対応が必要な3州4県を対象とした泥炭地回復に係る追加調査（以下、プレF/S）を再委託により実施した。これは、BRGの地方機関的位置づけである、州知事下に設置されている泥炭回復チーム（TRGD）と協働して、対象地域プロファイル調査（概況調査、市場調査分析、候補地マップ／プロファイル作成、デモンストレーションプロットの計画等）を、以下の3州4県の7泥炭水理単位（KHG）を対象に実施したものである。

表 3.1.1.1 泥炭地回復ビジネスのプレF/S対象地

州	県	泥炭水理単位（KHG）
南スマトラ	Ogan Komering Ilir（OKI）	Sungai Sugihan- Sungai Lumpur, Sungai Sibumbang- Sungai Batok Sungai Sugihan- Sungai Saleh
	Musi Banyuasin（MUBA）	Sungai Air Hitam Laut- Sungai Buntu Kecil
リアウ	Kepulauan Meranti	Pulau Tebing Tinggi
中央カリマンタン	Pulang Pisau.	Sungai Kahayang- Sungai Sebanggau Sungai Kahayang- Sungai Kapuas Sungai Katingan- Sungai Sebanggau

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

以下に、泥炭地回復ビジネスのプレF/S対象地の概要を示す。

1) 南スマトラ州 Ogan Komering Ilir（OKI）県

OKI県は、南スマトラ州の一つの県であり、面積は19,023km²、平均標高は海拔10m前後の低地に位置する。行政的には、18郡、327村である。人口は、787,513人（2015年）で、男性402,169人、女性384,894人であり、2014年からの人口増加率は、1.45%を示している。

人間開発指数（HDI、IPM）は、南スマトラ州平均（2014年）で66.75であるところ、OKI県では、63.87を示しており、平均より少ない値を示している。

OKI県の歳入は、2014年に1,519 billion Rsから2015年で1,600 billion Rsと増加傾向にある。個人の平均支出は、2014年の564,733ルピア/月から2015年は722,014ルピア/月と27%増加している。うち、食料の購入に56%、非食料の購入に44%支出している。

OKI県の経済成長率は、2014年の5.07%から2015年の4.81%と、わずかに減少している。2015年の最も成長率の高い業種は、通信セクター（14.4%）であり、次いで運輸・流通分野（12.1%）になる。労働者人口をみると、農林水産業（畜産業含む）が最も多数を占め、1,244人（2015年）が従事している。OKI県では、農業、林業、畜産業、水産業、プランテーションを含む農業分野は、地域経済への貢献度が高い分野である。農業分野の中でも特に水稻栽培が盛んであり、2015年には、138,460haの水田から567,999tのコメを生産している。プランテーションも盛んな産業の一つであり、小規模所有者により、ゴム（155,005ha）、油ヤシ（14,932ha）に続き、ココナッツ（3,323ha）が栽培されている。

2) 南スマトラ州 MUBA 県

MUBA 県は、南スマトラ州の一つの県であり、面積は 14,265km²。行政的には、14 郡、240 村である。人口は、611,510 人（2015 年）であり、そのうちの 13.6%が、県都である Sekayu 郡に居住している。

人間開発指数（HDI、IPM）は、南スマトラ州平均（2014 年）で 66.75 であるところ、MUBA 県では、64.93 を示しており、平均より少ない値を示している。

過去 3 年間の現在価格とした場合、石油・ガスを含めた地域総生産は、53,913 billion ルピア（2015 年）である。MUBA 県の経済成長率（石油・ガスを含む）は、2014 年の 4.67% から 2015 年の 2.28%と、減少しているが、石油・ガスを除いた経済成長率は 4.94%を示している（2015 年）。

個人の平均支出は、2014 年の 622,954 ルピア/月であり、そのうち、食料の購入に 373,329 ルピア、非食料の購入に 249,615 ルピアを支出している。

MUBA 県の主な産業は農業であり、米、ゴム、ココナッツ、パームオイルなどのプランテーション産品などが主に生産されている。また、鉱業や工業製品の製造もおこなわれている。これらの生産品の生産を可能にするのが、運搬業界である。MUBA 県は、標高 20m～140m と丘陵地帯も含まれる。また、多くの河川が流れている。このような地形条件において、県都までは陸路で移動することが可能であるが、低地の地方に向かうためには、公共の水路（ボート）を利用するのが一般的である。

3) リアウ州メランティ県

メランティ県は、リアウ州の一つの県であり、主要な 4 島から構成されており、面積は 3,714km² である。行政的には、9 郡、101 村に分かれている。人口は、181,095 人（2015 年）で、男性 93,017 人、女性 88,078 人であり、2010 年から 2015 年の間で 0.57%の人口増加率を示している。また、最も大きな島である Tebing Tinggi 島に、全体の 3 割の住民が住んでいる。

メランティ県の人間開発指数（HDI、IPM）は、62.91 を示している。

OKI 県の歳入は、2015 年で 15.12 trillion ルピアであり、そのうちの 34%は、農林水産業分野からの収入になっている。

メランティ県は、鉱物、プランテーションならびに水産業にかかる豊かな自然資源があることから、非常に高い投資ポテンシャルを持っている。プランテーションは国的にまた州的に農業分野で重要な役割を示しており、パームオイルとゴムが主流産物になっている。2015 年では、ゴム林が 20,394ha、アレカナッツが 394ha、油ヤシが 31,453ha、そしてサゴヤシが 38,614ha 栽培されており、それぞれ 7,636t、160t、27,384t ならびに 200,062t の生産量を誇る。非ハイブリッド種の水稲が 3,162ha、メイズが 367ha、キャッサバが 216ha など、農業生産が盛んである。

4) 中央カリマンタン州プランピサオ県

プランピサオ県は、中央カリマンタン州の一つの県であり、面積は 8,997km²。行政的には、8 郡、95 村である。人口は、124,845 人（2015 年）であり、男性 64,939 人、女性 59,906 人であり、2014 年からの人口増加率は、0.67%を示している。

プランピサオ県の人間開発指数（HDI、IPM）は、65.00 を示している。

プランピサオ県の地域総生産は、3,687 billion ルピア（2015 年）であり、そのうち農業生産が最も多く 38.9%を占め、ついで建設業が 15.9%を占める。プランピサオ県の経済成長

率は、2015年は7.80%と高い値を示している。

個人の平均支出は、2015年の796,854 Rs/月であり、そのうち、食料の購入に440,613 ルピア、非食料の購入に356,241 ルピアを支出している。

プランピサオ県の主な産業は農業であり、米、ゴム、ココナッツ、パームオイルなどのプランテーション産品などが主に生産されている。2015年では、水稻が94,772ha、乾燥農地（Dry field）が18,015ha、農園（Farm/Huma）が12,678ha、未利用地が41,256haとなっている。またロングビーンやバナナの生産が盛んである。プランテーションとしては、ゴム栽培が最も盛んであり、46,880haのゴム園で88.252tのゴムが生産されている。

3.1.2 対象 KHG の課題とポテンシャル

上記3.1.1にて記載したプレ F/S の対象となる KHG には、泥炭地の自然条件、社会条件の観点から、以下に挙げる課題が認められる。

- 土地の所有形態：
アクセスのよい場所などは、すでにコンセッションとして利用されていることが多い。
- 自然条件：
水路を開設されている泥炭地では、地下水位が低下し、泥炭が乾燥化し、火災が発生する可能性が高い場所が多いとともに、すでに、火災の被害を受けている場所が多い。
- アクセス条件：
基本的に、地方都市部からのアクセスはよくない。
村落林として残っている森林も、村の中心部からのアクセスが悪い場所が多い。

一方、対象となる KHG の立地条件、自然条件等を鑑みると、以下に挙げるようなポテンシャルも想定できる。

- 比較的、海岸線に近い場所、または、既存の水路・河川で海洋に通じることができる泥炭地が多いことから、そこで生産する製品・作物の量や品質如何では、インドネシア国内のみならず、隣国への輸出などの可能性がある。
- これまでの市場には出回っていない製品・作物を生産する可能性があり、生産できる量や品質によっては、新たな市場を開拓することができる可能性がある。

3.1.3 泥炭地経済活動の課題とポテンシャル

一般的に泥炭地は地方部に位置し、道路などのインフラが整備されていないことから、船など水路を使つてのアクセスを余儀なくされ、そのため、地方主要都市からのアクセスも時間が掛ることが多い。自然条件的にも、泥炭地特有の土壌条件、高い地下水位、頻発する泥炭火災など、通常の開発とは異なる条件下にある。社会条件的には、泥炭地周辺ならびに内部の村落は、貧困率が高い場合が多いとともに、既存の産業も農林水産業を主体とした一次産業となっている。このような条件下において、泥炭地の回復に資する事業に対しては、これまで公的資金が投入されてきたが、広範囲にわたる荒廃した泥炭地をより加速的に回復させるためには、民間資金の投入とその増大が重要である。

このような状況下で、民間資金の投入に関しては、以下に挙げるような課題が挙げられる。

- 主要な産業がないことから、金融機関からの融資が受けづらい。
- 泥炭地を回復する必要があるが、民間企業、金融機関の多くが、その意義・重要性を理解していない。
- 泥炭地内部、周辺の企業が小規模であることが多く、銀行からの融資を受ける際に、担保不足、保証不足が発生することが多い。

- 投資を検討する際にも、投資に対するインセンティブがない（少ない）ため、投資に踏み切れない。
- 条件に恵まれた開発が容易な場所は、すでにコンセッションが入っている場合が多く、後発企業の参入が難しい。

一方、泥炭地の立地条件、自然条件等を鑑みると、以下に挙げるようなポテンシャルも想定できる。

- 未利用の土地が広大にあり、適切な水位管理・泥炭火災予防を行う必要はあるが、大規模な事業を行える可能性がある。
- 海岸線に近い場所、または、既存の水路・河川で海洋に通じることができる泥炭地が多いことから、そこで生産する製品・作物の量や品質如何では、インドネシア国内のみならず、隣国への輸出などの可能性がある。

3.2 泥炭地の環境に適応する商品作物の市場調査分析の方法の検討

3.2.1 泥炭地回復の技術基準および基本計画のレビュー

(1) 技術基準

泥炭地回復は、民間を問わず、喫緊の課題となっている。そのため、環境林業省、泥炭地回復庁をはじめとした関係省庁が、各種規定、ガイドライン等を発行している。以下に挙げる環境林業大臣令が、泥炭地回復に対する基本的な技術基準となる。これ以外にも、泥炭地回復庁が要素技術に対するガイドラインなどを発行している。

環境林業省は、2017年2月に泥炭生態系の機能の回復の技術基準にかかる環境林業大臣令（P.16/MENLHK/SETJEN/KUM.1/2/2017）を發布した。この大臣令は、2014年第71号政令¹⁹を基本とし、泥炭生態系機能のインベントリおよび指定の手順にかかる環境林業大臣令（P.14/MENLHK/SETJEN/KUM.1/2/2017）²⁰と連動するものである。この大臣令は、事業者・活動、地方政府、中央政府およびコミュニティに対して、泥炭生態系回復ガイドラインになるとともに、回復の基本、被害の基準、泥炭回復の重要度、回復目標などを規定している。また、泥炭生態系回復に関して、計画、実施、モニタリングおよび報告、評価について規定するとともに、水理機能の回復、植生の回復、ならびに科学技術の進歩により利用可能な方法を通じて、泥炭水理単位（KHG）の泥炭生態系回復の実施方法について規定している。

また、泥炭地回復庁は、2016年の設立当初から、泥炭地の回復にかかる各種活動・作業に対するガイドラインの作成を進めている。2017年7月現在、次表に挙げるガイドラインが策定済み、あるいは策定中である。

表 3.2.1.1 泥炭地回復庁が発行、検討している泥炭地回復にかかる各種ガイドライン

資料名	発行日
泥炭再湿地施設建設にかかるガイドライン（Technical Guideline for Canal Blocking）	策定中
インドネシアでの森林・泥炭地火災を防止するための深井戸の掘削方法に関するガイドライン	検討中
泥炭地での苗畑建設にかかるガイドライン （Guidance and Procedures for Nursery Development in Peatlands）	2016年
泥炭林のための苗木生産にかかるガイドライン（Guidance and Procedures for Peat	2016年

¹⁹ 泥炭生態系の保全管理に係る政令 2014年第71号（PP No.71/2014、Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2014 tentang Perlindungan Dan Pengelolaan Ekosistem Gambut）

²⁰ Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.14/MenLHK/Setjen/Kum.1/2/2017 tentang Tata Cara Inventarisasi dan Penetapan Fungsi Ekosistem Gambut

資料名	発行日
Swamp Forest Cultivation)	
泥炭地での植林およびその管理にかかるガイドライン (Guidelines and Procedures for Planting in Peatlands and Maintenance)	2016年
泥炭地への再植生化にかかる技術ガイドライン (Technical Guideline for Revegetation on the Peatland)	2017年
泥炭地回復のための社会的セーフガードにかかるガイドライン	検討中
地下水モニタリングにかかるガイドラインおよびマニュアル	検討中
火災の無い泥炭管理のためのガイドライン (Guideline for Zero Burning Peatland Management)	8月に発行の予定

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) 泥炭地回復の基本計画

泥炭地回復の責務を負う組織は、環境林業省泥炭荒廃対策局（PKG）、2016年1月に発足した泥炭地回復庁（BRG）ならびに公共事業・国民住宅省（PU-PR）水資源総局低地局が主たる機関として挙げられる。

大統領令 2016 年第 1 号により、優先 7 州の泥炭地の回復を目的に設立された機関である BRG は、インドネシア国内での泥炭地回復にかかる主要な実施者の一つである。BRG は、5 年間の時限機関ではあるが、関係省庁と連携し、優先 7 州での約 200 万 ha の泥炭回復作業を促進することを目的としている。2016 年 1 月の設立後、BRG5 年計画（Five-year Strategic plan）ならびに泥炭地回復行動計画を策定するとともに、各州泥炭地回復チーム（TRGD）に対して、泥炭地回復作業計画の策定を促している。2016 年の優先対象州であるリアウ、南スマトラおよび中央カリマンタンの 3 州において、作業計画が策定されている。

BRG 対象の優先 7 州の中の泥炭地は、回復優先基準に従うと、以下のように分類される。総対象面積は 250 万 ha に上る。

表 3.2.1.2 BRG 対象優先 7 州内の泥炭地

州	2015年火災跡地			PEATドーム (水路あり)		浅い泥炭地 (水路有り)	合計 (ha)
	生産林（ライセンス有り）	生産林（ライセンス無し）	保全ゾーン（KK及びHL）	生産林（ライセンス有り）	保全ゾーン（KK及びHL）	保全ゾーン（KK及びHL）	
リアウ	38,884	63,535	2,008	668,502	9,913	31,890	814,732
ジャンビ	19,245	26,008	19,642	80,530	2,738	3,500	151,663
南スマトラ	172,290	76,797	41,277	305,573	10,427	9,543	615,907
西カリマンタン	1,769	27,239	2,850	62,308	4,801	20,667	119,634
中央カリマンタン	16,057	162,951	155,899	13,754	173,577	190,837	713,076
南カリマンタン	1,586	11,153		26,022			38,761
パプア	4,144	29,262	4,659	278		409	38,753
合計	253,975	396,945	226,335	1,156,968	201,457	256,846	2,492,527

Note: KK=Kawasan Konservasi or Conservation Areas、HL=Hutan Lindung or Protections Forests

出典：BRG 主催ドナー調整会議資料（2017年4月18日）

また、上述した 250 万 ha を管理主体別に分類すると、以下のようになり、コンセッション地が半数を占めることがわかる。

表 3.2.1.3 管理主体別の面積

管理主体	区分	面積（概数）	割合
国・地方政府	小計	689,000ha	28%
	保護林・保護区	337,000ha	13%
	保全ゾーン	352,000ha	14%
コミュニティ	小計	396,000ha	16%
	生産林	234,000ha	9%
	APL地	162,000ha	6%
コンセッション	小計	1,400,000ha	56%
	泥炭地の生産林	250,000ha	10%
	泥炭地の保全ゾーン	1,150,000ha	46%
回復対象地合計		2,500,000ha	100%

出典：BRG 主催 ドナー調整会議資料（2017年4月18日）

一方、上述した BRG5 ヶ年計画においては、年ごとに 20 万～60 万 ha の泥炭地を回復目標に置いている。

表 3.2.1.4 年別の回復対象面積

年	回復目標 (ha)	地図化優先地 (ha)	
		ライセンス地	非ライセンス地
2016	600,000	0	600,000
2017	400,000	235,000	325,000
2018	400,000	325,000	285,000
2019	400,000	325,000	200,900
2020	200,000	195,600	0
合計	2,000,000	1,081,600	1,411,400
		2,500,000	

出典：BRG 主催 ドナー調整会議資料（2017年4月18日）

また、泥炭地の回復は、泥炭水理単位（KHG）を単位に回復計画を策定し、実施する。BRG 対象優先7州のうち、パプア州を除く6州での優先対象 KHG は、次表のとおり、32 個の KHG である。このうち、2016/2017 年に実施する最優先 KHG は、3.1.1 で記載したように、リアウ州 Pulau Tebing Tinggi、南スマトラ州 Sungai Sugihan- Sungai Lumpur 等、7KHG である。

表 3.2.1.5 BRG 対象優先 6 州内の 2017 年予備計画における対象 KHG

Province	KHG	Province	KHG
Riau	KHG Pulau Padang	West Kalimantan	KHG Sungai Ambawang - Sungai Kubu
	KHG Pulau Tebing Tinggi		KHG Sungai Kapuas - Sungai Simpang Kanan
	KHG Sungai Kampar - Sungai Gaung		KHG Sungai Landak - Sungai Mempawah
	KHG Sungai Rokan - Sungai Siak Kecil		4KHG
	KHG Sungai Kiyap - Sungai Keinci	Central Kalimantan	KHG Sungai Kapuas - Sungai Barito
	KHG Sungai Siak - Sungai Kampar		KHG Sungai Kahayan - Sungai Kapuas
7KHG	KHG sungai Tapung Kiri - Sungai Kiyap		KHG Sungai Kahayan - Sungai Sebangau
Jambi	KHG Sungai Mendahara - Sungai	4KHG	KHG Sungai Katingan - Sungai

Province	KHG	Province	KHG
4KHG	Batanghari	South Kalimantan	Sebangau
	KHG Sungai Baung – Sungai Betara		KHG Sungai Balangan - Batangalai
	KHG Sungai Betara – Sungai Mendahara		KHG Sungai Barito - Sungai Alalak
	KHG Sungai Pengabuan - Sungai Baung		KHG Sungai Barito - Sungai Taping Sungai Taping
South Sumarta	KHG Sungai Air Hitam Laut - Sungai Buntu Kecil*	4KHG	KHG Sungai Utar - Sungai Serapat*
	KHG Sungai Lalan - Sungai Merang	Total	
	KHG Sungai Merang - Sungai Ngirawan	6 Province	32 KHG
	KHG Sungai Ngirawan - Sungai Sembilang	*Cross province KHG	
	KHG Sei Lalan - Sungai Bentayan		
	KHG Sungai Bentayan - Sungai Penimpahan		
	KHG Sungai Penimpahan - Sungai Air Hitam		
	KHG Sungai Sugihan - Sungai Lumpur		
	9KHG	KHG Sungai Saleh - Sungai Sugihan	

出典：BRG 主催ドナー調整会議資料（2017年4月18日）

3.2.2 成り立ちうるビジネスの洗い出しの検討

泥炭地は、大概、地方都市から離れた場所にあるとともに、道路などのインフラが整備されていない場合が多く、自然条件的にも強酸性土壌、高い地下水位など特殊な条件下にある。そのため、このような場所に適合するビジネスの選定には、その立地に適したビジネス、アクセスを考慮したビジネスの選定が必要になる。本案件で対象となる3州4県の泥炭地において、可能性のあるビジネスとしては、①農業、②林業、③水産業、④観光業などが考えられる。BRG担当者ならびに各地方州の担当者との協議の結果、また、彼らの希望するビジネスを検討した結果、以下に挙げるビジネスが、これらの泥炭地への導入の可能性が高い。

(1) アグロフォレストリ、サゴヤシ、バイオエネルギー

代替生計向上活動は、インドネシアにおける泥炭地回復の一つの選択肢であると考えられる。現時点では、これらの活動には、湿地農業（paldiculture）、サゴヤシ植林・サゴヤシの活用、ラタンを用いた工芸品の開発などが検討されている。泥炭生態系の機能の回復の技術基準にかかる環境林業大臣令²¹では、湿地農業に適した樹種・品種を推奨している。

表 3.2.2.1 泥炭地での植生回復や湿地農業に活用可能な泥炭地で自生する植物のタイプと種類

No.	Benefit	Selected Species
1.	Producers of food (including fruit, carbohydrates, protein, spices and fats / oils)	Sago (<i>Metroxylon</i> spp.) Asam kandis (<i>Garcinia xanthochymus</i>) Kerantungan (<i>Durio oxleyanus</i>)

²¹ Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.16/MenLHK/Setjen/Kum.1/2/2017 tentang Pedoman Teknis Pemulihan Fungsi Ekosistem Gambut

No.	Benefit	Selected Species
		Pepaken (<i>Durio kutejensis</i>) Mangga kasturi (<i>Mangifera casturi</i>) Mangga kueni (<i>Mangifera odorata</i>) Rambutan (<i>Nephelium</i> spp.) Nipah (<i>Nypa fruticans</i>) Kelakai (<i>Stenochlaena palustris</i>) Tengkawang (<i>Shorea stenoptera</i> , <i>S. macrophylla</i>) Liberian coffee (<i>Coffea liberica</i>)
2.	Producers of fiber (as a substitute raw material for pulp and paper)	Geronggang (<i>Cratogeomys arborescens</i>) Terentang (<i>Camponosperma auriculatum</i>) Gelam (<i>Melaleuca cajuputi</i>)
3.	Source of bio-energy (wood pellets, briquettes, bio-ethanol)	Gelam (<i>Melaleuca cajuputi</i>) Sagu (<i>Metroxylon sago</i>) Nipah (<i>Nypa fruticans</i>) Bintangur (<i>Callophyllum</i> sp.)
4.	Producing sap / latex	Jelutung (<i>Dyera polyphylla</i>) Nyatoh (<i>Palaquium leiocarpum</i>) Sundi (<i>Payena</i> spp., <i>Madhuca</i> spp.)
5.	Sources of medicines	Akar kuning (<i>Cosciniium fenestratum</i>) Pulai (<i>Alstonia pneumatophora</i>)
6.	Timber for construction	Klakok (<i>Gluta renghas</i>) Tumih (<i>Combretocarpus rotundatus</i>) Gelam (<i>Melaleuca cajuputi</i>)
7.	Source of honey bee (apiculture)	Gelam (<i>Melaleuca cajuputi</i>) Blawan (<i>Tristanopsis</i> sp.)
8.	Other forest products	Gaharu (<i>Aquilaria</i> sp.) Gemor (<i>Alseodaphne</i> sp.) Purun tikus (<i>Elaeocharis dulcis</i>) Rotan irit (<i>Calamus trachycoleus</i>)
9.	Wood conservation value	Ramin (<i>Gonystylus bancanus</i>) Meranti merah (<i>Shorea macrantha</i> , <i>Shorea balangeran</i>)

出典：環境林業大臣令第2017年P16号をもとに、FORDA、社会林業総局での聞き取り結果を加筆している。

(2) 畜産

1) 概要

インドネシアでの畜産は、畜産および動物衛生法（Law No. 18/2009）²²、改定畜産及び動物衛生法（Law No. 41/2014）²³ならびに動物・家畜の遺伝資源に係る政府規定（PP 48/2011）²⁴で規定されているが、泥炭地での畜産開発については、特に規定されていない。泥炭地への導入の可能性のある畜産は、水牛・牛、家禽（鶏、カモ）が挙げられる。

2) 牛・水牛（Cow/ Cattle, Water Buffalo）

a) 品種

家畜研究所（Livestock Research Agency）の資料によると、対象地の条件により、以下の品種が推奨される。

- | | |
|---------------------------|----------|
| ✓ Bali Cow / Local cattle | 中央カリマンタン |
| ✓ Water Buffalo | 南スマトラ |

b) 飼料の生産

家畜の生産性を上げるためには、適切な飼料の生産・確保が重要である。ミネラル

²² Law No. 18 of 2009 on Animal Husbandry and Animal Health

²³ Law No. 41 of 2014 on Amendment to Law No. 18 of 2009 on Animal Livestock and Health

²⁴ Government Regulation No. 48 of 2011 on Genetic Resources of Animals and Livestocking

土壌では、様々な品種の飼料作物の生産が可能であるが、泥炭地では、可能性のある品種が限定される。

通常は、牧草地において1種類の牧草の生産性を上げるためには、大量の肥料を付与することにより、生産性を最大化させることができる。しかし、大量の肥料を使用することは、下流部への水質汚染などの問題が発生する可能性がある。

肥料の付与を最小化しつつ、牧草の成長を向上させるためには、根粒菌を内包するマメ科植物との混植が考えられる。根粒菌を内包するマメ科植物は、大気中の窒素を固定させることができ、結果的に、その固定された窒素が牧草の成長を促進させることができる。

通常の牧草は、pH4以下の酸性土壌での成長は芳しくない。しかしながら、次に挙げる牧草、マメ科植物は、泥炭地での成長が期待できる。

表 3.2.2.2 泥炭地で生産可能な飼料作物のタイプと種類

種類	品種	概要
牧草 (Grass)	<i>Brachiaria decumbens</i>	アフリカ原産の牧草。貧栄養、pH3.5以下でも成長可能。滞水する（Waterlogged）重粘土（Heavy Clay）では成長は悪い。 ²⁵
	<i>Setaria sphacelata</i> var. <i>splendida</i>	アフリカ原産の牧草。貧栄養でも成長可能。短い乾期が望ましく、少雨・乾期中は成長が低下する一方、冠水には高い耐性を示す。 ²⁶
	<i>Hymenachne amplexicaulis</i> (Kumpai Grass)	北米原産だが、世界中に生息している。土質より水分条件に生育が左右され、沼地の縁、氾濫原、河岸など湿度の高い条件で生育する。水深1~2mの場所でも生育可能。 ²⁷
マメ科 (Legume)	<i>Sesbania rostrata</i>	アフリカ原産。窒素を固定し、成長が早いことから、緑肥や家畜用の資材としても用いられる。酸性土壌（pH4.3以下）でも成長可能だが、窒素固定率は低下する。重粘土（Heavy Clay）では成長は悪い。 ²⁸
	<i>Indigofera zollingeriana</i>	東南アジア原産。海岸・砂浜に生息。日当たりのよい山間部でも生育する。乾燥泥炭に適する。他の作物の日陰樹としても植えられている。 ²⁹

出典：家畜研究所（Livestock Research Agency）、農業省家畜・家畜衛生総局飼料局（Directorate of Animal Feed, Directorate General of Livestock and Veterinary Health, Ministry of Agriculture）への聞き取り（2017）

Tropical Forage ウェブサイト（<http://www.tropicalforages.info/>）

3) 家禽（鶏、カモ）

家畜研究所（Livestock Research Agency）の資料によると、対象地の条件により、以下の品種が推奨される。

表 3.2.2.3 泥炭地で飼育可能な家禽類

種類	品種	概要
ニワトリ	KUB Chicken (superior chicken)	インドネシアで品種改良された品種。雌鶏は卵を多く生産するとともに、雄鶏は食肉として活用できる。
カモ	Master Duck	Mojosari 種と Alabio 種のハイブリッド種 (MA Duck)。様々な環境に適応することが期待される。 ³⁰
	Mojosari Putih	Mojosari Putih/ white Mojosari (Mojosari x Peking)

²⁵ http://www.tropicalforages.info/key/Forages/Media/Html/Brachiaria_decumbens.htm

²⁶ http://www.tropicalforages.info/key/Forages/Media/Html/Setaria_sphacelata_var_splendida.htm

²⁷ http://www.tropicalforages.info/key/Forages/Media/Html/Hymenachne_amplexicaulis.htm

²⁸ http://www.tropicalforages.info/key/Forages/Media/Html/Sesbania_rostrata.htm

²⁹ <http://tropical.theferns.info/viewtropical.php?id=Indigofera+zollingeriana>

³⁰ <http://agricultural-info.blogspot.jp/2014/02/master-ducks-commercial-seed-laying.html>

出典：家畜研究所（Livestock Research Agency）、農業省家畜・家畜衛生総局飼料局（Directorate of Animal Feed, Directorate General of Livestock and Veterinary Health, Ministry of Agriculture）への聞き取り（2017）

家禽類への飼料は、市販の飼料を使うことで生産性が高まるが、飼料が高価であるため、地方の村落での活用は難しいと考えられる。放し飼いの場合は、特に飼料を与える必要はないが、サゴヤシの搾りかすなどを、飼料に混ぜて与えることも可能である。

また、日本では実績のある合鴨農法（カモを水田で飼育すること）も可能性のある活動（組み合わせ）の一つとして考えられる。この場合、カモは、水田内の草や害虫を採餌することにより、除草剤、殺虫剤などが不要となるとともに、カモの糞や排せつ物が、肥料の代わりとなることから、イネの成長を促進する効果も期待できる。

(3) 養殖（養魚）

1) 貯水池での養殖

泥炭地を縦断する水路を堰にて堰き止めた上流部にできる小規模な貯水池において、淡水魚の養殖が、可能性のある産業の一つとして検討される。以下に挙げる魚種が養殖の可能性はあるが、地域により水質などが異なることから、環境に応じて、適切な魚種を選択することが必要である。

表 3.2.2.4 泥炭地で養殖可能な魚種

	種名	備考
1.	Papuyu (<i>Anabas testudineus</i>)	最も導入可能と思われる。
2.	Gabus Haruan (<i>Chanana striata</i>)	最も導入可能と思われる。
3.	Jelawat (<i>Leptobarbus hoevenii</i>)	
4.	Kelabau (<i>Osteochilus melanopleuras</i>)	
5.	Arwana (<i>Schleropages formosus</i>)	
6.	Baung (<i>Mystus nemurus</i>)	
7.	Gurami (<i>Ospronemus gouramy</i>)	
8.	Belida (<i>Chitala lopis</i>)	

出典：海洋水産省養殖総局への聞き取り（2017）

2) Minapolitan（水産業奨励地）：Minapadi（水田での魚養殖）／Ugadi（水田でのエビ養殖）

海洋水産省令第 2012 年 18 号³¹および 2013 年 35 号³²に基づき、Minapolitan（水産業奨励地）のコンセプトに則った養殖業の普及が展開されている。省令 2012 年 18 号に基づき、計画ガイドラインが策定されるとともに、省令 2013 年 35 号に基づき、活動が推奨される地域が特定され、さらに、総局長令 2015 年 111A 号³³により、選定された地域で推奨される魚種の選定が行われた。ここでは、魚養殖と水田（Minapadi）ならびにエビ養殖と水田（Ugadi）の組み合わせが推奨されている。現在は、ジャワ島において活動が開始されているが、現段階では他の地域へは展開していない。

表 3.2.2.5 省令等で計画されている対象県における水産業奨励地ならびに推奨魚種

Province	District	Minapolitan Aquaculture Area *1	Minapolitan Fishing Area *1	Commodity *2
Riau	Kepulauan Meranti	-	PPI Tanjung Samak	-

³¹ Menteri Kelautan dan Perikanan Republik Indonesia Nomor PER.18/MEN/2012 tentang Pedoman Penyusunan Rencana Induk Pengembangan Kawasan Minapolitan

³² Menteri Kelautan dan Perikanan Republik Indonesia Nomor 35/KEPMEN-KP/2013 tentang Penetapan Kawasan Minapolitan

³³ Direktur Jenderal Perikanan Budidaya Nomor 111A/KEP-DJPB/2015 tentang Lokasi Sentra Produksi Perikanan Budidaya Berbasis Kawasan Minapolitan Terintegrasi Tahun 2016

Province	District	Minapolitan Aquaculture Area *1	Minapolitan Fishing Area *1	Commodity *2
South Sumatra	Ogan Komering Ilir (OKI)	Kecamatan Lempuing Kecamatan Mesuji Kecamatan SP Padang Kecamatan Pampangan Kecamatan Jewawi	-	Udang, Patin, Mas, Nila
	Musi Banyuasin (MUBA)	Kecamatan Lais Kecamatan Sungai Lilin Kecamatan Sekayu	PUD Sungai Musi	Nila, Patin
Central Kalimantan	Pulang Pisau	Kecamatan Kahayan Hilir Kecamatan Jabiren Raya	-	-

出典：*1: 海洋水産省令第 2013 年 35 号より抜粋、*2: 総局長令 2015 年 111A 号より抜粋

(4) 稲作

泥炭地で稲作を行う場合は、浅い泥炭地（60～100cm 程度）では、稲作が可能である、土壌改良、水位管理が必要になる。深い泥炭地では、稲作は困難である。

泥炭地を含む湿地帯での稲作には、湿地の環境に適合した品種（Inbrida Padi Rawa (INPARA)）が推奨される。泥炭地では、特に、IMPARA³⁴の品種が推奨された。稲作を実施する場所の特性にもよるが、上記 Minapolitan で魚やエビの養殖とともに栽培する品種としても、上記 IMPARA 種が適当である。

(5) 温室効果ガス排出削減

インドネシアでは、泥炭の分解、森林伐採・火災などにより、2005 年時点で約 21 億 tCO₂ の排出量があり、世界第 3 位の CO₂ 排出国であるとされる。そのうち、78% が泥炭からの排出で、そのうち、分解によるものが 41% を占めると言われている (DNPI, 2010)³⁵。そのため、泥炭地からの排出量を削減することが、全体の排出量削減に寄与するものである。

また、泥炭地においても、土地利用の違いにより排出量が異なるという報告もされている。兼松ほか (2016)³⁶は、ベトナム国南部の泥炭地における土地利用別の排出量を例示しており、かく乱の少ない国立公園内の泥炭地 (27.3 tCO₂/ha/yr) に比べて、農地 (36.4 tCO₂/ha/yr) やメラルーカ植林地 (31.8 tCO₂/ha/yr) での排出量が高いことを示している。また、火災の被害を受けていない泥炭と受けた泥炭では、火災の被害を受けたところの排出量 (27.3 tCO₂/ha/yr) が、前者 (受けていない) (13.65 tCO₂/ha/yr) の 2 倍の排出量を示している。泥炭地に対する農地などへの開発、また、火災の被害により、泥炭地からの排出量が増加することから、開発された土地の適切な管理、泥炭地の回復、泥炭地火災の予防の必要性が高いことがわかる。

3.2.3 ビジネスとしての妥当性の判定基準の検討

対象地の 3 州 4 県の立地条件、社会経済状況はさまざまである。そのため、以下に挙げるような項目をもとに、それぞれの対象地に導入可能な活動の妥当性を判断する。併せて、導入可能な活動を検討する際には、地域住民の希望、BRG/州 TRGD の希望・計画なども加味する。

³⁴ <http://bbpadi.litbang.pertanian.go.id/index.php/varietas/inbrida-padi-rawa-inpara/content/item/71-inpara-3>

³⁵ Dewan Nasional Perubahan Iklim, Indonesia (DNPI: National Council on Climate Change), 2010, Indonesia's Greenhouse Gas Abatement Cost Curve

³⁶ 兼松株式会社 (2016) : 平成 27 年度地球温暖化問題等対策調査事業 (途上国における森林の減少・劣化の防止等への我が国企業の貢献可視化に向けた実現可能性調査事業)

表 3.2.3.1 導入可能な活動の妥当性を判断する基準の一例

基準	細目	備考
1. 泥炭の有無	a. Peat depth: shallower than 0.5m b. Peat depth: deeper than 0.5m till 2m c. Peat depth: deeper than 2m	水田は、浅い泥炭地での導入が可能である。
2. 土地の所有形態	a. State forest Production forest Protection forest National park b. Other use land/ APL	
3. うち、コンセッションの有無	a. Logging concession (HPH) b. Palm Oil Plantation Concession (HGU) c. Industrial Forest Plantation Concession (HTI) d. Ecosystem restoration concession e. No licensed area	
4. 村落、市場からのアクセス	a. Near from the villages b. Far from the village c. Near to the market d. Far to the market e. With infrastructure to access f. Without infrastructure to access	対象地が村落中心地から遠い場合、または、市場までの物理的なアクセスがない、遠い場合は、日持ちのする産物を導入する必要がある。

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

投資の妥当性の判断としては、次表に挙げる基準が想定される。

表 3.2.3.2 投資の妥当性の判断基準

	基準	基準の概要
1	泥炭地回復への寄与	地下水位が地下 0.4m まで上昇するか。
2	実施主体	実施主体が明確か。
3	収益性	費用便益比（B/C 比）が 1.0 を超えるか。
4	利益性	確実なリターンがあるか。
5	回収性	利益が出る期間は何年後か。

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

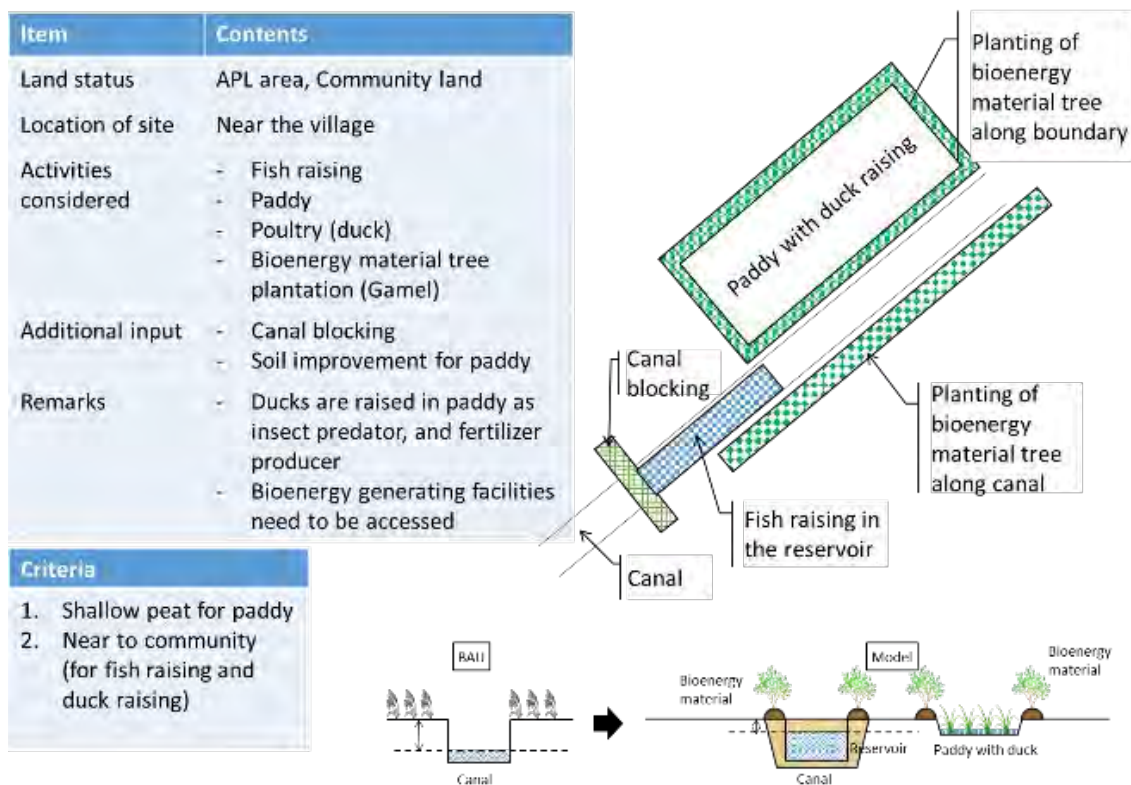
3.2.4 妥当なビジネスと商品作物の組み合わせの検討

上記 3.2.2 で検討した導入可能な活動を、上記 3.2.3 で検討した妥当性の判断基準に従い、対象地で導入可能な活動の予備的検討を行った。対象地のプロフィール調査は現在再委託により実施中につき、具体的な提案の段階ではないが、以下に挙げるような活動が基本ビジネスモデルとして挙げられる。これらの基本ビジネスモデルは、対象地の立地条件、社会経済条件などを考慮し、それぞれの場所に適する活動を組み合わせたものである。

表 3.2.4.1 基本ビジネスモデルの一例

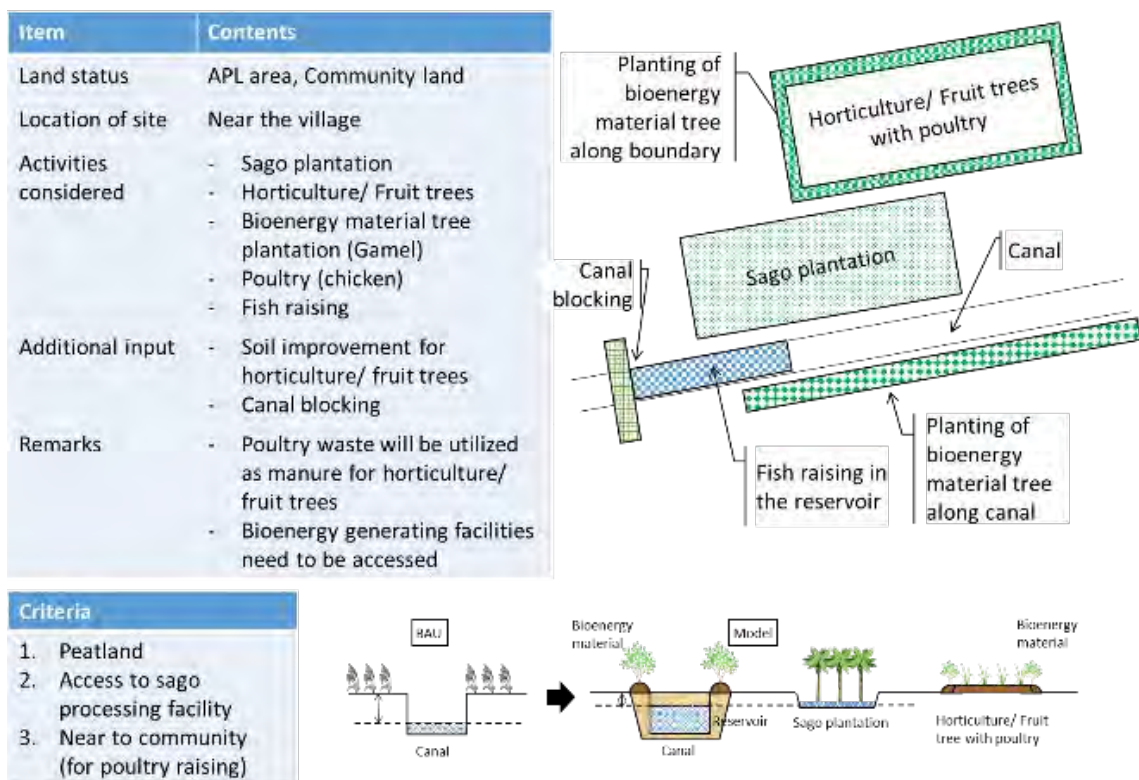
Products	Activity Item	Tentative Basic Business Models				
		Model 1	Model 2	Model 3	Model 4	Model 5
Agriculture products	Vegetables		X	X		
	Fruit trees		X	X		
	Rice (paddy)	X				
	Materials for bioenergy	X	X	X	X	
	Coffee					
Forest-related products	Sago palm		X		X	
	Indigenous trees				X	X
	Indigenous plants					X
	Non-timber forest products				X	
Livestock/ fishery	Water buffalo			X		
	Chicken		X	X		
	Duck	X				
	Fish	X	X			
	Fodder cultivation			X		
Non-productive activity	Infrastructure for eco-tourism					X
	Canal blocking	X	X	X	X	X

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

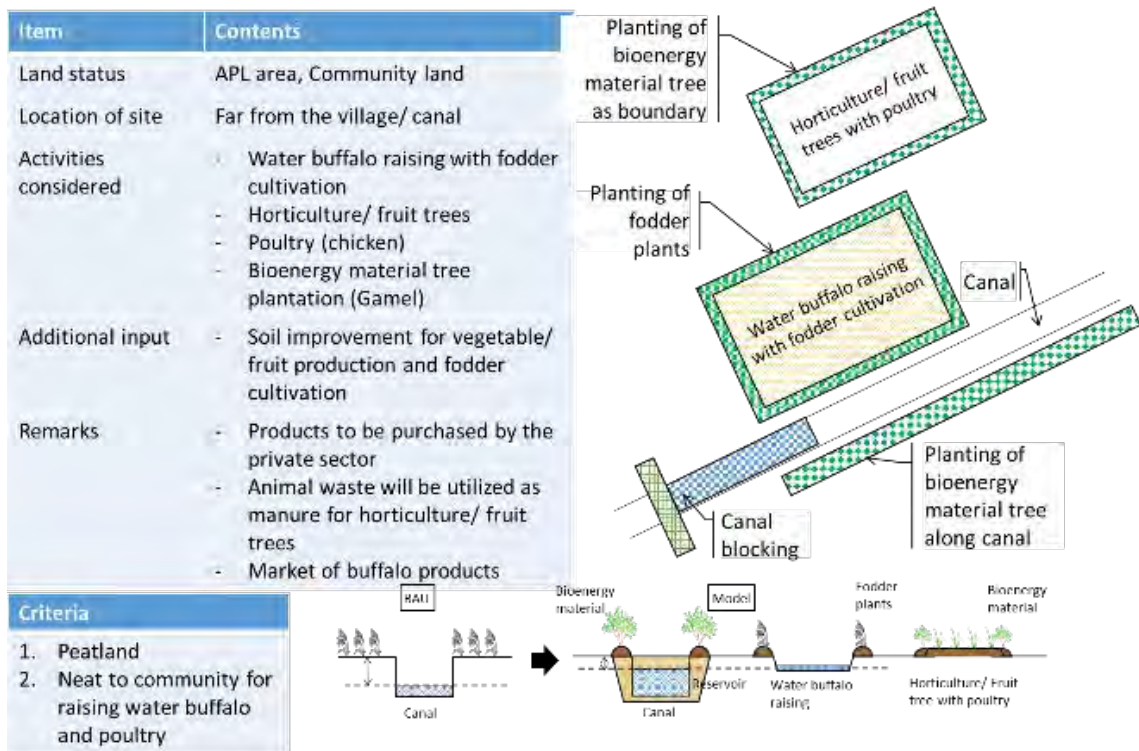


(3) モデル1：食料・水・エネルギーへの対応を考慮したモデル（APL：共有地での例）

図 3.2.4.1 基本ビジネスモデルの一例



(4) モデル2：食料・水・エネルギーへの対応を考慮したモデル（APL：共有地での例）

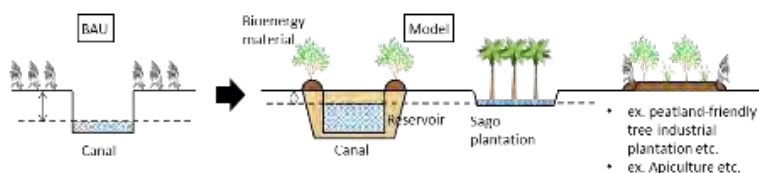
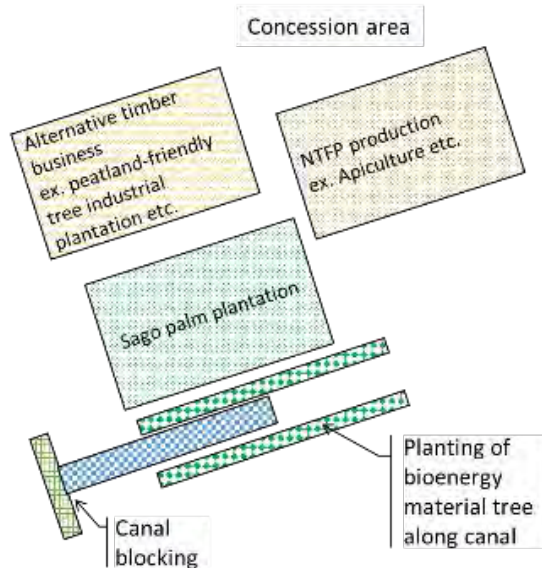


(5) モデル3：アグロフォレストリ、混牧林（APL：共有地での例）

図 3.2.4.1 基本ビジネスモデルの一例（続き）

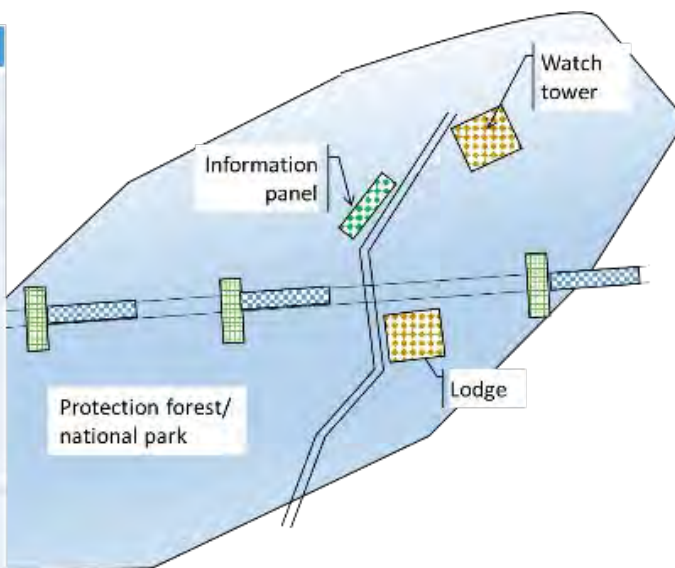
Item	Contents
Land status	State forest
Concession	Concession area in production forest
Activities considered	<ul style="list-style-type: none"> - Sago palm - Non-timber forest product - Alternative timber business
Additional input	<ul style="list-style-type: none"> - Canal blocking - Plant necessary trees/plants, if necessary - Soil improvement, if necessary
Remarks	<ul style="list-style-type: none"> - New concessions need to be acquired to produce products

Criteria
1. Agreement with Concession holders

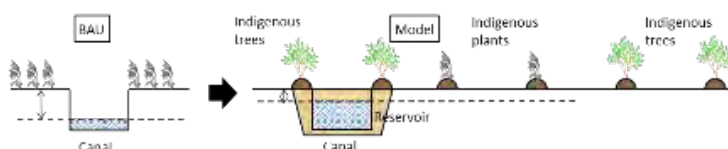


(6) モデル4：食料ならびに非木材産物の生産（コンセッション地の例）

Item	Contents
Land status	State forest Protection forest/ national park
Activities considered	<ul style="list-style-type: none"> - Peatland-friendly eco-tourism - Planting of indigenous trees
Additional input	<ul style="list-style-type: none"> - Canal blocking - Some small infrastructure/ facilities for eco-tourism
Remarks	<ul style="list-style-type: none"> - New concessions need to be acquired to implement eco-tourism



Criteria
1. Peatland
2. Wildlife still habitat
3. Accessibility to education facility/ environment



(7) モデル5：エコツーリズム、アグロツーリズム（保護区の例）

図 3.2.4.1 基本ビジネスモデルの一例（続き）

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

対象地のプロフィール調査（再委託）の結果に基づき、これら基本ビジネスモデルの詳細を検討するとともに、詳細な事業計画、経済分析等を行う。

3.2.5 事業実施形態と資金形態の検討

提案する事業モデルは、それぞれの対象地の立地条件、生産物の生産状況等により、コミュニティベースで実施すべき事業と、企業ベースで実施可能な事業に分けられる。それぞれの事業ならびに判断する基準を次表に整理する。

表 3.2.5.1 コミュニティベースならびに企業ベースで行うべき事業の切り分けの基準

基準	実施主体		備考
	コミュニティベース	企業ベース	
初期投資	初期投資が小規模か	初期投資が大規模か	
総事業費	総事業費が小規模か	総事業費が大規模か	
収益性	費用便益比が 1.0 以下でも可	費用便益比が 1.0 以上	
市場性	小規模な市場へのアクセスがあるか	大規模な市場へのアクセスがあるか	
生産性	生産規模は小規模か	ある一定以上の生産量が見込めるか	
加工（品質の維持）	遠距離を運搬する場合、加工無しでは品質が低下するか	遠距離を運搬する場合でも、加工無しでも品質が維持されるか	
加工（加工施設）	加工が必要な産物だが、簡易な加工施設で加工が可能か	加工が必要な産物であり、大規模な加工施設が必要か	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

上述した二つの実施主体に応じて、活用できる可能性のある資金形態を次表にまとめる。

表 3.2.5.2 実施主体ごとの活用可能な資金形態

実施主体	活用可能な資金形態	備考
コミュニティベース	インドネシア国内の既存の資金制度（KUR、Forest Development Fund）の活用が可能。各資金の詳細は 4.4 章で詳述する。	
企業ベース	民間企業の投資の促進。グリーンボンドなどの公的・私的なボンドの活用が可能。各資金の詳細は、4.4 章で詳述する。	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

3.3 泥炭地環境に適応する商品作物・サービス事業の市場調査結果

3.3.1 泥炭地環境に適応する商品作物洗い出し結果

対象地の自然環境および社会環境条件等は、同じ泥炭地ではあるものの、多岐にわたる。そのため、対象 3 州の大学コンソーシアムを再委託先として、再委託調査「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」を実施し、対象州・県において、生産可能で実行可能な、かつ泥炭回復に資する商品作物ならびにサービスの可能性について、調査を行い、それらの実行可能性について検討を行った。次表に、再委託調査の結果、導入の可能性があると判断された商品作物・サービスを記す。

表 3.3.1.1 対象県で検討された導入可能な商品作物・サービス一覧

分類	小分類	対象州/県			
		リアウ	南スマトラ		中央カリマンタン
		メランティ	OKI	MUBA	プランピサオ
農業/ プラン テー ション	食料、野菜	サゴ	湿地水稲		水稲・メイズ
		野菜			チリ、スイカ
	果物		パイナップル	パイナップル	
	コーヒー	リバリカコーヒー	リバリカコーヒー		
	アレカナッツ			アレカナッツ	
	プランテーション				ゴム
林業	早生樹植林	Gelam 植林			Gelam 植林
	郷土種植林	Beriang 植林	植林		
	林産物	ケナフ	ケナフ	Purun (草本)	ケナフ
水産業			伝統的な雨期の漁労	堰上流部での養殖	養殖
畜産業			水牛飼育		アヒル飼育
加工業		サゴ澱粉生産			
		サゴ残渣活用			
		林産物の加工			
その他		エコツーリズム			
		GHG 排出削減効果			

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

3.3.2 有望な主要商品作物・サービス事業の市場および収益分析

(1) 南スマトラ州 OKI 県

1) 水牛からの産品 (Gulo Puan)

a) 市場分析

OKI 県で水牛乳を原料とする生産物の市場は、いまだ限定される。州都パレンバンへは、週1~2回、1便当たり30~60kg程度が運搬され、州都で販売されているに過ぎない。OKI 県で生産された Gulo puan は、生産者から直接パレンバンの仲買人に販売される。水牛乳の生産が一定的ではないので、製品の生産も不定期になっている問題がある。水牛乳を使った製品はパレンバンでは新しい製品であり、販売量はそれほど多くはなく、認知度も低い。そのため、生産量、販売量、また認知度の向上のためには、より付加価値の高い製品（キャラメルミルクキャンディ、ヨーグルト、アイスクリームなど）が生産できる体制を構築する必要がある。

新鮮な水牛乳は、OKI 県では、15,000~20,000IDR/litter であるが、Gulo puan とすると、60,000IDR/Litter 程度になる。

b) 収益分析

水牛乳からの産品である Gulo puan の収益分析の結果は以下のとおりである。

表 3.3.2.1 稲作農繁期での Gulo Puan 生産販売にかかる収益分析（6月～10月）

項目	値	備考
生産単位	30kg/月	
分析期間	5 ヶ月	
初期投資	0.6 百万ルピア	
生産コスト	5.9 百万ルピア	32litter
販売額	1.8 百万ルピア	30kg
収益	9.0 百万ルピア	
RCR	1.53	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

表 3.3.2.2 稲作非農繁期での Gulo Puan 生産販売にかかる収益分析（11月～5月）

項目	値	備考
生産単位	60kg/月	
分析期間	7 ヶ月	
初期投資	0.6 百万ルピア	
生産コスト	13.0 百万ルピア	80litter
販売額	3.6 百万ルピア	60kg
収益	25.2 百万ルピア	
RCR	1.94	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

2) 湿地水産業（干し魚、燻製）

a) 市場分析

OKI 県で生産される干し魚、燻製の 10%がローカルマーケットで販売されているのみで、残りの 90%は、域外のバンドン、ポゴール、メダンなどに販売されている。通常は、週 2 回、1 回につき 100kg 程度の製品を運搬、販売されている。干し魚、燻製の市場は安定している。また、OKI 県産の干し魚は、主に州外に販売していることから、州内では競争は少ない。そのため、競争相手は、ジャンビ、北スマトラ等の生産者になる。

OKI 県での問題は、市場へ運搬・販売するまでに保存、保管するスペースが十分でない、ということである。

b) 収益分析

干し魚、燻製の収益分析の結果は以下のとおりである。

表 3.3.2.3 干し魚の生産販売にかかる収益分析

項目	値	備考
生産単位	生産量 3,000kg/月	原材料 9,000kg/月
分析期間	1 ヶ月	
初期投資	12.0 百万ルピア	
生産コスト	110.8 百万ルピア/月	
販売額	120 百万ルピア/月	
収益	8.5 百万ルピア/月	
RCR	1.08	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

表 3.3.2.4 魚の燻製の生産販売にかかる収益分析

項目	値	備考
生産単位	生産量 3,000kg/月	原材料 9,000kg/月
分析期間	1 ヶ月	
初期投資	18.0 百万ルピア	
生産コスト	179.5 百万ルピア/月	
販売額	300.0 百万ルピア/月	
収益	119.6 百万 /月	
RCR	1.66	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

3) Purun を用いた工芸品

a) 市場分析

Purun（草本）を用いた工芸品は、通常、注文生産である。県政府としては、この民芸品を特産物として売り出したい考えである。この製品の問題点は、現状が注文生産であること、技術をもつ生産者の確保、また、原料となる Purun の確保である。また、技術をもつ生産者でも一日当たり 10 個程度しか制作できないことから、大量注文に応ずることが難しい。

安価な材料を使っているが、これらの工芸品は、マットが 25,000～30,000 ルピア、バッグが 40,000～50,000 ルピア、財布が 25,000 ルピアなどで販売できる。

b) 収益分析

十分な注文量を確保できることを前提として、Purun 工芸品生産の収益分析の結果は以下のとおりである。

表 3.3.2.5 Purun 工芸品の生産販売にかかる収益分析

項目	値	備考
生産単位	53,100 個/月	
分析期間	1 か月	
初期投資	1.3 百万ルピア	
生産コスト	456.3 百万ルピア/月	
販売額	686.7 百万ルピア/月	
収益	230.4 百万ルピア/月	
RCR	1.50	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

4) 湿地水稲

a) 市場分析

湿地性の水稲は、ローカル市場を対象としている。そのため、湿地での水稲の生産性は、年 1 回の生産であることから、現状でも低い。水稲農家の収入も低く、これは、脱穀・販売を中間業者を介しているからである。そのため、農家が直接、脱穀し、市場に販売することができれば、農家の収入向上にもつながることが期待できる。

b) 収益分析

湿地水稲の収益分析の結果は以下のとおりである。

表 3.3.2.6 湿地水稻の生産販売にかかる収益分析

項目	値	備考
生産単位	2.5ha	
分析期間	1年	
初期投資	6.2 百万ルピア	
生産コスト	20.4 百万ルピア/年	
販売額	40.0 百万ルピア/年	
収益	18.0 百万ルピア/年	生産量：1年目 10,000kg
RCR	1.82	

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

5) リベリカコーヒー

a) 市場分析

リベリカコーヒーは、湿地で生産可能な産物の一つであり、ジャンピ州での生産が盛んである。ローカル市場での需要は少ないが、主に、マレーシアやシンガポールに輸出されている。ジャンピ州では、リベリカコーヒーは、ロブスタ種（25,000 IDR/kg）より高値で取引されている。

仲買業者への農家からの買い取り価格は37,000～38,000 IDR/kgであり、これが、協同組合へは、44,500～45,000 IDR/kgで取引されている。

コーヒー豆のパッケージがあまり良くないことから、見栄えのするパッケージを作ることが市場拡大への一つの手段でもある。

b) 収益分析

リベリカコーヒーの栽培のためには日陰樹が必要であることから、ここでは、後述するアレカナッツとの組み合わせをした場合の収益分析をおこなった。その結果は以下のとおりである。

表 3.3.2.7 リベリカコーヒー・アレカナッツの生産販売にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	25年	
生産コスト	72.38 百万ルピア	割引率 11%
収益	141.87 百万ルピア	割引率 11%
NPV	69.50 百万ルピア	
BCR	1.96	
IRR	20.5	

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

6) アレカナッツ

a) 市場分析

アレカナッツは、通常、パイナップル、ヤシ、コーヒーなどと組み合わせたアグロフォレストリの形式で植栽される。アレカナッツは、品質にもよるが、インドやマレーシアへ高値で輸出されている。アレカナッツの価格は、品質、種類、収穫後の乾燥法によりことなる。特に重要なのは含水量と色で、この条件が直接価格に反映する。しかしながら、栽培をする農家の多くは、高品質を確保する方法を知らないことから、安価で販売しているのが現状である。

第一次仲買業者への農家からの買い取り価格は、非乾燥で4,000～5,000 IDR/kg、乾燥

したもので 15,000 IDR/kg である。

b) 収益分析

アレカナッツの樹冠下では、他の作物も生産が可能であることから、ここでは、アレカナッツと稲作／トウモロコシの栽培を組み合わせた場合の収益分析をおこなった。その結果は以下のとおりである。

表 3.3.2.8 アレカナッツ・稲作／トウモロコシの生産販売にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	25年	
生産コスト	116.66 百万ルピア	割引率 11%
収益	412.62 百万ルピア	割引率 11%
NPV	295.97 百万ルピア	
BCR	3.54	
IRR	30.9	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

7) パイナップル

a) 市場分析

パイナップルは、国内、国外問わず、市場拡大に大きな期待が持てる作物の一つである。農業情報システムデータセンター（2015）の情報では、不足量が 2017 年の 17,149t から、2019 年には、58,079t が不足するとの推定もされている。農家は通常、生の状態で仲買人に販売している。そのため、買い取り価格は、仲買人によるところが大きい。通常は、収穫前に、ある一定面積の畑で栽培されているパイナップルを購入する方法が取られており、おおかた 60～80 百万ルピア/ha で購入されている。

b) 収益分析

アレカナッツの樹冠下では、他の作物も生産が可能であることから、ここでは、アレカナッツとパイナップルの栽培を組み合わせした場合の収益分析をおこなった。その結果は以下のとおりである。

表 3.3.2.9 パイナップル・アレカナッツの生産販売にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	25年	
生産コスト	79.50 百万ルピア	割引率 11%
収益	364.10 百万ルピア	割引率 11%
NPV	284.60 百万ルピア	
BCR	4.57	
IRR	38.7	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

(2) 南スマトラ州 MUBA 県

1) ケナフ

a) 市場分析

国内外を問わず、ケナフをはじめとした繊維作物の需要は大きい。インドネシアの気候下では、ケナフは苗木を植栽してから3.5か月程度で収穫が可能であることから、インドネシアでのケナフ生産の可能性は高い。

Bambang Prayitno氏は、東ジャワとスラウェシで1,500haのケナフを栽培している。ケナフの価格は国際繊維価格に影響を受けるが、現在は、9,000～20,000 IDR/kgである。また、東カリマンタンでの経験から、ケナフから十分な繊維を採取するためには、ある程度大規模な面積での栽培が必要であると言われている。

インドネシアでは、ケナフは現在、主に民間企業により栽培されており、農家によるケナフ栽培は限られている。これは、ある程度大面積での栽培が必要なこと、さらに、市場へのアクセスが困難であること、である。市場に関しては、ケナフ繊維は、主に、自動車産業が使用していることから、農家が直接アクセスするのは難しい。

インドネシアでは、複数の企業がケナフを原料として利用し、製品の製造を行っている。例えば、PT Indonesia Nihon Seima (Tangerang)はジュートやジオテクスタイルマットを、PT ABA (東ジャワ)は自動車産業用の特別なファイバーボードを生産している。しかし、PT. ABA社は年間3,000tの繊維が必要なところ、1,500tしか国内で調達できず、残りは、ベトナムから輸入している状況である。

また、日米の自動車業界も、ケナフ繊維に注目している。これは、環境に配慮した自動車を製造する際に、これまで使用していたプラスチック製品ではなく、天然資源であるケナフ繊維を使用することに利点を感じているからである。

そのため、需要に耐えうる生産量があること、求められる品質を維持できること、プラスチック製品や、中国やベトナムで生産されているケナフより安価なこと、さらに、注文に応じて適宜調達できること、が達成できれば、インドネシアでのケナフ生産は、可能性のある産業になる。

b) 収益分析

ケナフは通常、樹木や作物（トウモロコシなど）との間作で栽培される。そのため、ケナフ以外の収益をでるため、経済的に有利な作物である。

インドネシア国内で栽培されているケナフ栽培の収益分析の結果は以下のとおりである。

表 3.3.2.10 ケナフの生産販売にかかる収益分析の例

地域・立地	生産者	Ratio
中央カリマンタン州の潮間帯の湿地でのケナフ栽培	Agricultural Technology Assessment Board - BPTP, Central Kalimantan	R/C: 3.04
東ジャワの潮間帯以外の湿地で、ケナフとトウモロコシとの間作	Indonesian Tobacco and Fiber Crops Research Institute - Balittas, Malang	B/C: 2.12
東ジャワでの非潮間帯以外での湿地でのケナフ栽培	-	R/C: 1.56

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

(3) リアウ州メランティ県

1) サゴヤシ

a) 市場分析

サゴヤシからの製品は、その形態により市場や価格が異なる。立木もしくは玉切りされた幹の状態では、近隣の村落で湿性サゴ澱粉を生産するサゴ澱粉製粉所へ販売されるに過ぎない。湿性サゴ澱粉の状態では、県レベルに市場は広がり、県都にある乾燥サゴ

澱粉を精製する製粉所へ販売され、さらにはマレーシアにも輸出される。

乾燥サゴ澱粉の状態では、市場はさらに広がる。メランティ県で製粉される乾燥サゴ澱粉の大部分は、ジャワ島にある **Cirebon** の工場に販売されているため、メランティ県内での利用・販売は限られている。

伐倒した幹の長さにもよるが、立木では、250,000～400,000 ルピア／本、玉切りした状態では、35,000～45,000 ルピア／個で、湿性サゴ澱粉精製所へ販売される。湿性サゴ澱粉になると、1,800～2,000 ルピア/kg で、乾燥サゴ澱粉の状態では、4,500～6,000 ルピア/kg で販売される。

サゴヤシからの製品により高い付加価値を高めるために、中央政府は、20 Billion ルピアをかけて、総合的なサゴ澱粉加工工場を、2020年までにメランティ県に建設することを計画している。これが実現すれば、メランティ県で栽培されるサゴヤシは、原材料として大量に必要となり、持続的なサゴ林経営が求められ、メランティ県内の村落にとっても、持続的な収入源とつながることが期待できる。

また、メランティ県内の対象地に隣接する土地は、PT.NSP のサゴヤシ林になっている。PT.NSP のサゴヤシ林からの生産量は、同島にある加工場の生産規模に満たないことから、現在は、対岸の **Siak** などから運搬している。そのため、PT.NSP のサゴヤシ林に隣接する村の村有林ならびにライセンス未発行地で生産されるサゴヤシは、PT.NSP と対象村とのパートナーシップのもと、PT.NSP に購入されることが期待される。

b) 収益分析

メランティのような島嶼部では、木材の入手が困難であることから、それらの需要が高い。また、**Selumar** のように、泥炭地や湿地でも生育可能な樹種がある。そのため、サゴヤシと **Selumar** の混植するモデルに対して、収益分析をおこなった。その結果は以下のとおりである。

表 3.3.2.11 サゴヤシ・Selumar 混植の生産販売にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	20年	
生産コスト	55.4 百万ルピア	割引率 16% (23.6 百万ルピア)
収益	310.0 百万ルピア	割引率 16% (46.8 百万ルピア)
NPV	23.18 百万ルピア	
RCR	0.98	
BCR	1.98	
IRR	10.74	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10月現在）

2) サゴヤシの残渣を利用したキノコ栽培

a) 市場分析

サゴヤシの幹からでん粉を精製する際に、皮や繊維などの有機物の残渣が残る。これらをパルプ化し、それをメディア（用土）として使いキノコを栽培することができる。サゴヤシ残渣を利用することには、二つの利点がある。一つ目は、残渣の有効活用であり、二つ目は、村落住民に対する新たな生計向上手段の創出である。キノコは、インドネシア国内外問わず、健康食品としての需要が高く、国内外で市場が開かれているとあってよい。インドネシア国内では、通常、25,000～40,000 ルピア/kg で取引される。

b) 収益分析

サゴヤシ残渣を活用したキノコ栽培の経済分析は、**Dedi Suyerman** 氏が行っている。そ

の例は以下のとおりである。

表 3.3.2.12 サゴヤシ残渣を利用したキノコ栽培の生産販売にかかる収益分析

項目	値	備考
生産単位	4 ユニット、	サゴ・パルプ 5,000kg
分析期間	1 年	
初期投資	14.5 百万ルピア	
生産コスト	6.8 百万ルピア/月	
収益	201.0 百万ルピア/年	生産量 600kg/月
RCR	2.10	
BCR	1.10	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

3) ウッドペレット

a) 市場分析

ウッドペレットは、インドネシア国内向けではなく、主に韓国向けに産業用・家庭内用に輸出されている。最近では、インドネシア産のウッドペレットは、韓国以外でも、中国、日本ならびにヨーロッパ各国からも輸入したいという要望が挙げられている。

b) 収益分析

ウッドペレットの原料となるサゴヤシの樹皮は、年間 739,000t ほどが残渣として発生し、これは、465,000t 相当のウッドペレットが生産できる量に相当する。この量の残渣を用いると、時間当たり 6t の生産能力のある工場が 20 基必要になる。

上記を前提とした、ウッドペレットの収益分析を以下に示す。

表 3.3.2.13 ウッドペレットの生産販売にかかる収益分析

項目	値	備考
生産単位	1 工場（6t/年の生産規模）	
分析期間	1 年	
生産コスト	227,860 百万ルピア	割引率 16%
販売額	302,400 百万ルピア	
収益	74,540 百万ルピア	割引率 16%
NPV	29,835.19 百万ルピア	
RCR	0.26	
BCR	1.26	
IRR	48.17	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

4) リベリカコーヒー

a) 市場分析

コーヒー豆の需要は、インドネシア国内外問わず、高いものである。インドネシアコーヒー輸出業協会の情報によると、リベリカコーヒーの産地であるジャンピ州 Sempian 県および Kedabu Rapat 県で生産されるリベリカ種の 80%は、隣国マレーシアに輸出されている。生豆の状態では、40,000～50,000 ルピア/kg、焙煎した状態では、120,000～130,000 ルピア/kg で取引されている。

b) 収益分析

リベリカコーヒーの主要な生産地であるジャンピ州 Sempian 県および Kedabu Rapat 県では、適切な管理のもと、年間 ha あたり 8,000～10,000kg の生豆が生産されている。メランティ県では、同様の規模での生産は難しいと考えられ、仮に生産量が 10%と仮定した場合、800～1,000kg の生産量になると推定され、それは、36 百万～45 百万ルピア／年に該当する。

上記を前提とした、リベリカコーヒー栽培の収益分析を以下に示す。

表 3.3.2.14 リベリカコーヒーの生産販売にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	17 年	
生産コスト	87.1 百万ルピア	割引率 16% (33.9 百万ルピア)
販売額	375.8 百万ルピア	
収益	288.63 百万ルピア	割引率 16% (77.7 百万ルピア)
NPV	43.86 百万ルピア	
RCR	2.30	
BCR	1.30	
IRR	16.61	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

- (4) 中央カリマンタン州プランピサオ県
1) Gelam (Melaleuca cajuputi) 植栽
a) 市場分析

カリマンタンのよう大面積の湿地が分布する地方では、建材に使用する木材の需要は高い。Gelam は、火災や乾燥に強い樹木であるとともに、湿地帯や強酸性土壌、貧栄養の土地に対する抵抗力が高い。樹皮の部分が厚いため、材木としては、重量の 52%程度しか利用できず、残りの 48%ほどは、残渣として使われていない。

また、Gelam は、建材として利用されるほか、コンクリートを打設する際の仮設材に使用されるなど、建設用に利用されている。また、工芸品の原料としても需要があるとともに、残渣が多いことから、残渣を利用した炭焼きにも活用されている。

- b) 収益分析

Gelam (Melaleuca cajuputi) 植栽にかかる収益分析の結果は以下のとおりである。

表 3.3.2.15 Gelam (Melaleuca cajuputi) 植栽にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	5 年	
投資額	48.50 百万ルピア	(割引率 16% : 47.4 百万ルピア)
販売額	137.5 百万ルピア	(割引率 16% : 65.5 百万ルピア)
NPV	18.07 百万ルピア	
BCR	1.38	
回収期間	5 年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

- 2) Laban (Vitex pinnata L) 植栽
a) 市場分析

Laban (*Vitex pinnata* L) は、ジャワ島、スマトラ島、カリマンタン島等、インドネシア国内で見られる樹木である。基本的に、ミネラル土壌に生育する。

材木としては、重量の 70%程度しか利用できず、残りの 30%ほどは、残渣として使われていない。用途としては、内装材、家具材、建材として利用されるほか、残渣を利用した炭焼きにも利用されている。また、葉や根茎部は腹痛、皮膚炎などの症状に対して漢方薬として利用されている。

b) 収益分析

Laban (*Vitex pinnata* L) 植栽にかかる収益分析の結果は以下のとおりである。

表 3.3.2.16 Laban (*Vitex pinnata* L) 植栽にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	20年	
投資額	56.98 百万ルピア	(割引率 16%)
収益	64.9 百万ルピア	(割引率 16%)
NPV	7.87 百万ルピア	
BCR	1.14	
回収期間	7年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

3) Balangeran (*Shorea balangeran* (Korth.)) 植栽

a) 市場分析

Balangeran (*Shorea balangeran* (Korth.)) は、Dipterocarpaceae 科の樹木であり、湿潤な熱帯雨林内、湿地や河畔、泥炭地、砂地などに生息する。

木材としては、乾燥・湿度への耐性が強いことから、小型ボートやモーター付きのボートの材料として利用される。しかし、植栽後伐採できるまでに 20 年以上を要することから、村落ではあまり植栽されていない。

b) 収益分析

Balangeran (*Shorea balangeran* (Korth.)) 植栽にかかる収益分析の結果は以下のとおりである。

表 3.3.2.17 Balangeran (*Shorea balangeran* (Korth.)) 植栽にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	20年	
投資額	44.09 百万ルピア	(割引率 16%)
収益	119.48 百万ルピア	(割引率 16%)
NPV	75.40 百万ルピア	
BCR	2.71	
回収期間	15年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

4) ゴムノキ植栽

a) 市場分析

プランピサオ県にはゴムノキ植林地が 24.29ha あるが、多くは樹齢 70 年を越す老齢

林である。そのため、新しいゴムノキを改植する必要があるとともに、これらの老齢木は、伐倒後、ウッドペレット、家具、炭などの原材料として活用することが可能である。

b) 収益分析

ゴムノキ植栽にかかる収益分析の結果は以下のとおりである。

表 3.3.2.18 ゴムノキ植栽にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	25年	
投資額	42.18 百万ルピア	(割引率 16%)
収益	48.82 百万ルピア	(割引率 16%)
NPV	6.65 百万ルピア	
BCR	1.16	
回収期間	9年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

5) Alabio duck 飼育

a) 市場分析

Alabio duck (Anas platyrhynchos Borneo) は、南カリマンタン原産のアヒルの一種である。樹木が点在し日影と空地がある場所、水辺の近くで飼育することが可能である。生後 5~6 か月から卵を産むようになり、その後 18 か月ほど、卵を産み続ける。

b) 収益分析

Alabio duck 飼育にかかる収益分析の結果は以下のとおりである。

表 3.3.2.19 Alabio duck 飼育にかかる収益分析

項目	値	備考
生産単位	100 尾	
分析期間	22 ヶ月	
投資額	36.58 百万ルピア	(割引率 16%)
収益	76.29 百万ルピア	(割引率 16%)
NPV	39.71 百万ルピア	
BCR	2.09	
回収期間	1年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

6) 稲作

a) 市場分析

プランピサオ県には 66,052ha に上る水田があるが、氾濫水と天水を利用した非灌漑水田である。これらの水田から生産されるコメは、中央カリマンタン内で販売されるとともに、南カリマンタンのように近隣州の市場にも出回っている。

b) 収益分析

稲作にかかる収益分析の結果は以下のとおりである。通常、キャッサバ、メイズ、野菜などと混植されるため、収益分析には、これら作物による収入も加味されている。

表 3.3.2.20 水稲にかかる収益分析

項目	値	備考
生産単位	1ha	
分析期間	1年	
投資額	6.82 百万ルピア	
収益	7.38 百万ルピア	キャッサバ、メイズ、野菜を含む
NPV	0.56 百万ルピア	キャッサバ、メイズ、野菜を含む
BCR	1.08	
回収期間	1年	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

7) 水産業

プランピサオ県では、外水（海）、河川、陸水（池、沼など）から魚介類を捕獲している。KHG S. Kahayan-Sebangau 内では、年間 2 万 t に上る漁獲がある。地元民は、加工した魚を好み、加工品の方が生魚より高価で取引されている。

(5) 全対象地に共通なサービス

1) 環境サービス

a) 市場分析

適切な森林管理による炭素吸収は、温室効果ガス排出量削減といった気候変動に関連した全世界的なスキームに従い、有望な事業の一つである。

b) 収益分析

南スマトラ州森林研究所は、既存の産業植林地において、試験的な試算を行っている。割引率 10%（8 年）で試算すると、木材生産だけでは NPV が負の値、BCR も 1 以下、IRR も 10% 以下と低い値を示し、事業としては成り立たない。一方、炭素を加味することで、BCR が 2 以上、IRR も 28% と高い値を示し、事業として成り立つ可能性を示している。

表 3.3.2.21 南スマトラ州での産業植林地での環境サービスにかかる収益分析

項目	値（割引率 10%）			備考
	NPV (Rp)	BCR	IRR (%)	
木材	-3,714,370	0.85	6.65	
炭素	9,605,864	1.38	18.16	
木材および炭素	31,261,136	2.23	28.65	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

2) 温室効果ガス排出削減

本調査で提案するビジネスモデルを実施することにより、泥炭地の地下水位が上昇することが期待されることから、GHG の排出量の削減が見込まれる。泥炭地における MRV 方法論は VCS（Verified Carbon Standard）やインドネシアにおける JCM-REDD+ プロジェクト等が参考となる。本報告書では、それぞれの方法論の詳細は延べないが、CDM 事業、REDD+ 事業などの既存の事業化調査報告書などから事例をとり、本調査の対象地において、ビジネスモデルを実施することにより、CO₂ 排出量がどの程度削減される可能性があるかを推測する。

ここでは、清水建設（2011）³⁷の事例から、PEAT-CO2（Hooijer et al., 2006）³⁸の考えに基づき、CO₂排出削減量を推定する。本プロジェクトの対象地は、火災の被害地が主であるが、上記 PEAT-CO2 の事例は、火災による泥炭からの CO₂発生は考慮していない。

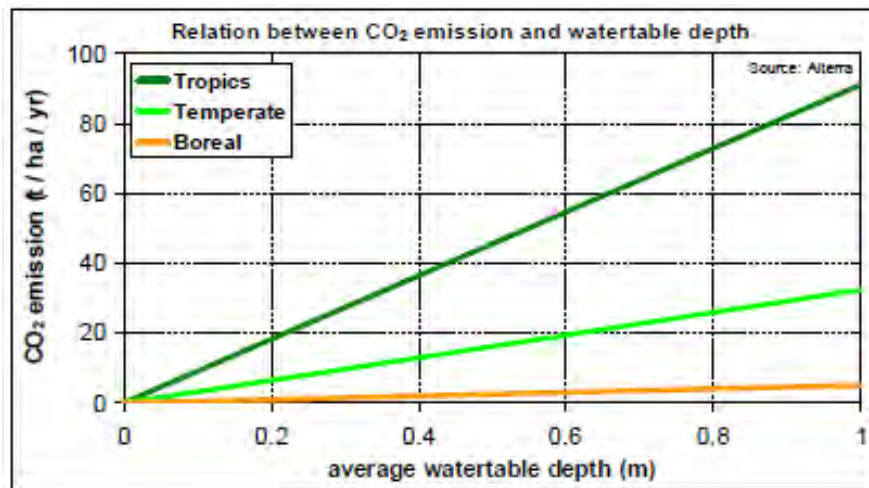


図 3.3.2.1 排水深度と CO₂排出量との関係

出典：Hooijer et al., (2006)

- ・ 泥炭地における人工水路からの排水が原因で、泥炭の好気性分解が起き、CO₂を排出する。
- ・ 東南アジアにおける排水深度（排水深度 0.5~1.0m に適用可能）と CO₂に関する以下の回帰式を用いる。
 $91 \text{ t-CO}_2/\text{ha/y per m of drainage depth in peatland}$
- ・ ただし、本調査では、より控えめな評価をするために、上記の 50%とする。
 $45.5 \text{ t-CO}_2/\text{ha/y per m of drainage depth in peatland} \times \text{面積 (ha)} \times \text{上昇量 (m)}$

PEAT-CO2 では、排水等により水位が下がった場所の泥炭分解により排出される CO₂ の算定に用いている。そのため、水位を回復させた場合に、本来排出されるはずの CO₂ の排出が抑制される、という考え方である。

上記の回帰式を用いて、以下の条件のもと、本調査でのビジネスモデルを実施することによる排出量削減量を予測する。なお、より精緻な推定のためには、より詳細な調査ならびに検討を要することから、今回の推定値は、参考程度とする。

- ・ 排出削減量計算条件
 - モデルサイト面積：100ha
 - 排水深の平均上昇量：-0.9m を -0.4m に、0.5m 上昇させる
- ・ 計算結果
 - $45.5 \text{ t-CO}_2/\text{ha/y/m} \times 100\text{ha} \times 0.5\text{m} = 2,275 \text{ t-CO}_2/\text{ha/y}$

³⁷ 清水建設株式会社（2011）：平成 22 年度 CDM/JI 事業調査 インドネシア・泥炭管理 NAMA 実現可能性調査報告書

³⁸ Hooijer, A, M. Silvius, H. Wösten, and S. Page, 2006: PEAT-CO2, Assessment of CO₂ emissions from drained peatlands in SE Asia. Delft Hydraulics report Q3943

3.4 民間投資計画の候補地マップ・プロフィールの作成

3.4.1 地域別民間投資計画の候補案

対象4県は、立地的に、また、自然条件・社会条件的に、異なっていることから、それぞれで計画されうる活動は異なっている。上述した調査結果を受けて、優先県別の投資計画案として、対象村落、主要な産品、生産物、実施主体別の事業分野、想定される資金源についての検討結果を下述する。検討の際には、地域特性、市場調査、収益分析の結果を参考にする。

表 3.4.1.1 南スマトラ州 OKI 県での投資計画案

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
<ul style="list-style-type: none"> Desa Bangsal Desa Kuro Desa Manggris Pulau Layang 	<ul style="list-style-type: none"> Water buffalo 	<ul style="list-style-type: none"> Gulo puan (wet-cristal caramelled milk) Dadih (fermented buffalo milk) Susu segar (pasteurized fresh milk) Minuman yoghurt Es krim (ice cream) Permen susu (caramelled milk candy) 	<ul style="list-style-type: none"> Swamp buffalo cultivation Harvesting of buffalo milk Processing of ready-to-sell products 	<ul style="list-style-type: none"> Market Processing of derivative products 	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries Financial services institutions (banking and non banking institutions): revolving funds, sharia banking, conventional banking (KUR), green bonds
<ul style="list-style-type: none"> Pedamaran Kayuagung Pampangan SP Padang Pangkalan Lampam Tulung Selapan Cengal Sungai Menang 	<ul style="list-style-type: none"> Swamp fishery (Lebak Lebung) 	<ul style="list-style-type: none"> Fresh fish Salted fish Smoke fish 	<ul style="list-style-type: none"> Fish cultivation Harvesting fish Processing of ready-to-sell products 	<ul style="list-style-type: none"> Market Processing of derivative products 	<ul style="list-style-type: none"> PT Sarana Multi Infrastruktur (SMI)
<ul style="list-style-type: none"> Pampangan Pedamaran 	<ul style="list-style-type: none"> Purun 	<ul style="list-style-type: none"> Bag Purse Pencil case Mat Key chain Sandals Fan 	<ul style="list-style-type: none"> Processing of ready-to-sell products 	<ul style="list-style-type: none"> Market 	
<ul style="list-style-type: none"> Pedamaran Kayuagung Pampangan Pangkalan Lampam Tulung Selapan Cengal Sungai Menang Air sugihan SP Padang Pedamaran Pedamaran Timur 	<ul style="list-style-type: none"> Agriculture Food Crops and Horticulture 	<ul style="list-style-type: none"> Rice Palawija Vegetables 	<ul style="list-style-type: none"> Cultivation Harvesting Processing of ready-to-sell products 	<ul style="list-style-type: none"> Market Processing of derivative products 	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
<ul style="list-style-type: none"> • Rengas Merah • Bukit Batu • Riding • Penyajab 	<ul style="list-style-type: none"> • Liberika Coffee 	<ul style="list-style-type: none"> • Drink and mixed food ingredients • Charcoal • Vinegar to eat • Chemical material 	<ul style="list-style-type: none"> • Cultivation • Harvesting • Processing of ready-to-sell products 	<ul style="list-style-type: none"> • Market • Processing of derivative products 	<ul style="list-style-type: none"> • Private • Government: Bumdes, BLU, government programs through ministries and non-ministries
<ul style="list-style-type: none"> • HPT • Pedamaran • Pedamaran • Pampangan • Rengas Merah • Bukit Batu • Riding • Penyajab 	<ul style="list-style-type: none"> • Areca nut 	<ul style="list-style-type: none"> • Food and beverages • Drugs • Cosmetic ingredients • Chemical material • Alternative energy sources 	<ul style="list-style-type: none"> • Cultivation • Harvesting • Processing of ready-to-sell products 	<ul style="list-style-type: none"> • Market • Processing of derivative products 	<ul style="list-style-type: none"> • Financial services institutions (banking institutions and
<ul style="list-style-type: none"> • HPT • Pedamaran • Pedamaran • Pampangan • Rengas Merah • Bukit Batu • Riding • Penyajab 	<ul style="list-style-type: none"> • Pineapple 	<ul style="list-style-type: none"> • Fresh fruit • Food and beverages • Cosmetic ingredients • Chemical material • Compost • Animal feed 	<ul style="list-style-type: none"> • Cultivation • Harvesting 	<ul style="list-style-type: none"> • Market • Processing of derivative products 	
<ul style="list-style-type: none"> • HPT • Pedamaran • Pedamaran • Pampangan 	<ul style="list-style-type: none"> • Beriang 	<ul style="list-style-type: none"> • Building material • Firewood 	<ul style="list-style-type: none"> • Cultivation • Harvesting 	<ul style="list-style-type: none"> • Market 	<ul style="list-style-type: none"> • Private • Government: Bumdes, BLU, government programs
<ul style="list-style-type: none"> • Rengas Merah • Bukit Batu • Riding • Penyajab 	<ul style="list-style-type: none"> • Gelam 	<ul style="list-style-type: none"> • Limited construction materials • Firewood 	<ul style="list-style-type: none"> • Cultivation • Harvesting 	<ul style="list-style-type: none"> • Market 	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

表 3.4.1.2 南スマトラ州 MUBA 県での投資計画案

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
<ul style="list-style-type: none"> • Merang forest Around 7,250 ha Regulation of the Minister of Forestry No.54 / Menhut-II / 2010 dated January 21, 2010 • Kepayang Village Forest Around 5.170 ha Regulation of the Minister of Forestry No.573 / Menhut-II / 2013 dated 23 	<ul style="list-style-type: none"> • Kenaf • Bergan • Splash • Pinang • Pineapple • Food crops and horticulture • Canal blocking swamp fisheries • Environmental carbon sequestration services. 	<ul style="list-style-type: none"> • Fiber • Building material • Limited construction materials • Firewood • Food and beverages • Drugs • Cosmetic ingredients • Chemical material • Alternative energy sources • Fresh fruit • Compost 	<ul style="list-style-type: none"> • Cultivation • Harvesting • Processing of ready-to-sell products 	<ul style="list-style-type: none"> • Market • Processing of derivative products 	<ul style="list-style-type: none"> • Private • Government: Bumdes, BLU, government programs through ministries and non-ministries • Financial services institutions (banking and non-banking institutions): revolving funds, sharia banking, conventional banking (KUR), green bonds

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
August 2013 • HP Non Concession Around 56.029, 74 ha		• Animal feed			• PT Sarana Multi Infrastruktur (SMI)

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

表 3.4.1.3 リアウ州メランティ県での投資計画案

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
• Sungai Tohor village	• Sago • Wood pellet	• Wet sago form • Dried sago flour, • Liquid sugar, • Shrimp crackers, and sago pearl • Sago noodles,	• Cultivation • Harvesting • Processing Products ready to sell	• Market • Processing of derivative products	• Private • Government: Bumdes, BLU, government programs through ministries and non-ministries • Financial services institutions (banking and non- banking institutions): revolving funds, sharia banking, conventional banking (KUR), green bonds • PT Sarana Multi Infrastruktur (SMI)
• Sungai Tohor village	• Sago mushroom	• Mushroom			
• Teluk Buntal, Tanjung Gadai, Tanjung Sari, Sendanu Darul Ihsan, and Nipah Sendanu villages	• Liberica coffee	• Drink and mixed food ingredients • Charcoal • Vinegar to eat • Chemical material			

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

表 3.4.1.4 中央カリマンタン州プランピサオ県での投資計画案

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
• Location A	• Splash • Balangeran • Ducks • Fish	• Building material • Firewood • Charcoal • Telor • Meat • Fresh fish • Smoke fish • Dried fish • Wadi	• Cultivation • Harvesting • Processing Products ready to sell	• Market • Processing of derivative products	• Private • Government: Bumdes, BLU, government programs through ministries and non-ministries • Financial services institutions (banking and non- banking institutions): revolving funds, sharia banking, conventional banking (KUR), green bonds • PT Sarana Multi
• Location B	• Laban • Rubber • Agriculture of Food Crops and Horticulture	• Building material • Firewood • Charcoal • Sap • Rice • Palawija • Vegetables			

場所	主要な産品	生産物	実施主体別の事業分野		資金
			コミュニティベース	企業ベース	
					Infrastruktur (SMI)

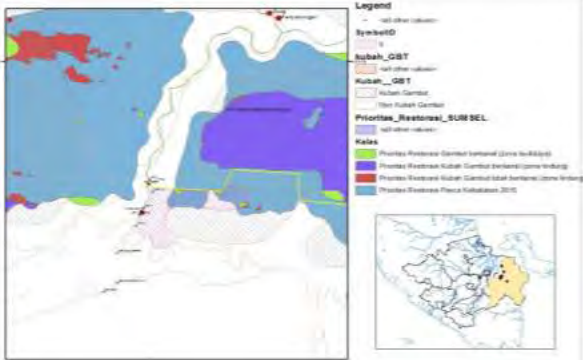
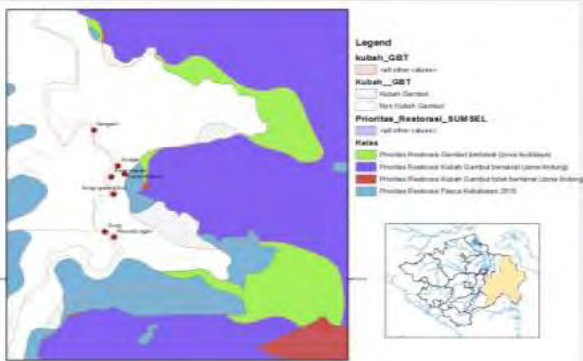
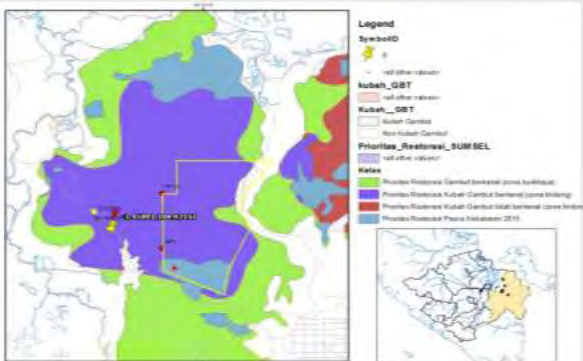
出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

3.4.2 民間企業の参画による泥炭地回復の適地の検討

上記 3.4.1 にて記載した対象地ごとの投資計画案の中から、収益分析と実施可能性の観点から、民間企業の参画による泥炭地回復のパイロット地区およびパイロット活動を選定し、それら計画案の詳細を下述する。

表 3.4.2.1 南スマトラ州 OKI 県でのパイロット地区パイロット活動の計画案

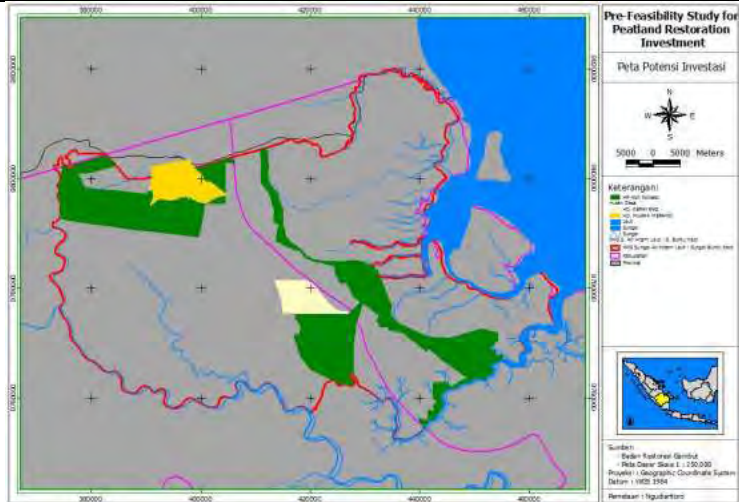
No.	Items	Description		Remarks
1	Pilot activity	Agroforestry with Areca nuts and Pineapples		
2	Pilot location	Riding village, KHG Sungai Sugihan- Sungai Lumpur	1,650ha	APL area, shallow peat
		Rengas Merah village, KHG Sungai Sugihan Sungai Lumpur	600ha	Planted area of PT. BMH, shallow peat
		Limited Production Forest in Pedamaran village, KHG Sungai Sibumbang-Sungai Batok	10,000ha	Limited Production Forest in Pedamaran village, deep peat (peat dome)
3	Description of Pilot Activity	1. Inter-cropping of areca nuts and pineapples 2. Area nuts, planted with a distance of 3 x 12 m (287 stems / ha) 3. Pineapples, planted with a distance of 30 x 100cm (21,500 pcs/ha). Pineapples can be harvested every 9 to 12 months		
4	In-situ Implementer (on site)	Farmers group to conduct cultivation, harvesting and initial processing of ready-to-sell products		
	Ex-situ Implementer (off site)	Traders to conduct marketing, and private companies to conduct secondary processing of derivative products		
5	Investment (Discount factor = 11%)	Initial cost	IDR 47,200,000	Land clearing, planting, fertilizaing
		Operation cost	IDR 84,630,000	
		Total	IDR 131,830,000	
6	Revenue (Discount factor = 11%)	Coffee	IDR 280,000,000	
		Areca nut	IDR 262,800,000	
		Total	IDR 542,800,000	
7	Financial analysis	NPV (IDR)	141,857,494 IDR	
		BCR (%)	1.96	
		IRR (%)	20.5	25-year cycle
		RCR (%)		
		PBP (year)		
8	Possible financial source	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries Financial services institutions (banking and non banking institutions) : revolving funds, sharia system, local banks (KUR), green bonds 		
9	Map			

No.	Items	Description	Remarks
			Map of potential areas for agroforestry activities in Riding village
			Map of potential areas for agroforestry activities in Rengas Merah village
			Map of potential areas for agroforestry activities in Limited Production Forest in Pedamaran village

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

表 3.4.2.2 南スマトラ州 MUBA 県でのパイロット地区パイロット活動の計画案

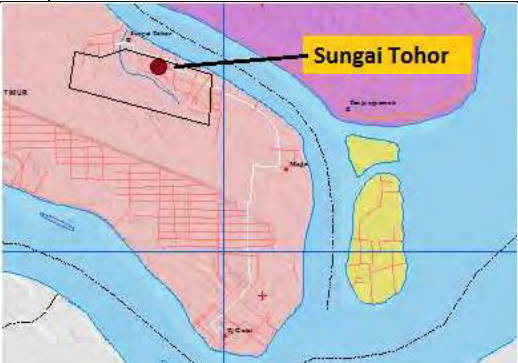
No.	Items	Description	Remarks	
1	Pilot activity	Kenaf production		
2	Pilot location	Muara Merang village , KHG Sungai Air Hitam Laut Sungai Buntu Kecil	7,250ha	Village forest, deep peat Ex. Logged over areas of HPH PT. Bumi Raya, deep peat
		Village forest in Kepayang village, KHG Sungai Air Hitam Laut Sungai Buntu Kecil	5,170ha	
3	Description of Pilot Activity	1. Kenaf planting		
4	In-situ Implementer (on site)	Farmers group to conduct cultivation, harvesting and initial processing of ready-to-sell products		
	Ex-situ Implementer (off site)	Traders to conduct marketing, and private companies to conduct secondary processing of derivative products		
5	Investment	Initial cost	IDR N/A	

No.	Items	Description		Remarks
		Operation cost	IDR N/A	
		Total	IDR N/A	
6	Revenue		N/A	
			N/A	
7	Financial analysis	BCR (%)	2.12 (Indonesian Tobacco and Fiber Crops Research Institute, Balittas, Malang)	
		RCR (%)	3.04 (BPPT), 1.56 (Lamongan, East Java)	
		PBP (year)	N/A	
8	Possible financial source	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries Financial services institutions (banking and non banking institutions): revolving funds, sharia system, local banks (KUR), green bonds 		
9	Map			Map of potential areas for kenaf production in KHG Sungai Air Hitam Laut Sungai Buntu Kecil

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

表 3.4.2.3 リアウ州メランティ県でのパイロット地区パイロット活動の計画案

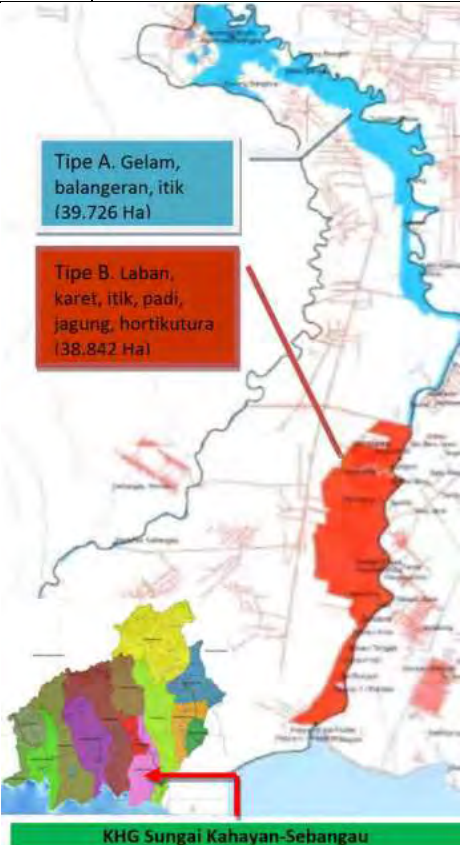
No.	Items	Description			Remarks
1	Pilot activity	Sago and Selumar cultivation with mushroom production and wood pellet			
2	Pilot location	Village forest in Sungai Tohor village, KHG Pulau Tebing Tinggi	300ha		Ex-PT. LUM areas, shallow peat
3	Description of Pilot Activity	<ol style="list-style-type: none"> Sago/ Selumar Tree Cultivation <ol style="list-style-type: none"> Inter-cropping of sago palm and Selumar Sago palm, planted in a distance of 9 x 9m (123 trees/ha). Sago can be harvested after 12 years Selumar tree, planted in a distance of 4.5 x 4.5 m (370 trees /ha) Mushroom <ol style="list-style-type: none"> 600kg of mushroom will be produced by using 5,000kg of sago waste as media. Wood pellet Wood pellet will be produced by using sago waste. 			
4	In-situ Implementer (on site)	Farmers group to conduct cultivation, harvesting and transporting to the local fineries			
	Ex-situ Implementer (off site)	Local fineries to produce wet sago, traders to market the wet sago			
5	Investment	Sago/ Selumar	Mushroom (per	Wood pellet	

No.	Items	Description				Remarks
			(per ha)	4 incubation chamber	(per 6t/ha)	
		Initial cost	12,698,272	14,465,000	11,984,000,000	
		Operation cost	42,670,000	81,390,000	215,875,633,333	
		Total	55,368,272	95,855,000	227,859,633,333	
6	Revenue		310,040,988	21,000,000	302,400,000,000	
7	Financial analysis	Analysis period	20 years	12 month	1 year	
		NPV (IDR)	23,183,746		29,835,194,653	
		RCR (%)	0.98	2.10	0.26	
		BCR (%)	1.98	1.10	1.26	
		IRR (%)	10.74		48.17	
	Discount Factor	16%		16%		
8	Possible financial source	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries Financial services institutions (banking and non banking institutions): revolving funds, sharia system, local banks (KUR), green bonds 				
9	Map					Map of potential areas for production of sago and Selumar in KHG Pulau Tebing Tinggi

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

表 3.4.2.4 中央カリマンタン州プランピサオ県でのパイロット地区パイロット活動の計画案

No.	Items	Description				Remarks
1	Pilot activity	Silvo-forestry with tree planting and duck raising				
2	Pilot location (area)	APL areas in KHG ungai Kahayan Sungai Sebangau,			39,726 ha in total	APL area, shallow peat
3	Description of Pilot Activity	1. Gelam and Balangeran, planted in 39,726 ha shallow peat land in total 2. Alabio duck raising under the shade of trees				
4	In-situ Implementer (on site)	Farmers group to conduct cultivation, harvesting and initial processing of ready-to-sell products for Gelam and Balangeran. Farmers group to raise duck and market to the local market				
	Ex-situ Implementer (off site)	Traders to conduct marketing, and private companies to conduct secondary processing of derivative products for Gelam and Balangeran				
5	Investment		Gelam (per ha)	Balangeran (per ha)	Alabio duck (100 pcs)	
		Initial cost	IDR 41,000,000	IDR 32,500,000	IDR 6,000,000	
		Operation cost	IDR 7,500,000	IDR 30,000,000	IDR 34,050,000	
		Total	IDR 48,500,000	IDR 62,500,000	IDR 40,050,000	
6	Revenue		IDR 137,500,000	IDR 1,500,000,000	IDR 90,940,000	
7	Financial analysis	Analysis period	5 year	20 years	22 month	
		NPV	IDR 18,065,784	IDR 75,396,164	IDR 39,708,686	
		BCR	1.38	2.71	2.09	
		RCR				

No.	Items	Description				Remarks
		PBP Discount factor	5 year 16%	15 year 16%	6 month 13%	
8	Possible financial source	<ul style="list-style-type: none"> Private Government: Bumdes, BLU, government programs through ministries and non-ministries Financial services institutions (banking and non banking institutions): revolving funds, sharia system, local banks (KUR), green bonds 				
9	Map					Map of potential areas for silvo-forestry activity (Type A) in KHG Sungai Kahayan Sungai Sebangau

出典：「BRG-JICA 優先4州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第2段階）」最終報告書より抜粋。2017（10月現在）

3.5 デモンストレーションプロットの情報収集

3.5.1 事業者ポテンシャル

(1) インドネシア国内企業

インドネシア国内企業の中で、頻発する泥炭から発生する火災により煙害被害を憂う企業などの中に、また、泥炭地で生産される産物を利用することができる企業の中に、泥炭地回復事業の事業者としてのポテンシャルの高い企業が想定される。コミュニティベースならびに民間企業ベースでの活動で想定される企業・業種は次表のとおりである。

表 3.5.1.1 実施主体ごとのインドネシア国内企業の事業者ポテンシャル

実施主体	事業者ポテンシャルの高い企業・業種	備考
コミュニティ		

実施主体	事業者ポテンシャルの高い企業・業種	備考
ベース		
企業ベース	<ul style="list-style-type: none"> ✓ 水稲栽培：中央カリマンタン、南カリマンタン州では、すでに、企業ベースで水稲栽培を開始している。更なる技術開発は必要だが、今後、事業者としてポテンシャルが高い。 ✓ 製品の運搬に難があるが、コンセッション上でのアカシア造林から得られる繊維の代替品として、ケナフ産業は有望である。購入先は、パルプ工場が想定される。 	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) インドネシア国外企業

頻発する泥炭から発生する火災により煙害被害をこうむる可能性の高い東南アジア諸国ならびに、インドネシアとのつながりの強化を望む諸国などの企業の中に、事業者としてのポテンシャルの高い企業が想定される。コミュニティベースならびに民間企業ベースでの活動で想定される企業・業種は次表のとおりである。

表 3.5.1.2 実施主体ごとのインドネシア国外企業の事業者ポテンシャル

実施主体	事業者ポテンシャルの高い企業・業種	備考
コミュニティベース	<ul style="list-style-type: none"> ✓ サゴヤシなど枝条・樹皮などの廃材や廃液を活用したバイオマス発電。 	
企業ベース	<ul style="list-style-type: none"> ✓ サゴヤシでん粉の活用：サゴヤシでん粉を利用する食品、化粧品製造業。食品は、グルテンフリーの要素を取り入れた対アレルギー対策の健康食品が有望か。 ✓ サゴヤシなど枝条・樹皮などの廃材を活用した繊維の抽出、利用。 ✓ ケナフ：ケナフ繊維を原料として利用する製品製造。 	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

3.5.2 民間企業参画による泥炭地回復のビジネスモデル

上記 3.1～3.5 において前述した様々なビジネスモデルは、対象3州のみならず、インドネシア国内の他の地域への適用が可能なビジネスモデルである。そのため、前述した検討結果、さらに、これまでの経験やそこから得られた教訓などから、他地域への適用の際に活用できる情報を、以下に整理する。

表 3.5.2.1 他地域への活用が期待されるビジネスモデル

分類	小分類	特徴	対象地域
農業／プランテーション	サゴ	比較的泥炭深の厚い地域への導入が可能。下述するサゴ澱粉生産のために、ある程度整備された施設が必要。	スマトラ島、カリマンタン島の泥炭地や湿地帯。
	水稲・メイズ	比較的泥炭深の浅い地域で、かつ、適切な水位管理ができる施設が必要。下述する魚養殖、アヒル飼育との組み合わせにより、多角的な収入が得られる可能性がある。	スマトラ島、カリマンタン島での泥炭深の浅い地域。

分類	小分類	特徴	対象地域
	パイナップル/ アレカナッツ	アレカナッツなどと組み合わせること で、経年的な収入が期待できる。	全国的に導入可能。
	リベリカコー ヒー	低地の気候条件に適合し、泥炭地や湿地 でも生育可能。開花時期が固体により異 なり、コーヒー林としては、一年を通じ て、収穫が可能。	スマトラ島、カリマ ンタン島での低地の 泥炭地や湿地帯に導 入可能。
林業	早生樹植林 (Gelam など)	島嶼部など、もともと材木になりえる樹 木が少ない地域に導入が可能。	Meranti 県、Meranti 島嶼県など
	郷土植林 (Beriang など)	島嶼部など、もともと材木になりえる樹 木が少ない地域に導入が可能。	Meranti 県、Meranti 島嶼県など
	林産物 (ケナフ)	基本的に、立地条件を問わないことか ら、泥炭深の厚さに依らず、導入するこ とができる。市場へのアクセス (販売先 の工場など) が課題。	全国的に導入可能。
水産業	養殖	堰 (Canal blocking) を設置する水路にお いては、魚養殖の導入は可能。地域に応 じた魚種の養殖。	市場に近ければ、な お良し。
		水稲栽培と魚やエビの養殖の組み合わ せが、関係省庁から推奨されている。	スマトラ島、カリマ ンタン島での泥炭深 の浅い地域。
畜産業	水牛飼育		
	アヒル飼育	サゴ栽培や水稲栽培との組み合わせ での導入が考えられる。	全国的に導入可能。
加工業	サゴ澱粉生産	サゴ澱粉生産のために、ある程度整備さ れた施設が必要。	上述したサゴ栽培を 行う場所に隣接した 地域。
	サゴ残渣活用	サゴ澱粉生産から排出される残渣を活 用して、キノコの栽培やバイオガス発電 なども考えられる。	

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

第4章 民間投資促進のためのステークホルダー調整会議等の支援

4.1 定例会議等の開催

4.1.1 ステークホルダー調整会議等の開催の概要

下表に記載するように、泥炭地回復ビジネスへの官民の投資促進の方策を検討する会合について支援した。

表 4.1.1.1 泥炭地回復投資促進に係るステークホルダー調整会議等の概要

段階/種類	日時	開催場所 <主催>	会議・セミナー等	備考
その1				
調整会議 No.1	2017年2月 7日	Hotel AONE (Jakarta) <BRG>	泥炭地回復における民間投資 促進に係る FGD	
その2				
調整会議 No.2	2017年4月 3日	Hotel Oria (Jakarta) <BRG>	泥炭地回復における民間投資 促進スキーム構想に係る FGD	
泥炭回復投資 セミナー(東京)	2017年4月 11日	Cofferece Hall University of Tokyo (Tokyo) <JICA>	インドネシアにおける泥炭回 復のための民間投資セミナー	4月10日国際シンポ ジウム「森林・泥炭か らのGHG排出抑止」 開催
調整会議 No.3	2017年5月 23日	Hotel. Oria (Jakarta) <BRG>	泥炭地回復における民間投資 促進スキームデザインに係る FGD	
調整会議 No.4	2017年6月 20日	Hotel. Morrisey (Jakarta) <BRG>	泥炭地回復における投資イン センティブ・ファシリティス キームデザインチームの組織 化及び協議	
調整会議 No.5	2017年7月 12日	Hotel. Morrisey (Jakarta) <BRG>	泥炭地回復における投資イン センティブ・ファシリティス キームに係る FGD	
調整会議 No.6	2017年7月 25日	Hotel. Oria (Jakarta) <BRG>	泥炭地回復における投資イン センティブ・ファシリティス キーム結論化に係る FGD	
泥炭回復投資 セミナー(ジャ カルタ)	2017年7月 27日	Hotel Sari Pan Pacific (Jakarta) <BRG>	グリーン経済促進における泥 炭地回復ビジネスモデルワー クショップ	
調整会議 No.7	2017年10 月5日	Hotel. Morrisey (Jakarta) <BRG>	OKI, MUBA, Kepulauan Meranti, Pulpis 県での泥炭地回 復ビジネスモデル調査最終報 告説明	
調整会議 No.8	2017年10 月6日	OJK (Jakarta) <OJK>	泥炭地回復ビジネスに対する ファイナンスガイドライン素 案の協議	●2017年3月17日 BRG(Deputy 1 及び 4)OJK 表敬 ●2017年7月26日 コンソシアムとのガ イドラインニーズに 関する打合せ

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

4.1.2 ステークホルダー調整会議での検討の概要

下表に示すように、計7回の会合を通じて、現行のインセンティブ、ファシリティに係るスキームを応用して泥炭回復に資する事業への投資を促進する方策案の議論を支援した。特に、現行制度のもとで多様なインセンティブ・ファシリティの適用が容易となる経済特区（Kawasan Ekonomi Khusus/KEK）を BRG 申請により「泥炭回復経済地域（KoEING-Merah Putih）」として設定することが提案された。2017年10月5日の会合の結果、提案された経済特区の設定の準備を開始することを、BRGのDeputy4により決定された。

表 4.1.2.1 泥炭地回復投資促進に係るステークホルダー調整会議の議題の概要

(付属資料 1.2 参照)

調整会議	日時		議題/議論トピック (リソース/ファシリテーター)	備考
その1				
No.1	2017年2月7日 (0.5day)	1	BRG's Targets related to investment to peatland restoration and mapping of potential locations (BRG/Deputy1)	
		2	Green investment by private sector in Peatland restoration (JICA Survey Mission)	
		3	F/S results related to peatland restoration investment (UNSRI)	
		4	Policy support in investment and development (Kemenco Ekon)	
		5	Investment potential for peatland restoration in 3 prov. (TRGD Sumsel, TRGD Kalsel)	
		6	Continued discussion and summary	
その2				
No.2	2017年4月3日 (0.5day)	1	Incentive approach for investor/ entrepreneur in business contributing peatland restoration (BRG/ Kapokja Deputy 4)	
		2	Facility approach for funding to business contributing peatland restoration (BRG/ Head of WG Deputy 4)	
		3	Business model contributing peatland restoration (KLHK/ Special Staf for Minister)	
		4	Following Stage/ Action (BRG/ Program Expert Deputy 4)	
No.3	2017年5月23日 (1.0day)	1	Proposed concept of Investment Engagement Seminar for Peatland Restoration (Jul. 2017) (JICA Survey Mission)	
		2	Example of potential fishery business with peatland wetting (KKP)	Panel Discussion
		3	Example of potential incentive for investor related to peatland restoration (BKPM)	
		4	Example of integration of utilization of Sago waste (ABLO)	
		5a	Group A: Scope of business contributing peatland restoration (Consortium Study Team)	Group discussion
		5b	Group B: Basic design of facility and incentive to enhance funding to business contributing peatland restoration (BRG/ Deputy1)	
6	Presentation of results of group discussion, and discussion for next step/action (BRG/ Program Expert Deputy 4)	Panel Discussion		
No.4	2017年6月20日 (0.5day)	1	Results of FGD on facility and incentive for investment di Peatland (23 May 2017) and coordination meeting on study progress of consortium study team (14 Jun. 2017) (JICA Survey Mission)	
		2	Discussion for organizing Design Team of Facility and	

調整会議	日時		議題/議論トピック (リソース/ファシリテーター)	備考
			Incentive in peatland restoration, as well as follow-up discussion (BRG/ Head of WG Deputy 4)	
No.5	2017年7月 12日 (0.5day)	1	Proposed way of thinking on kinds of business influencing peatland restoration as targets of incentive/facility (JICA Survey Mission)	
		2	Study progress on MUBA and OKI Districts in Sumsel Prov, Meranti District in Riau Prov., and Pulpis District in Kalteng (Consortium Study Team)	
		3	Recommended facility for investment in peatland restoration (Facility Group of Design Team)	
		4	Recommended incentive for investment in peatland restoration (Incentive Group of Design Team)	
		5	Analisis dari Business Consultant (International Center for Applied Finance and Economics, IPB [Inter CAFE] and PT. Cutivate)	
No.6	2017年7月 25日 (0.5day)	1	Proposed way of thinking on concept of peatland business investment model as targets of incentive and facility (JICA Survey Mission)	
		2	Draft concluded incentive scheme for investment in peatland restoration (Incentive Group of Design Team)	
		3	Draft concluded facility scheme for investment in peatland restoration (Facility Group of Design Team)	
		4	Discussion by Business Consultant (Inter CAFÉ)	
		5	Draft conclude study results (Consortium Study Team)	
			Finalisasi draft concluded incentive and facility scheme for peatland restoration	
No.7	2017年10月 5日 (0.5day)	1	Singing of documents on handover of monitoring equipment (BRG/ Deputy 4- Head of JICA Survey Mission) and Opening (BRG/ Deputy4)	
		2	Peatland restoration business model in MUBA, OKI, Meranti and Pulpis Districts (Consortium Study Team)	
		3	Draft Final Reporting of JICA Survey Mission (JICA Survey Mission)	
		4	Sharing experiences (Kyoto University Team)	
		5	Discussion material presentation (Inter CAFE)	SEZ
		6	Comments related to peatland restoration business model and special economic zones (Consortium Study Team)	
		7	Closing (BRG/Deputy 4)	
No.8	2017年10月 6日 (0.5day)	1	Presentation on Draft-0 Guideline on Finance to Peatland Restoration Business (Consortium Study Team)	
		2	Comments for improvement of Draft-0 Guideline on Finance to Peatland Restoration Business (OJK)	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

Overview of Stakeholder Coordination Meetings/FGD for Incentive & Facility on Investment for Peatland Restoration



図 4.1.2.1 ステークホルダー調整会議の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

4.2 泥炭地回復投資セミナー（ジャカルタ及び東京）開催支援

以下のようにBRGが予定している2017年4月に東京、7月にジャカルタの計2回の泥炭地回復投資セミナーについて、関係機関との事前調整の上、スピーカーの選定やプログラムの検討を支援した。またセミナー開催に際し、日・インドネシア両国の発表者への一部旅費支給を含むセミナー開催当日の各種調整等のロジスティック業務に加え、スピーカーおよび参加者からの情報収集やセミナーの成果の取りまとめを行った。

4.2.1 泥炭地回復投資セミナー（東京）の概要

2017年4月11日（火）に東京において「インドネシアにおける泥炭地回復のための民間投資セミナー」と題したセミナーを開催した。このセミナーは、泥炭地のグリーン経済開発および住民の生計向上の実現を目指し、泥炭地管理・回復にかかる農業やバイオマス利用等の取り組みや課題、さらに民間企業の事例を踏まえ、日本の官民が果たしうる役割について理解を深

めることを目的として実施した。

基調講演では、インドネシアにおける泥炭地の分布や炭素蓄積といった話題の他、水源涵養機能や地域住民の資源といった泥炭地の機能が解説され、また現在、工業化が進められているサゴヤシの植栽（コミュニティベースの栽培）についても紹介された。

一般講演では、以下の話題について講演が行われた。

- a) インドネシアが環境重視の政策へと転換した背景にある好調な経済状況の解説
- b) 南スマトラにおける大規模火災とそれに端を発する火災対策の充実
- c) 緑の気候基金、グリーンボンドといった泥炭地回復に適用可能な金融スキーム

パネルディスカッションでは、上記の講演を基に、民間投資を呼び込むために必要な措置や、投資に関する日本側、インドネシア側の実情等について意見交換が行われた。

本セミナーの総括として閉会挨拶では以下のようにまとめられた。

現在の状況として、インドネシアには 600-700 万 ha という規模の荒廃泥炭地が存在し、BRG はこの 5 年で 200 万haの泥炭地を回復させる目標を立てている。これは喫緊の地球環境的課題であるとともに、巨大な投資需要が存在するということである。

また、泥炭地回復に対して、今後の大きな可能性と、活動を通して得られる多面的効果について今後の努力の継続が必要である。

さらに、セミナー終了後はインドネシア政府関係者と日本の有志による円卓会議を実施し、日本からの投資を促進するためのより実践的な課題や問題について意見を交換した。

表 4.2.1.1 泥炭地回復投資セミナー（東京）の議題の概要

（付属資料 1.3 参照）

時間	講演者/ モデレーター	プログラム
09:00 - 09:10	森田 隆博（JICA 地球環境部次長 兼森林・自然環境グループ長）	開会挨拶
09:10 - 09:50	Dr. Nur Masripatin（インドネシア環境林 業省気候変動総局長） Mr. Nazir Foad（インドネシア泥炭地回 復庁長官）	基調講演
09:50 - 10:10	休憩	
10:10 - 11:10	1. 水野 広祐（京都大学東南アジ ア研究所教授） 2. Mr. Alex Noerdin（インドネシア・ 南スマトラ州知事） 3. 吉高 まり（三菱 UFJ モルガン・ スタンレー証券株式会社）	一般講演 「インドネシアの泥炭地回復への民間投資ポテン シヤル」 1. インドネシアの経済概況と環境投資 2. 南スマトラ州の事例 3. 泥炭地回復への民間を巻き込んだ金融スキーム
11:10 - 11:55	阿部健一（総合地球環境学研究所 （RIHN）教授）	パネルディスカッション 「泥炭地回復の機会と挑戦」
11:55 - 12:00	水野 広祐（京都大学東南アジア研 究所教授）	閉会挨拶

2017 年 4 月の泥炭回復投資セミナー（東京）出席のための訪日時に、京都大学・RINH との

協力の関係で京都に滞在した際に、在大阪インドネシア領事より大阪領事館予算で大阪泥炭回復投資セミナーの開催が BRG 長官へ提案された。その結果を受け、2017 年 10 月に BRG は大阪領事館と共同で泥炭回復投資セミナーを開催し、投資ポテンシャルの発掘を期待している。本調査結果は、こうした将来の投資ポテンシャル発掘にあたっても活用される。



開会挨拶



基調講演



パネルディスカッション



円卓会議

図 4.2.1.1 泥炭地回復投資セミナー（東京）の概観

4.2.2 泥炭地回復投資セミナー（ジャカルタ）の概要

2017 年 7 月 27 日（木）にインドネシア、ジャカルタにおいて「Workshop on Restoration Business Model of Peatland Areas in Enhancing the Development of Green Economy」と題したセミナーを開催した。このセミナーは、以下の課題について検討することを目的として実施した。

- a) 投資家を呼び込むための泥炭地回復ビジネスモデルの策定
- b) 以下の条件に基づいたビジネスコンセプトの策定
 - ・優先的な泥炭地回復サイト
 - ・金融サービス、コミュニティ、政府投資、民間投資のタイプ別の商品選択
 - ・創始者／実施者の特定
 - ・資金調達モデルの策定
- c) 投資スキームの成熟、投資準備のステップ、提供されるファシリティやインセンティブの種類

d) 潜在的な投資家を助成するために推奨されるステップ

JICA、BRG 代表者によるオープニングスピーチ（Session-1）では、泥炭地回復ビジネスに関する現在の状況や課題、民間投資の必要性について概説され、本ワークショップ成果への期待が述べられた。

パネルディスカッション（Session-2）では（1）重点4県における実現可能性調査の成果、（2）泥炭地の農地（水田）利用、（3）経済特区の設定、といった話題が提供された。

グループディスカッション（Session-3）では参加者が2つのグループに分かれ、グループ1では泥炭地回復に関する投資の経済特区におけるコミュニティベースのビジネスモデルについて、グループ2では企業ベースのビジネスモデルについての議論が交わされた。

総合セッション（Session-4）では各グループディスカッションの成果が共有され、グループ1の成果として、投資家の関心と呼び込むためのビジネスコンセプトや、コミュニティベースビジネスの強化ステップが提案された。また、グループ2の成果として、今後実行可能な2つのビジネスモデルとして、地域ビジネスモデルと商品ビジネスモデルが提示された。

最後に閉会挨拶では、本ワークショップ成果について今後のフォローアップの必要性や投資開発の目標、現在の立ち位置に関する言及がなされた。

表 4.2.2.1 泥炭地回復投資セミナー（ジャカルタ）の議題の概要

（付属資料 1.3 参照）

時間	講演者/ モデレーター	プログラム
09:00 - 10:00	1. Hideyuki Kubo, JICA Indonesia 2. Nasir Fuad, Head of Peat Restoration Agency (BRG)	Session-1 Opening Speech
10:00 - 10:15		Coffee Break
10:15 - 12:15	Moderator: Mr. Budi Wardhana 1. Prof. Robiyanto, Coordinator of University Consortium Team 2. Team PT. Sinar Pangan Indonesia 3. Ani Suryati Ningsih, Coordinating Ministry for Economic Affairs, Incentives and BRG Facilitating Team	Session-2 Panel Discussion: "Business Model for Peatland Restoration" 1. Pre-Feasibility Study for Peatland Restoration Investment in Four Most Prioritized Areas in Indonesia 2. Peatland Processing for Agricultural Land 3. Draft for Development of Special Economic Zone on Peatland Investment (KOENIG)
12:15 - 15:45 (12:30 - 13:30 Lunch Break)	Group 1: Facilitator: Hanni Adiati (KLHK) and Hiromitsu Kuno (JICA Mission) Group 2: Facilitator: Sri Endang Novitasari (BKPM) and Hening Parlan (BRG)	Session-3 Group Session Group 1: Theme: Community-Based Business Model in the Special Economic Zone of Peatland Restoration Investment Group 2: Theme: Company-Based Business Model
15:45 - 16:00		Coffee Break
16:00 - 17:00	Moderator: Head of Working Group on	Session-4 Plenary Session

時間	講演者/ モデレーター	プログラム
	Restoration Research (BRG)	Results of Discussion Group 1: Community-Based Business in Special Economic Zone for Peat Restoration Investment Results of Discussion Group 2: Proposed Model
17:00 - 17:15	Haris Gunawan, Deputy of Research and Development, BRG RI	Closing Remarks



図 4.2.2.1 泥炭地回復投資セミナー（ジャカルタ）の概観

4.3 民間投資促進制度の検討支援

4.3.1 企業投資促進にかかる政策・法制度・組織体制

インドネシアにおける民間投資関連規制に関する関係規定や規則は、頻繁に改定される一方で、基本的な法律や大統領令は、長期にわたり据え置かれる状況が続いている。また、省庁間での調整が伴わない場合が多く、類似した規定や規則が発行される場合もある。

インドネシア政府による民間投資促進を実施するための基礎となる主要な各種規定は、次表のとおりである。

表 4.3.1.1 民間投資促進にかかる各種規定および政策

年	法規制名	要点/特徴
2007	Law on Investment (UU No. 25/2007)	- 投資法
2014	Law on Trade (UU No. 7/2014)	- 貿易法
2016	Presidential Regulation No. 44 of 2016 (Perpres No.44/2016)	- 投資が閉鎖されている分野と投資条件が開放されている分野とリストにかかる大統領令 - ネガティブリスト (Negative list)
2015	Ministerial Regulation of Finance No. 159/PMK.010/2015 (Permenkeu No. 159/2015)	- 法人所得税減税にかかる仕組みについての省令 - 法人税免除措置/タックスホリデー (Tax holiday)
2014	Presidential Regulation No. 39 of 2014 (Perpres No. 39/2014)	- 投資が閉鎖されている分野と投資条件が開放されている分野とリストにかかる大統領令 - ネガティブリスト
2012	Ministerial Regulation of Finance No. 76/PMK.011/2012 (Permenkeu No. 76/2012)	- 投資枠組みにおける開発または産業開発のための機械および資機材の輸入にかかる輸入関税の免除にかかる財務省令第 176 号 (2009 年) の改定に係る財務省令 - 輸入関税優遇制度 (Tax exemption)
2009	Ministerial Regulation of Finance No. 176/PMK.011/2009 (Permenkeu No. 176/2009)	- 投資枠組みにおける開発または産業開発のための機械および資機材の輸入にかかる輸入関税の免除にかかる財務省令 - 輸入関税優遇制度 (Tax exemption)
2015	Regulation of Head of the Investment Coordinating Board No. 19 of 2015 (Perka BKPM No.19/2015)	- 法人所得税減税の仕組みへの申請手続きに係る BKPM 長官令第 13 号 (2015 年) の修正にかかる BKPM 長官令 - 法人税免除措置/タックスホリデー (Tax holiday)
2015	Regulation of Head of the Investment Coordinating Board No. 13 of 2015 (Perka BKPM No.13/2015)	- 法人所得税減税の仕組みへの申請手続きに係る BKPM 長官令 - 法人税免除措置/タックスホリデー (Tax holiday)
2009	Ministerial Regulation of Finance No. 144/PMK.011/2012 (Permenkeu No. 144/2012)	- 特定の事業分野または特定地域における投資のための所得税の円滑化にかかる財務省令
2015	Government Regulation No. 18 of 2015 (PP No.18/2015)	- 特定の事業分野または特定地域における投資にかかる所得税に対するインセンティブにかかる仕組みに関する政令 - 投資減税/タックスアローワンス
2015	Ministerial Regulation of Finance No. 89/PMK.010/2015 (Permenkeu No. 89/2015)	- 特定の事業分野または特定地域への投資に対する所得税に対するインセンティブ、ならびに、国内機関の納税者の所得税に対するインセンティブに対する資産および罰金の移転に係る財務省令 - 財務省令第 144 号 (2012 年) の改定
2016	Governmental Regulation No. 9 of 2016 (PP No.9/2016)	- 特定の事業分野または特定地域における投資にかかる所得税に対するインセンティブにかかる仕組みに関する政令第 18 号 (2015 年) の改定 - 投資減税/タックスアローワンス
2015	Ministerial Regulation of Finance No. 159/PMK.010/2015 (Permenkeu No. 159/2015)	- 所得税減税に係る仕組みの開発に係る財務省令
2015	Regulation of Head of the Investment Coordinating Board No. 18 of 2015 (Perka BKPM No. 18/2015)	- 特定の事業分野または特定地域での所得税減税の仕組みにかかる申請手続きにかかる BKPM 長官令第 8 号 (2015 年) の改定
2015	Regulation of Head of Investment Coordinating Board No. 8 of 2015 (Perka BKPM No. 8/2015)	- 特定の事業分野または特定地域での所得税減税の仕組みにかかる申請手続きにかかる BKPM 長官令

年	法規制名	要点/特徴
2016	Regulation of Head of Investment Coordinating Board No. 10 of 2016 (Perka BKPM No. 10/2016)	- 2017年までに資本投資の監視を分権化するための実施ガイドラインにかかるBKPM長官令
2015	Regulation of the Head of Investment Coordinating Board No. 16 of 2015 (Perka BKPM No. 16/2015)	- 投資促進サービスに対するガイドラインおよび手続きに係るBKPM長官令
2015	Regulation of Head of Investment Coordinating Board No. 17 of 2015 (Perka BKPM No. 17/2015)	- 投資の実施を管理する際のガイドラインおよび手続きにかかるBKPM長官令
2016	Regulation of Head of Investment Coordinating Board No. 6 of 2016 (Perka BKPM No. 6/2016)	- 投資許可にかかるガイドラインおよび手続きにかかるBKPM長官令第14号（2015年）の改定
2015	Regulation of Head of Investment Coordinating Board No. 14 of 2015 (Perka BKPM No. 14/2015)	- 投資許可にかかるガイドラインおよび手続きにかかるBKPM長官令
2015	Regulation of Head of Investment Coordinating Board No. 15 of 2015 (Perka BKPM No. 15/2015)	- 投資へのライセンス化および非ライセンス化にかかるガイドライン及び手続きにかかるBKPM長官令

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(1) 投資関連法

インドネシアでの投資に関連する法令は以下のとおりである。

表 4.3.1.2 インドネシアでの投資関連法

	法令	概要
1	外国投資法（1967年1号） 同法改定（1970年11号）	外国人が事業を行う際の基本法
2	内国投資法（1968年6号） 同法改定（1970年12号）	奨励措置を持つインドネシア国内企業（PMDN）の基本法
3	投資法（2007年25号）	

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) 投資分野

インドネシアでの投資可能な事業分野は、外資参入閉鎖分野（ネガティブリスト）で規定されている。以下のように、このリストは数年おきに改定されており、現在は、大統領令2016年44号が適用される。

表 4.3.1.3 投資可能な分野を規定するネガティブリストの改定の変遷

	年月	法令	内容
	2000年7月		投資閉鎖分野（ネガティブリスト）改訂
	2007年12月	大統領令111号	投資閉鎖分野（ネガティブリスト）改訂
	2010年5月	大統領令36号	投資閉鎖分野（ネガティブリスト）改訂
	2014年	大統領令39号	投資閉鎖分野（ネガティブリスト）改訂
	2016年5月	大統領令44号	投資閉鎖分野（ネガティブリスト）改訂

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

また、現在適応されている大統領令2016年44号にて規定されている投資可能な分野の概要は次表のとおりである。

表 4.3.1.4 2017 年現在のインドネシアにおける投資分野の概要

分類	小分類	概要	分野・事業数
開放されている事業分野	—	特定の条件を付けないインドネシア国外投資	—
閉鎖されている事業分野	—	投資活動、事業活動の禁止	8 分野 20 事業
条件付きで開放されている事業分野	a. 中小零細企業・協同組合のために留保されている事業分野	中小零細企業・協同組合のために留保されている、あるいはパートナーシップが条件付けられている事業分野	8 分野 145 事業
	b. 特定の条件付きで開放されている事業分野	1) 外資比率制限 2) 特定の場所 3) 特別許可 4) 内資 100%、及び/或いは 5) アセアン協力の枠組みにおける資本比率制限	16 分野 350 事業

出典：大統領令 2016 年 44 号から抜粋

上記の条件付きで開放されている事業分野のうち、泥炭地回復に関連するものは、次表のとおりである。

表 4.3.1.5 条件付きで開放されている事業分野のうち、泥炭地回復に関連する事業

(1) 中小零細企業・協同組合のために留保されている事業分野

分野	事業分類	番号	事業
農業	Staple food crop cultivation business, in an area of more than 25 ha Plantation seeding business, in an area of less than 25 ha	1	Rice
		7	Jatropha curca crops
		15	Oil palm crops
		20	Medicinal/ pharmaceutical crops (other than horticulture crops)
		22	Rubber and other Latex Producing crops
		29	Oil palm plantation
		33	Essential oil plantations
		34	Medicinal/ pharmaceutical crops (other than horticulture plantations)
		36	Rubber and other latex producing poantations
		39	Crude vegetable and animal oil industry (edible oil)
		40	Copra, fiber, coconut shell charcoa, dust, nata de coco industry
		41	Coconut oil industry
		42	Palm oil industry
		45	Peeling, cleaning, drying, and sorting of poantation products industry (cocoa and coffee beans industry)
	51	Rubber for sheet, concentrated latex industry	
52	Jatropha curcas oil industry		
53	Breeding and raising of pigs in a total of less than or equivalent to 125 in number		
54	Breeding and raising of native chickens and crossbreeding		
林業	Business wth specific capacities	55	Other forest plantation businesses (sugar palm, Pecan, Tamarind seed, Charcoal raw material, cinnamon)
		58	Production of swallow nest in nature
		59	Sawmill industry (production capacity of up to 2,000 m3/year)
		66	Shellac, allternative food crop (sago) , latex, and

分野	事業分類	番号	事業
水産業	Business with specific capacities		honeybee business
		69	Hatchery of brackish water fish
		70	Hatchery of freshwater fish
		72	Rearing of brackish water fish
		73	Rearing of freshwater fish
		74	Fishery product processing business: salting/ drying of fish and other water biota industry
		75	Fishery product processing business: smoking fish and other water biota industry
		76	Fishery product processing business: yeasting/ fermentation fish and other cooked products (for extraction and fish jelly) industry
		77	Fishery product processing business: Minced fish and surimi processing-based industry
		78	Marketing, distribution, sholesale, and export businesses of fish products
		79	Fish preservation industry

出典：大統領令 2016 年 44 号から抜粋

(2) 特定の条件付きで開放されている事業分野

分野	事業分類	番号	事業	条件
農業	Seeding/ seedling business of staple food crops in an area of more than 25 ha	1	Rice	Foreign capital ownership: Max 49%
		7	Rice	Foreign capital ownership: Max 49%
	Plantation seeding business industry, in an area of 25 ha or more	13	Jatropha curca crops	Foreign capital ownership: Max 95%
		19	Coconut palm crops	Foreign capital ownership: Max 95%
		20	Oil palm crops	Foreign capital ownership: Max 95%
		21	Beverate material crops (tea, coffee and cocoa)	Foreign capital ownership: Max 95%
		27	Rubber and other latex producing crops	Foreign capital ownership: Max 95%
	Plantation business in an area of 25 ha or more up to a specified area without processing units	29	Jatropha curca plantation	Foreign capital ownership: Max 95%
		36	Coconut palm plantation	Foreign capital ownership: Max 95%
		37	Oil palm plantation	Foreign capital ownership: Max 95%
		42	Medicinal/ pharmaceutical material plantation	Foreign capital ownership: Max 95%
		44	Rubber and other latex producing plantation	Foreign capital ownership: Max 95%
	Plantation business in a total area of 25 ha or more integrated to the processing units iwth the same or exceeding a certain capacity	47	Jatropha curca plantation and jatropha oil industry	Foreign capital ownership: Max 95%
		51	Coconut palm plantation and coconut oil industry	Foreign capital ownership: Max 95%
		52	Coconut palm plantation and industry of copra, fiber, shell charcoal, dust and nata de coco	Foreign capital ownership: Max 95%
		53	Oil palm plantation anc crude palm oil (CPO) industry	Foreign capital ownership: Max 95%
		54	Coffee plantation and coffee bean peeling, cleaning and sorting industry	Foreign capital ownership: Max 95%

分野	事業分類	番号	事業	条件
	Business with the same or exceeding a certain capacity	59	Rubber plantation and industry of sheet, concentrated latex	Foreign capital ownership: Max 95%
		63	Coconut oil industry	Foreign capital ownership: Max 95%
		64	Palm oil industry	Foreign capital ownership: Max 95%
		65	Peeling, cleaning, drying and sorting of plantation products industry (cocoa beans and coffee beans)	Foreign capital ownership: Max 95%
		71	Industry of rubber to be sheets, concentrated latex	Foreign capital ownership: Max 95%
		96	Mushroom cultivating	Foreign capital ownership: Max 30%
		101	Horticulture agrotourism business	Foreign capital ownership: Max 30%
林業		112	Nature tourism business in teh form of provision of ecotourism facilities, activities and services within forest areas including water tourism, natural adventure tourism and cave tourism	Foreign capital ownership: Max 49%
観光・創造的活動		242	Natural tourism object business outside conservation areas	Foreign capital ownership: Max 67%

出典：大統領令 2016 年 44 号から抜粋

(3) プランテーション事業にかかる許可

また、2013 年 9 月 30 日付農業大臣規程 2013 年第 98 号 (No.98/Permentan/OT.140/9/2013) にて、プランテーション事業の許可について規定している。

1) プランテーション事業の分類と許認可

a. プランテーション作物の栽培事業 (Plantation Cultivation Business)

栽培面積が 25ha 以下の場合、栽培用プランテーション事業登録証 (STD-B : Surat Tanda Daftar Usaha Perkebunan untuk Budidaya) の取得が、また、25ha 超の場合は栽培用プランテーション事業認可 (IUP-B : Izin Usaha Perkebunan untuk Budidaya) の取得が必要。ただし、作物により面積上限があり、サトウキビでは 15 万 ha、油ヤシ 10 万 ha、ゴムと茶、綿は 2 万 ha、コーヒー、カカオ、カシューナッツ 1 万 ha など。

b. プランテーション収穫物の加工事業

油ヤシ、茶、サトウキビの特定の規模以上の加工事業は、加工事業用プランテーション事業認可 (IUP-P : Izin Usaha Perkebunan untuk Pengolahan)、その他は加工事業用プランテーション事業登録証 (STD-P : Surat Tanda Daftar Usaha Perkebunan untuk Industri Pengolahan Hasil Perkebunan) を取得。

c. プランテーション栽培・加工統合事業

油ヤシ 1,000ha 以上、茶 240ha 以上、サトウキビ 2,000ha 以上の栽培を行う場合、プランテーション事業認可 (IUP : Izin Usaha Perkebunan) を取得。ただし、作物により作付面積に上限があり、サトウキビでは 15 万 ha、油ヤシ 10 万 ha、ゴムと茶、綿は 2 万 ha、コーヒー、カカオ、カシューナッツ 1 万 ha など。

2) 外資の農園事業参加

外資法人または外国人の場合は、国内事業者と提携し、インドネシア法人を設立しなければならない。投資調整庁 (BKPM) での投資申請では、農業省内の農園担当総局からの技術推薦状の事前取得が必要。

3) その他

- a) IUP-B 保有者には、原料の 20%以上を自己のプランテーションから調達する義務がある。
- b) 250ha 以上の IUP-B または IUP 保有者は、周辺地域に用地面積の 20%以上の広さについて住民プランテーションの開発便宜を提供する義務、地域住民を参加（雇用）する義務、周囲のコミュニティと文書による合意を得る義務がある。
- c) 火入れによらない開墾技術を用い、火災を防止する開墾の人材と施設、設備、システムを備えていることなど。

4.3.2 民間投資促進にかかる優遇税制等のインセンティブ

インドネシア国では、経済政策パッケージ（PKE）を取りまとめ、基本方針として、国際的な水準まで規制緩和を進めることにより、投資の拡大、インフラ整備の推進という主要政策を実現させるとともに、景気刺激策としての機能を担っている。投資環境の改善においては、インフラ整備拡大に向けての各種措置、税制度の改定、インセンティブの拡大、土地収用法の改善、工業団地・経済特区の推進などが挙げられる。一般的に、泥炭地回復に関連する事業は、民間投資には不向きであると考えられることから、泥炭地回復に対して民間投資を促進する上で、投資にかかるインセンティブが重要になる。インドネシア国における投資に係るインセンティブには、輸入関税優遇制度、法人税免除措置（タックスホリデー（法人ベース））ならびに投資減税（タックスアローワンス制度（事業ベース））が挙げられる。それぞれの詳細は以下のとおりである。

(1) 輸入関税優遇制度

インドネシア国内への機械、品物ならびに原材料の輸入を計画する企業（法人）に対する輸入関税優遇制度の概要は、以下のとおりである。

表 4.3.2.1 インドネシア国での輸入関税優遇制度の概要

項目	概要
法制度	財務省令第 76 号（2012 年、財務省令第 176 号（2009 年）の改定） ³⁹
概要	機械、品物ならびに製造に用いる原材料の輸入について、2 年間の輸入関税を免除する。 必要とされている数量に達していない機械・設備の輸入は、原則 2 年以内に輸入関税を免除する。1 年間の延長が可能。 機械の投資総額の 30%以上について、国産の機械を使用する場合は、原材料の輸入関税免除を 4 年間に延長する。
条件	輸入関税免除の対象となる機械、品物および原材料は、以下のとおりである。 <ul style="list-style-type: none"> ・ インドネシア国内で生産されていないもの ・ インドネシア国内で調達可能であるが、必要とされる仕様・基準を満たさないもの。 ・ インドネシア国内で調達可能であるが、当該事業で必要とされる数量に達しないもの。

出典：BKPM ウェブサイトから抜粋（<http://www.bkpm.go.id/en/investment-procedures/investment-incentives/>）

(2) 法人税免除措置／タックスホリデー（法人ベース）

インドネシア国内への新規の投資を行う計画のある企業（法人）に対する法人税免除措置

³⁹ Ministerial Regulation of Finance No. 76/PMK.011/2012 on Amendment of. No. 176/PMK.011/2009

（タックスホリデー）の概要は、以下のとおりである。

表 4.3.2.2 インドネシア国での法人税免除措置（タックスホリデー）の概要

項目	概要
法制度	<ul style="list-style-type: none"> 財務省令 2015 年 159 号⁴⁰ BKPM 長官規定 2015 年 19 号⁴¹
概要	<ul style="list-style-type: none"> 業務免許に書かれた通り主な営業をすることで、法人税減免措置を与えられる。 法人税額の 10%～100%が減税となり、商業生産の開始後 5～15 年間、減税となる。さらに、国益にかなうとみなされる場合は、減税期間が 20 年間に延長される場合がある。 新規の資本投資計画に係る適法な最低投資額は、1 兆ルピア。ただし、通信・情報産業の場合は、最低投資額は 1 兆ルピアから 5000 億ルピアへの減額が認められる。
対象	<p>パイオニア産業という広い関連性を有し、付加価値及び外延性が高く、新技術を駆使し国家経済に戦略的価値を与える工業。該当するパイオニア産業分類は、以下のとおり。</p> <ol style="list-style-type: none"> 1. 上流部門の金属工業、 2. 石油精製業、 3. 石油・天然ガスを供給源とする基礎有機化学産業、 4. 産業機械製造産業 5. 農・林・水産品の加工業 6. 通信・情報産業、 7. 海上輸送産業、 8. 経済特区における加工業、 9. 経済インフラ産業（官民協業（KPB⁴²）下の経済インフラを除く）
新たな法人納税者	<ul style="list-style-type: none"> 最低投資額は 1 兆ルピア。 最適負債と資本の比率を達成する。 納税者は、計画された投資額の少なくとも 10%をインドネシア国内の銀行に預け、投資計画の実現前には預金を引き出さないことを記した誓約書を提出する必要がある。 2011 年 8 月 15 日以降に設立された企業であること。 法人税減免措置の手続期間を短縮された。申請者は投資調整庁に申請を提出する。その後、投資調整庁に 25 日、財務省に 20 日処理される。合計 45 日の間に終了できる。 申請が否認された場合、政令 2015 年 18 号に規定された基準を満たした場合は、申請者はこのインセンティブを享受できる。

出典：BKPM ウェブサイトから抜粋 (<http://www.bkpm.go.id/en/investment-procedures/investment-incentives/>)

(3) 投資減税／タックスアローワンス制度（事業ベース）

インドネシア国内への新規の投資を行う計画のある企業（法人）に対する、特定の分野ごとの投資減税（タックスアローワンス）の概要は、以下のとおりである。

⁴⁰ Regulation of Ministry of Finance No. 159/PMK.010/2015

⁴¹ Regulation of Chairman of BKPM No. 18 of 2015 on Guidance of Income Tax Facility Application for Investment in certain Business Fields and/or Locations

⁴² Skema Kerjasama Pemerintah dan Badan Usaha

表 4.3.2.3 インドネシア国での投資減税（タックスアローワンス）の概要

項目	概 要
法制度	<ul style="list-style-type: none"> 財務省令 2015 年 89 号⁴³、 特定の事業分野/地域に於ける投資に対する所得税優遇措置に関する政令 2015 第 18 号⁴⁴ 特定の事業分野/地域に於ける投資に対する所得税優遇措置に関する政令 2015 第 18 号の改正に係る政令 2016 年第 9 号⁴⁵
概要	<p>所得税に関する優遇措置は以下の通りである。</p> <ul style="list-style-type: none"> 投資額の 30% に対して、年に 5%、6 年に渡り課税所得から控除することができる。 有形固定資産の減価償却期間を短縮できる。 二重課税控除の原則に基づき、インドネシア国外の非居住者に支払われる収入に対する所得税の税率は、10% 又はそれ以下に軽減される。 損失の繰越期間を下記の条件を充足することにより、5 年以上 10 年まで活用できる。 <ol style="list-style-type: none"> 1) 一定の業種で工業団地又は保税地域で投資を行う。 2) 設備の開発を行う。 3) 原材料について少なくとも 70% を国内調達する。 4) 500~1000 人を採用する。 5) 研究開発を行う (R&D) 6) 再投資を行う 7) 売却額の 30% 以上を輸出する。
対象業種	<ul style="list-style-type: none"> 投資減税を与えられる業種の数は 145 業種。政令 2015 年 18 号にて 143 業種が対象とされたが、政令 2016 年 9 号により一部改訂され、145 業種に増加した。

出典：BKPM ウェブサイトから抜粋 (<http://www.bkpm.go.id/en/investment-procedures/investment-incentives/>)

(4) 経済特別区 (Special Economic Zone : SEZ)

インドネシアでは、2009 年に経済特区法（法律第 39 号、2009 年）が公布されたが、その後もしばらくは経済特区の開発は遅れていた。しかしながら、2012 年以降、開発が進み、現在までに全国 10 カ所の SEZ が動き出している。うち、2 カ所は操業を開始しており、残り 8 カ所は、開発中である（2016 年 12 月現在）。経済政策パッケージ第 6 弾（2015 年 11 月）において、インフラ整備政策の一環として、SEZ の開発を加速させるとして、詳細の規定と各種インセンティブが発表された。

表 4.3.2.4 インドネシア国での経済特区 (SEZ) の概要

法制度	<ul style="list-style-type: none"> 経済特区法 2009 年⁴⁶ 財務省令 2015 年 104 号⁴⁷
概要	SEZ に対する、財政的インセンティブとしては、以下の項目が挙げられる

⁴³ Ministerial Regulation of Finance No. 89/PMK.010/2015 on Procedures for Provision of Income Tax Facilities for Investment in Specific Business Fields and / or in Specific Regions and Transfer of Assets and Sanctions for Domestic Agency Taxpayers Income Tax Facilities

⁴⁴ Government Regulation Number 18 of 2015 on Income Tax Facilities for Investment in Specific Business Area and/or in Specific Regions

⁴⁵ Governmental Regulation No. 9 of 2016 on Amendment of Governmental Regulation No. 18 of 2015 on Income Tax Facility for Investment in Specific Business and/or Specific Regions

⁴⁶ Law of the Republic of Indonesia Number 39 Year 2009 regarding Special Economic Zones (SEZ)

⁴⁷ Peraturan Menteri Keuangan Republik Indonesia Nomor 104/PMK.010/2016 tentang Perlakuan Perpajakan, Kepabeanan, dan Cukai Pada Kawasan Ekonomi Khusus

	<ul style="list-style-type: none"> ・ 法人税：20～100%の幅で最長 25 年間の減税 ・ 輸入原材料：付加価値税の免除 ・ 製品販売：国内売り上げについては売り上げ税の免除 ・ レストラン等：遊興税を 50～100%の幅で割引 ・ 製造業：タックスホリデーの対象 <p>また、その他のインセンティブとしては、以下の項目が挙げられる。</p> <ul style="list-style-type: none"> ・ ネガティブリストの適用免除 ・ 不動産所有の許可、 ・ IMTA（労働許可）発行の短縮化 ・ 飲料水事業の継続許可 ・ 食品販売業における BPOM 許可のオンライン化など。
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出典：BKPM ウェブサイトから抜粋 (<http://www.bkpm.go.id/en/investment-procedures/investment-incentives/>)

4.3.3 政府支援・補助制度

コミュニティが実施主体となる事業は、おおむね利益便益比があまり高くない事業が多く、民間投資の活用は難しい。そのため、これらの事業への投資は、おもに公的な資金の活用が推奨される。コミュニティ事業投資への支援にかかる政策、法制度に関連して、以下に挙げる公共資金の活用が想定される。

(1) 特別信用保証制度（Credit for Business Program（Kredit Usaha Rakyat: KUR））

インドネシアでは、零細・中小企業はインドネシア経済において重要な地位を占めているとされるが、零細・中小企業向け金融システムは量的充足度の観点から不十分とされる。その根拠として、ミクロでは零細・中小企業の約 6 割が銀行ローンを得られず自己資金中心となっているとされている。

このような状況下、インドネシア政府は零細・中小企業の資金アクセスの改善を図ってきており、2007 年に制度化された政府の特別信用保証制度（KUR、Kredit Usaha Rakyat）は、零細・中小企業の資金アクセスの改善のための中心的な施策である。しかし、業種別 KUR 貸出残高は、大半が卸売・小売業を対象にしており、KUR 制度の優先業種とされる農林漁業向け貸出残高が 2 割程度、製造業向けは数%にとどまっており、生産セクター向けの貸出が限定的なものとなっている。

また、零細・中小企業への安価、簡単かつ迅速な借り入れサービスを提供するために商業用金利を引き上げるインドネシア政府の一環として、2015 年より KUR は、保証金への補助金から、金利への補助に移行している。

表 4.3.3.1 特別信用保証制度（Kredit Usaha Rakyat: KUR）の概要

項目	概 要			
関連省庁	経済調整大臣府、財務省、農業省、環境林業省、工業省、鉱業省、協同組合・中小企業省			
実施銀行	国営商業銀行 7 行及び 26 の地方開発銀行			
保証割合	80%：農業、漁業、林業、小企業 70%：それ以外のセクター			
対象企業	零細、小、中企業及び協同組合、ビジネスグループ、連携機関となっている。			
		零細企業	小企業	中企業
	純資産	50 百万ルピア以下	50 百万ルピア超 5 億ルピア以下	5 億ルピア超 100 億ルピア以下
	売上	3 億ルピア以下	3 億ルピア超	25 億ルピア超

項目	概 要	
		25 億ルピア以下
	基本的に、事業として成り立っているが、担保などがなく銀行からの借り入れができない企業が対象とされている。	
資金用途	運転資金、設備資金	
融資期間	運転資金：3 年、設備資金：5 年。	
融資上限額	KUR Micro：25 百万ルピア以下 KUR Retail：25 百万ルピア超 5 億ルピア以下 KUR TKI：25 百万ルピア以下	
上限金利	KUR Micro：9% KUR Retail：9%	

出典：経済調整大臣府への聞き取り

(2) 森林経営資金調達のためのリボルビングファンド（Revolving Fund for Financing Forestry Business）

環境林業省内の環境林業資金調達センターは、環境開発や森林経営のための植林基金（Reforestation fund）や他の森林・環境開発基金を基にした回転資金（リボルビングファンド）を管理することを目的とした公的機関（Public service agency：Badan Layanan Umum（BLU））である。

森林経営資金調達のためのリボルビングファンドは、環境林業省規定 P.59/2015⁴⁸に基づき、i) 政府予算（APBN）の一部であり、無償ではなく、プロジェクトオリент資金である、ii) 実施可能な事業を計画しているコミュニティに与えられる、iii) 支払い、回収、さらに他の受益者に再利用されるものである、さらに、iv) 林業や環境への投資の事業資本を強化するものである、と規定されている。

表 4.3.3.2 森林経営資金調達のためのリボルビングファンドの概要

項 目	内 容
リボルビングファンドの目的	森林ビジネスの資本の強化、ならびに、環境劣化・汚染対策への資金調達
リボルビングファンド管理の基本	適任者、適地、適切な活動また、分割払いシステムに基づいた適切な支払いと回収
リボルビングファンドのスキーム	融資、分収、シャリア（イスラムの資金システム（準備中））
ローンの利率	<ul style="list-style-type: none"> • 中小企業：Rs. 40 billion、インドネシア銀行の利率に 4%を加える（最大年率 10%） • 零細企業：最大 Rs. 2 billion。インドネシア銀行の利率と同率（最大年率 8%） • 連携機関（チャンネル）：インドネシア銀行の 50%（最大 4%） • 企業、協同組合：ファイナンスセンターの利益の 35% • 保護区内の森林事業は、生産林内での利率の 50%
リボルビングファンドが活用できる森林事業	<ul style="list-style-type: none"> a) 産業植林（HTI） b) コミュニティ植林（HTR） c) 社会林業（HKm） d) 村落林（HD） e) 民有林（HR） f) 非木材生産物（HHBK: NTFP） g) 集約林業および生態系回復（Silin, RE）

⁴⁸ Minister Regulation No: P.59/Menlhk-Setjen/2015 regarding Revolving Fund for Land and Forest Rehabilitation

出典：公的機関・環境林業資金調達センター（BLU PUSAT P2H）の資料より抜粋

4.3.4 泥炭回復投資促進制度の設計案

(1) 経済特区の設定

上記で収集した情報及びステークホルダー協議などを通じた議論から、以下のように、まず現行の経済特区制度を活用して、「泥炭回復経済特区（Kawasan Ekonomi Restorasi Gambut [KoENIG-Merah Putih]）」の設定を通じて投資促進していく。

具体的な泥炭回復への投資促進を目指し、BRGは8月に共同調査実施コンソシウム（現地再委託）提案の事業候補地の視察と地方首長との対話を開始し⁴⁹、2017年10月5日の会合の結果、提案された経済特区の設定の準備を開始することを、BRGのDeputy4により決定された。

表 4.3.4.1 泥炭回復経済特区提案コンセプトの基本事項

No.	項目	要点/特徴
1	申請者	省庁: BRG（設定条件が少ない）
2	設定目的	<ul style="list-style-type: none"> ● その他の経済: 環境にやさしい新経済成長地区（他の特区との違い） <ul style="list-style-type: none"> a) 新（大統領の）政策で焦点 b) 開発上の制約と特殊性を有する泥炭地の経済開発の柱に位置づける。付加価値の創造、労働力吸収、貧困軽減に貢献。 c) 持続的開発の原則。SDG 指標達成貢献: 泥炭火災の軽減による炭素排出の軽減に貢献
3	経済活動	<ul style="list-style-type: none"> ● 経済セクター/活動は、地域自然資源を有効活用するもの ● 競争力のある製品を生産するセクター/活動 ● 環境にやさしく適正技術の適用したセクター/活動の開発 ● 中小企業開発できるセクター/活動 ● 1活動で開発できる経済スケールを満たすもの ● 泥炭地の特徴に準じた環境にやさしいセクター/活動
4	誘致投資	<ul style="list-style-type: none"> ● 土地ベース（活動と作物）と非土地ベース（土地ベースと連動した下流） ● 中小企業レベル、大企業レベルと経済活動レベルを取捨選択して、海外だけでなく国内投資も目標 ● 小企業レベルの活動として、村落公社（BUMDES）が大きな役割を持つ。 ● 必用とする資金規模は大きくなるので、持続的ファイナンス（その一つの手段としてグリーンボンド）からの資金調達（下流に関心を持つ海外企業など） ● 海外の観光客を取り込める泥炭地特有のエコツーリズム開発を組み込む

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

(2) 優遇税制対象事業リストの改定

上記の議論の過程でも代替案として提案されているのが、4.1で検討した企業投資に対する優遇税制のうち、指定事業に対する法人税の減税措置に関する政令⁵⁰における優遇税制対象事業のリストの改定からアプローチする案が提案される。改定プロセスは、2015年の改定後、2年に一度で、2016年に改定しており、次回2018年改定のために、ちょうど今年2017年は

⁴⁹ BRG Deputy4 のチーム（と IPB ビジネス開発研究者）により、2017年8月7-9日南スマトラ州 OKI 県、11-13日中央カリマンタン州 Pulpis 県を訪問。

⁵⁰ Peraturan Pemerintah Republik Indonesia Nomor 18 Tahun 2015 tentang Fasilitas Pajak Penghasilan untuk Penanaman Modal di Bidang-bidang Usaha Tertentu dan/atau di Daerah-daerah Tertentu（6 April 2015）

改定準備作業期間である。

農林水産品の加工業に対する大型投資企業については投資促進のためにすでに法人税免税措置を受けることができる。一方、中小企業に対しては別途、法人税および個人所得税の減税措置を受けることができる（2003年46号政令⁵¹）。

泥炭回復効果の促進面から、下表のように事業地の位置、事業内容に泥炭回復上重要な水位管理などを規定することが提案される。一方、泥炭回復に対する投資促進が加速させるため、泥炭地回復事業へのファイナンス、泥炭地回復地からの産物の加工からの所得も対象として含めることが提案される。

表 4.3.4.2 減税措置対象の泥炭回復事業の基本的なスコープ案

	General Incentive/Facility	Special Economic Zone (KEK)
Location	In 7 BRG's Prioritized Provinces	Same as left
	Covering first Restoration Priority: Fire Prone (e.g. 2015)	Same as left
Business	Including rewetting/ water control (average water table >0.4m)	And to contributing food/ energy security and other strategic purposes in the province
	Including financial Institution to finance the business as shown in above	And primary processing using the products from the restoration area

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

4.4 民間企業の参画による泥炭地回復ビジネスモデルの提示の検討

4.4.1 インドネシア国内金融機関からのファイナンスの可能性

2017年51号OJK令により、大規模企業からグリーンファイナンスの実施が2019年1月から義務付けられる。泥炭地回復事業資金に対して投融資を受けやすくなる環境になる可能性が高まった。

下表に示すように、インドネシア国内企業の資金調達先として銀行のクレジットが占める割合が高い。その次に、キャピタルマーケットで、株式、債権の発行となる。そのため、投融資の資金源ポテンシャルとしては、まずグリーンレンディング、その次に、グリーンボンドの発行の検討が考えられる。

表 4.4.1.1 インドネシア国内の民間企業の資金調達先の概況（2013年）

区分	細分	Trillion IDR	備考 (%)
Bank credit		585.01	(78.42)
Non-bank financing		161.02	(21.58)
	Capital market	115.04	(15.42)
		IPO/Right issues	57.54 (7.71)
		Coporate bonds	57.50 (7.71)
	Financing companies	45.98	(6.16)
計		746.03	(100.00)

出典：UNEP. 2015. Towards a Sustainable Financial System in Indonesia. Table4

⁵¹ Peraturan Pemerintah Republik Indonesia Nomor 46 Tahun 2013 tentang Pajak Penghasilan atas Penghasilan dari Usaha yang Diterima atau Diperole Wajib Pajak yang Memiliki Peredana Bruto Tertentu (13 Juni 2013)

(1) 銀行からの資金調達ポテンシャルと課題⁵²

2015年1月現在営業中の銀行は約120社ある。このうち、国営の4大銀行、10社の海外企業を含む。アセット保有高の高い10社は、Bank Mandiri, Bank Rakyat Indonesia (BRI), Bank Central Asia (BCA), Bank Negara Indonesia (BNI), CIMB Niaga, Bank Danamon Indonesia, Bank Permata, Bank Pan Indonesia, Bank Tabungan Negara (BTN), Bank Internasional Indonesia である。

現状として、銀行クレジットまたは公式のクレジットからの資金調達はインドネシアの企業の約20%程度にとどまっていると推定されている。不履行に対する銀行のリスク感が高く、小ビジネス、新しいタイプのビジネスに対するクレジットを供与したがない。銀行ファイナンスへのアクセスが限定されることが、グリーン投資に対するバリエーションとなっていると見られている。

グリーンファイナンスとして、小水力やジオサーマル発電など「再生可能資源」、「持続的農業」、環境効率の良い機械、エコラベル製品など「グリーン工業」、「エコツーリズム」事業があげられている。グリーンファイナンスへのポートフォリオ、全ファイナンスのポートフォリオの約1%にとどまっていると推定されている。

農林漁業者向けの民間の金融システムとしては、民間銀行が中小企業向けならびにマイクロファイナンスのシステムを持っている。その中でも、BRI (Bank Rakyat Indonesia) が、小規模およびマイクロファイナンスを対象としたインドネシア国内で最大規模の銀行である。

また、BRI以外のBTPNのような民間銀行でも、BRIと同様の零細・中小企業向けのファイナンスを行っている。この際は、農家個人ではなく、農家により形成されたグループ・協同組合 (Kooperasi) に対して貸し付けを行う。

また、在インドネシアの本邦系銀行 (SMBC) に聞き取りを行ったところ、通常は、インドネシア国内の大手企業に対しての大規模な融資 (3~10百万USD) を行っているが、本邦企業が出資しているインドネシア企業に対しては、小規模の融資を行っているとのことである (ただし、本邦企業が日本国内で口座を持っていることが条件)。

(2) キャピタルマーケットからの資金調達ポテンシャルと課題⁵³

2014年11月の情報では、インドネシアでは株式の場合、約65%は国外の投資家である。国外、国内とも機関投資家が70%以上を占めると推定されている。株式だけでなく、債券マーケットも増加傾向にある。債権市場、特に企業債権インドネシア建は、グリーン投資の長期資金調達源として重要な役割を持つと見込まれる。

インドネシアの持続的投資マーケットのレベルはまだ低い、エネルギーセクターで膨大な資金ニーズがあり、再生可能エネルギーもグリーン投資のポテンシャルが高い。

2009年からインドネシア NGO の KEHATI の生物多様性信託基金とインドネシア証券取引所 (BEI) が協力して、持続的責任投資 (SRI) の標準化と規制のために SRI-KEHATI index を開発している。また、2014年に PT. Indo Premier Investment Management が SRI-KEHATI-ETF を立ち上げ、SRI KEHATI Index を追跡できる。

2014年には、住宅開発事業者 PT.Ciputra Residence が IFC のグリーン建築スタンダードを適用して、IFC の一部保証により債権を発行している。また、KEHATI と財務省協力により

⁵² UNEP. 2015. Towards a Sustainable Financial System in Indonesia. pp 16, 19.

こうした傾向は、金融庁などの行政機関も情報を把握しつつある。PT. SPSJ 社 (サゴ澱粉製造企業) など民間企業からの情報では、オイルパーム農園、不動産など明確な担保 (土地) が指定できる事業は銀行から容易にクレジットが得られる傾向にある。しかし、工作機械など土地以外の担保しか指定できないが製造業などでは銀行から容易にクレジットが得られない傾向にある。

⁵³ UNEP. 2015. Towards a Sustainable Financial System in Indonesia. pp 17, 20-21,33

マングローブ回復プログラムにおいて、国債 ORI010 の販売エージェントとして、20 の金融機関が協力し、販売手数料はプログラムに寄付した事例もある。

4.4.2 国際金融機関からのファイナンスの可能性

BRG では、下図に示すように公共ファンドからの資金調達も想定している。ICCTF、IFAD の Jokowi Village Fund、世銀などを第1 優先している。

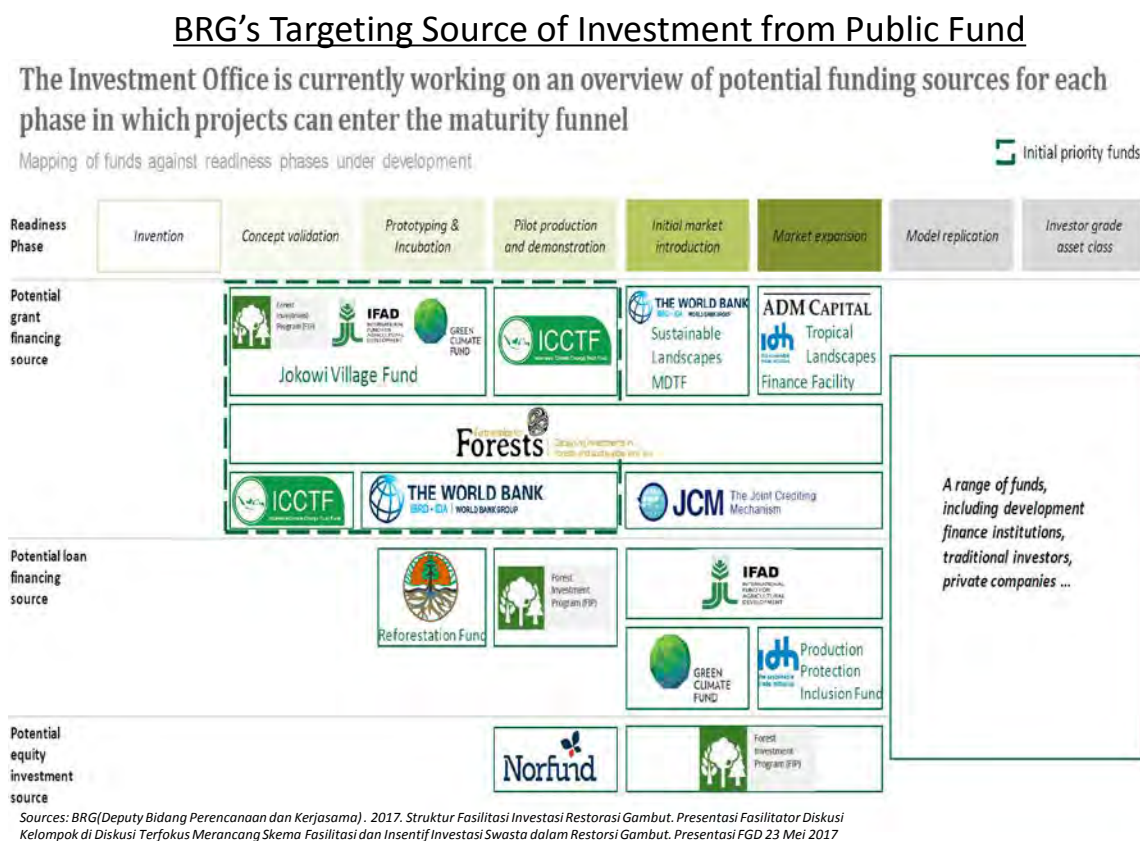


図 4.4.2.1 BRG が資金調達先と想定している公共ファンド
 出典：2017 年 5 月調整会議での BRG Deputy1 の発表資料⁵⁴

その中で、世銀は Multi Donor Trust Fund (MDTF) のファンドマネジャーとなつている。MDTF は 3 コンポーネント (One-map、泥炭回復、火災予防) から構成されており、泥炭回復はノルウェー資金を原資として、BRG が計画する活動や事業などについて無償支援するものである。世銀関係者からの情報では、MDTF は BRG 支援に焦点を当てているため、民間セクターは ADM Capital の Tropical Landscape Finance Facility であれば、民間セクターの資金調達の支援もできる可能性がある。

開発途上国や経済移行国において、国や地域、あるいは地球規模の地球環境問題や気候変動対策などのプロジェクトに用いることが可能な国際的な基金として、緑の気候基金 (Green Climate Fund : GCF) や地球環境ファシリティ (Global Environment Facility : GEF) があげられる。また、インドネシア国内では、ノルウェー資金が主体となっているマルチドナートラスト

⁵⁴ Sources: BRG(Deputy Bidang Perencanaan dan Kerjasama) . 2017. Struktur Fasilitas Investasi Restorasi Gambut. Presentasi Fasilitator Diskusi Kelompok di Diskusi Terfokus Merancang Skema Fasilitas dan Insentif Investasi Swasta dalam Restorasi Gambut. Presentasi FGD 23 Mei 2017

ファンド（MDTF）なども挙げられる。ここでは、今後積極的な活用が見込まれる GCF について、その概要を示す。

緑の気候基金（Green Climate Fund：GCF）

緑の気候基金（Green Climate Fund：GCF）は、開発途上国の温室効果ガス削減（緩和）と気候変動の影響への対処（適応）を支援するため、気候変動に関する国際連合枠組条約（UNFCCC）に基づく資金供与の制度の運営を委託された多国間基金である。2010年のCOP16で採択されたカンクン合意において、気候変動枠組条約（United Nations Framework Convention on Climate Change: UNFCCC）の資金メカニズムの運営体として、緑の気候基金（Green Climate Fund: GCF）の設立が決定された。このGCFに対しては、我が国から15億USDの拠出を表明するなど、世界全体で102億USDの拠出表明がされており、それらの資金が有効に活用されることが期待される。2015年5月、我が国政府は、日本が拠出表明を行った15億USD相当額の拠出のための取決めに署名を行った。これにより、本基金への拠出額は、開発途上国向けの事業や計画に対する資金配分を開始するための基準値である各国拠出表明総額の50%を超えたことから、GCFは正式にその支援活動を開始した。

表 4.4.2.1 緑の気候基金（GCF）の投資枠組みの概要

項目	内容
投資方針	<ul style="list-style-type: none"> 低炭素かつ気候リスクに強靭な持続可能な開発に向け、パラダイム・シフトを促すポテンシャルが高いプロジェクト／プログラムに投資 対象プロジェクト／プログラムが実現するために必要最低限の譲許性を付与 GCFからの資金拠出が、他の公的資金、民間資金を締め出さないように配慮する 借款は、財務的に健全な、収益を生み出す活動にのみ供与する。
投資戦略とポートフォリオ目標	<ul style="list-style-type: none"> 適応と緩和の資金配分バランスは長期的に 50:50 適応資金の 50%以上を、特に気候変動に脆弱な地域（後発開発途上国（LDCs）、小島嶼開発途上国（SIDS）、アフリカ諸国）に充当 少数の国に偏らないように、幅広い国に適正に配分する 民間セクターファシリティ（PSF）を通じて相当規模の資金を拠出し、民間セクターとの連携を最大限高める。 途上国が GCF 資金にアクセスできるよう十分な支援を行う。
資金供与手法	贈与、借款、出資および保証
支援対象分野	<ol style="list-style-type: none"> 適応（気候強靭性の強化） <ul style="list-style-type: none"> 生態系・生態系サービス インフラ・建築環境 健康・食料・水の安全 住民・コミュニティの生計向上 緩和（温室効果ガス削減） <ul style="list-style-type: none"> 発電、エネルギーアクセス向上（省エネ） 交通 建物、都市、産業、家電（省エネ） 森林・土地利用

出典：森から世界を変える REDD+プラットフォーム 平成 29 年度第 3 回ナレッジ分科会ナレッジセミナー「緑の気候基金（GCF）の取り組みの進捗状況」説明資料より抜粋（2017年8月）

資金供与は、あらかじめ認証した認証実施機関（Accredited Entities: AEs）を通じて行う。AEs は、GCF にプロジェクトプロポーザルを提出し、GCF へ資金支援を要請することができる機関である。承認されたプロジェクトの監理・指導及びプロジェクトへの資金提供を行う。これらの認証実施機関の対象としては、国際機関、二国間機関、途上国の期間、民間企業、

NGO 等、幅広い機関が対象となり、理事会による承認を得て、登録される。2017 年 8 月現在、認証された AE は合計 54 機関であり、我が国の機関としては、JICA および三菱東京 UFJ 銀行が AEs として承認された（第 17 回 GCF 理事会）。これら AEs は、下表のダイレクト・アクセス機関と国際アクセス機関に区別される。

表 4.4.2.2 緑の気候基金（GCF）の認証実施機関（AE）の区分

ダイレクト・アクセス機関	国際アクセス機関
<ul style="list-style-type: none"> 国家、準国家、地域レベルの官民及び NGO 途上国の政府機関・公的機関、途上国の民間企業、途上国の地域国際機関・金融機関 	<ul style="list-style-type: none"> 国際開発金融機関（MDBs）、国連機関、二国間開発援助機関／開発金融機関、国際 NGO、先進国の民間企業・多国籍企業
<ul style="list-style-type: none"> 途上国 NDA からの推薦が必要 レディネス支援を受けることができる 	<ul style="list-style-type: none"> 幅広い地域での気候変動問題に関する知見が必要 我が国の機関では、JICA、三菱東京 UFJ 銀行は、ここに含まれる。

出典：森から世界を変える REDD+プラットフォーム 平成 29 年度第 3 回ナレッジ分科会ナレッジセミナー「緑の気候基金（GCF）の取り組みの進捗状況」説明資料より抜粋（2017 年 8 月）

4.4.3 投資ポテンシャル案件の発掘

(1) ポテンシャルの発掘概況

BRG でも他ドナーとの協力により、投資促進に向けた検討を始めている。

- Sistemiq⁵⁵の協力で「Peatland Incubator」と呼ばれるポテンシャルビジネスモデルのアセスメントや熟度を上げる支援をするプロセスを検討している。BRG と「Investment Committee（IC）」さらに Sistemiq 内に「Technical Assistance Unit（TAU）」を設けている。2017 年 6 月時点の情報では、熟度が低い「アイディアレベル（第 1 段階）」が 2 件、「アイディアノートレベル（第 2 段階）」が 8 件、「コンセプトノートレベル（第 3 段階）」が 3 件リストアップされている。
- 投資判断クライテリアとして、高い GHG 削減効果、広域事業面積を重視している。泥炭回復だけでなく、泥炭の保全が含まれれば、泥炭回復がなくても、採用される。Sistemiq のメンバーからの情報⁵⁶では、中央カリマンタンなど開発された泥炭地が広い地域よりも、パプアなど開発が始まっていない泥炭地が広いところを好む傾向にある。Sistemiq 協力は REDD+や炭素オフセットビジネスの育成に関心があると推測される。

(2) 中央カリマンタン州 Pulpis 県分収方式水稻農園（Rice Estate）ビジネス

上記 3.5.2 でコンソシウム調査結果を活用して検討したビジネスモデルのうち、水稻モデルの事業化の可能性が高い。中央カリマンタン州には、Pulpis 県内の BRG 泥炭地回復優先地約 1,500ha に PT.SPI⁵⁷社が経営展開を計画しているベネフィットシェア（分収）方式による水稻農園（Rice Estate）事業計画がある。

⁵⁵ イギリスに本社を持つエネルギー・廃棄物および環境関連のビジネスコンサルタント。2016 年ダボスで SDGs の目標達成促進のためにビジネス界が主体となって設立されたビジネス・持続的開発コミッション（the Business and Sustainable Development Commission）の事務局も努める。

⁵⁶ 2017 年 5 月 BRG、Sistemiq と合同現地調査（BRG が中央カリマンタン州プランピサウ県で試行している水稻栽培における火入れなし土地管理（PLTB）のデモンストレーションプロット）からの情報。

⁵⁷ PT.Sinar Pangan Indonesia

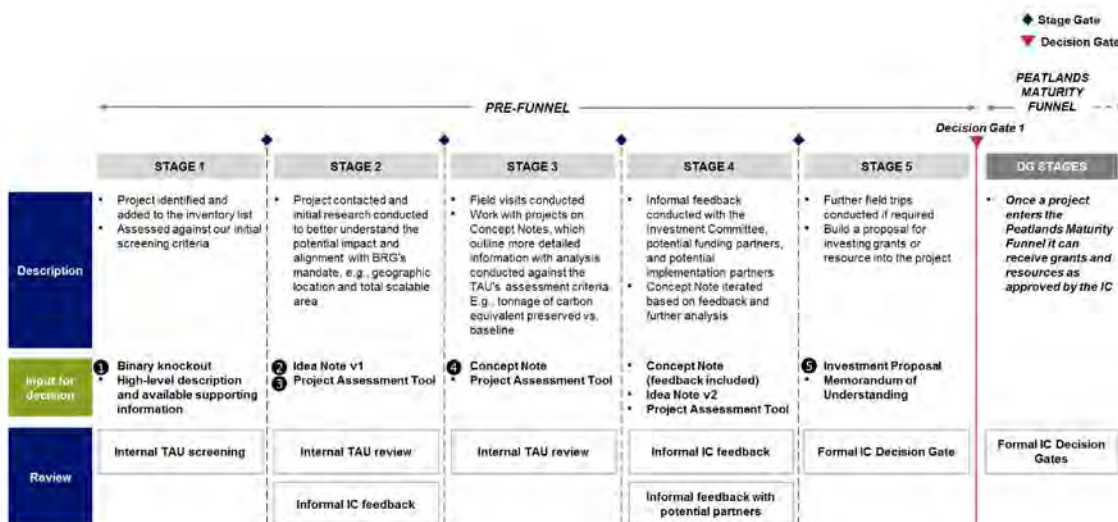
We are setting up a 'Technical Assistance Unit' capable of delivering public and private sector funding as effectively as possible to projects developing scalable approaches to restoring, protecting, and sustaining the Indonesian peatlands

High-level investment criteria

Carbon impact	<ul style="list-style-type: none"> Value delivered to the environment in terms of carbon as compared to BAU Projects that have potential to save > 1Mt CO2e/year
Land area impact	<ul style="list-style-type: none"> Area of land that is under improved sustainable management Projects that have a potential area of > 10,000 ha
Social impact	<ul style="list-style-type: none"> Social impact on the communities and stakeholders effected by the project (job creation, additional income)
Scalability/ Replicability	<ul style="list-style-type: none"> Ability for the project to scale-up operations and/or for the model to be replicated
Return over resources	<ul style="list-style-type: none"> Projects that deliver great benefit per Dollar invested Prioritize projects with the highest impact/Dollar

Outcomes

- The aim is to contribute towards BRG's **2.5 m hectare** target as well as broader protection of the peatlands
- The 2.5m ha target suggests a ~ **USD 600m** of capital will need to be deployed
- Having a GHG impact in the order of ~ **140 mtons CO2e**



SISTEMIQ提案のIncubatorプロセス

図 4.4.3.1 BRG の投資アセスメントプロセスの概要

出典：2017年5月調整会議でのBRG Deputy1の発表資料⁵⁸

BRG が同県のデモンストレーションで試行している火入れなし土地管理（PLTB）と同様に、泥炭地を地表整理した際に発生する雑草木を有機物分解促進菌により分解することにより火入れが不要になり、pHの緩和もでき、水稻栽培ができる。水稻栽培により、浅い泥炭地の泥炭水位の上昇または含水率の上昇、有機物分解の効果により低いpHやパイライトの緩和により泥炭地回復が期待されるものである

⁵⁸ BRG. 2017. Struktur Fasilitas Investasi Restorasi Gambut. Presentasi Fasilitator Diskusi Kelompok di Diskusi Terfokus Merancang Skema Fasilitas dan Insentif Investasi Swasta dalam Restorasi Gambut (23 Mei 2017). (FGD (Deputy Bidang Perencanaan dan Kerjasama))

休閒地から水稻栽培を再開する場合は機械化地表整備を組み合わせ、大規模な契約栽培により、効率的に大規模に PLTB を実施できるものである。契約農家は企業の職員として雇用することもできるが、分収地については銀行との連携によりマイクロクレジット（KUR）を適用する方法もある。

事業資金調達の具体化が優先されている。当社のビジネスコンセプトに対する期待は高く、インドネシア国内銀行 PT BNI から対象地の住民向けの KUR との連携の調整も進められている。今後、民間金融機関からファイナンスの対象として優先される。

Rice Estate Business Plan in BRG's Prioritized Peatland Restoration Area in Pulpis District, Central Kalimantan Province

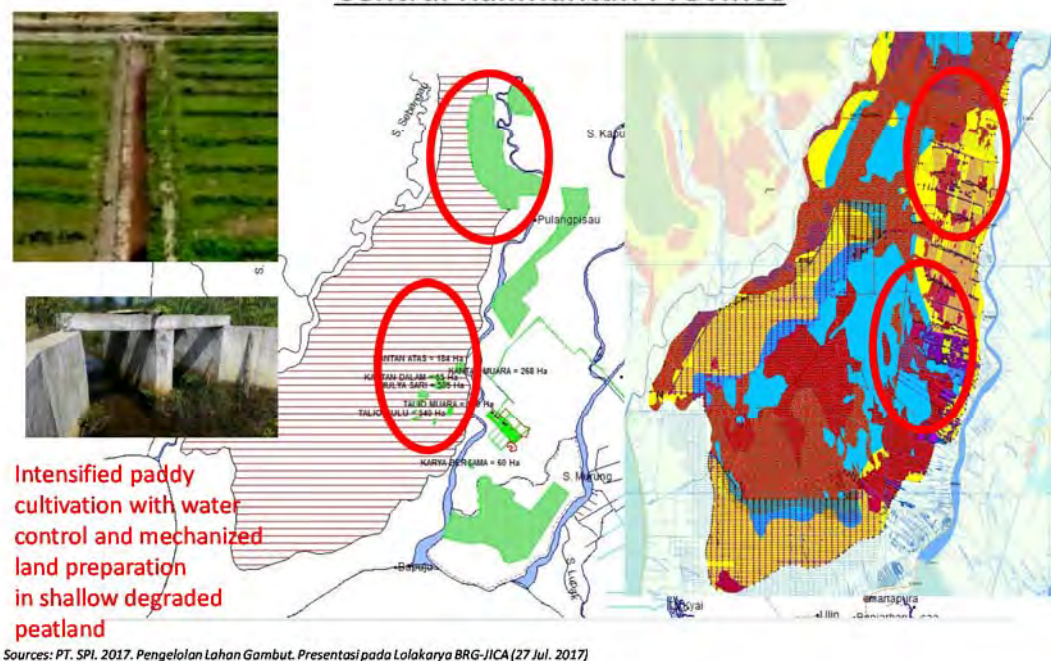


図 4.4.3.2. 中央カリマンタン州 Pulpis 県分収方式水稻農園（Rice Estate）ビジネスプランの概要
出典：ジャカルタ泥炭投資促進セミナー（2017年7月27日）PT. SPI 社発表資料

- (3) 中央カリマンタン州・南カリマンタン州境界付近における環境サービスビジネス
- Bappenas と GGGI の協力では、中央カリマンタン州においてポテンシャルビジネスモデルの発掘、官民連携の促進に向けた KHG の総合管理のためのステークホルダー協議の支援などを行っている。その一環で、中央カリマンタン・南カリマンタン両州の境界 4 県に位置する KHG Sungai Utar-Sungai Serapat の管理と協力について、ブレンーンストーミングするワークショップが 2017 年 6 月に開催された。当 KHG には、炭素吸収事業コンセッション、生態系回復事業コンセッションが設定されているほか大規模なオイルパーム農園も分布しており、官民連携で環境サービスに配慮した地域開発を目指している。
- 両州の泥炭回復への投資に関心の高い GGGI、ICCTF などが主体となって、協調して GCF からの資金による F/S 調査とファイナンスを模索しており、そのためのワーキンググループの組織化し、BRG から GCF へ申請することを検討している。今後、民間シンクタンクや NGO などがワーキンググループに参加し GCF からのファイナンスを促進する対象として優先される。

第5章 協カプログラム案の提案

5.1 調査成果のレビュー

5.1.1 コンポーネントごとの成果

(5) 対象地の泥炭地モニタリングの試行

14 箇所（4 箇所については先行調査で JICA 事務所による調達、10 箇所については本調査で、JICA 調査ミッションによる調達）について水位測定装置を設置し、BPPT との協力により開発された BRG の泥炭水位モニタリング情報リアルタイムシステムの主要なデータを提供し、システムの構築に寄与した。これにより、泥炭地回復の定量的な評価につながる。

また、ステークホルダーに対する ToT 研修を試行し、BRG が今後行う ToT 研修の基礎を開発した。

(6) 対象地域のプロフィール調査

3 大学と 1 研究所のコンソーシアム調査チームによる調査（2017 年 5 月～9 月）の結果、約 20 種以上の商品作物のポテンシャルを発掘した。その中から、下表に示すように投資案件の発掘が優先される泥炭地回復ビジネスモデル案が提案された。

表 5.1.1.1 泥炭地回復ビジネスモデル案

No.	Commodity	Product	Potential Market	Location	Potential Partner
1.	• Paddy Rice	• Rice	• BULOG • Local Government Company • Private company	• OKI • Pulang Pisau	• PT. Sinar Pangan Indonesia • PT. Belitang Panen Raya
2.	• Betel Nut	• Dried nut	• Pakistan • India • China • Korea • Thailand	• OKI • MUBA • Pulang Pisau	• CV. Mutiara Pinang
3.	• Hibiscus canabius	• Fiber	• Outomotive industry • Plastic based industry	• OKI • MUBA • Pulang Pisau • Kepulauan Meranti	• PT. Astra International • PT. Cahaya Perdana Plastik
4.	• Energy wood (Cerberra manghas, Vitex pubescens, Melaleuca cajuputy)	• Wood pellet, charcoal, • Bioetanol	• Processing industry • Electricity company	• OKI • MUBA • Pulang Pisau	• PT. Pellet Biomass Indonesia • PT. Terregra Asia Energy
5.	• Coffee	• Green bean • Coffee powder	• International coffe markert	• OKI • MUBA • Kepulauan Meranti	• UD.Coffephile • UD. Kopiloka
6.	• Sago	• Sago powder • Mushroom from sago waste	• International food industry	• Kepulauan Meranti	• PT. NSP
7.	• Ecotourism and Melayu tribes tradition (water buffalo, “lebak lebung”, purun handicraft)	• Ecotourism, souvenir	• ASEAN country (Malaysia, Singapore, etc)	• OKI • Kepulauan Meranti	• Genpi (Generasi pariwisata Sumsel)

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティースタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）



図 5.1.1.1. 泥炭地回復ビジネス体制案

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書 2017（10 月現在）をもとに作成

また、上図に示すように、民間企業は金融機関から資金調達しながら、個別ないし組織化したコミュニティと連携して泥炭地回復地域の産物の生産やサービスを提供し、国営企業などの企業へのマーケティングを行う協調ビジネス体制構築の案が提案された。

(7) 民間投資促進のためのステークホルダー調整会議等の支援

ステークホルダー調整会議（2017 年 2 月～10 月まで計 7 回、その他、OJK との個別協議 3 回）、泥炭地回復投資セミナー（2017 年 4 月東京、2017 年 7 月）を通じて、泥炭回復への民間投資を促進するため、インセンティブやファイシリティの適用が容易となる経済特区 (KEK) を KHG を単位（境界）として設定することとなった。

コンソーシアム調査チームから具体的な KEK 設定優先箇所の提案が行われた。

その他、会議やセミナーでは、国内金融機関、国営企業との協力関係を構築することにより、コミュニティベースビジネスを強化する方策の提案もあった。

表 5.1.1.2 経済特区の設定が優先される KHG

No.	District	KEK	KHG
1.	Ogan Komering Ilir	Sugihan Saleh	Sugihan River – Saleh River
2.	Musi Banyuasin	Penimpahan Sungai Buntu Kecil	Air Hitam Laut River – Buntu Kecil River
3.	Kepulauan Meranti	Pulau Tebing Tinggi	Pulau Tebing Tinggi
4.	Pulang Pisau	Kahayan Sebangau	Kahayan River – Sebangau River

出典：「BRG-JICA 優先 4 州における泥炭地回復投資に係るプレ・フィージビリティスタディー調査（第 2 段階）」最終報告書より抜粋。2017（10 月現在）

5.1.2 今後の成果の活用

(1) 対象地の泥炭地モニタリングの継続

BRG は 14 箇所の水位測定装置の国家財産登録を行い、維持・管理予算の確実に執行することが求められる。一方、BRG の解散時に備えて、実際に目標とされる泥炭水位モニタリングの実施者への引き渡しに向けた調整を早めに開始することが重要である。

(2) 対象地域のプロフィール調査

上記のビジネスモデル案について、具体的な投資に向けた事前準備が開始している事例のある水稲以外の作物・サービスについて、ポテンシャル案件を発掘することがまず求められる。

(3) ステークホルダー調整会議等の開催

上記の経済特区の設定を進めることが求められているほか、国内金融機関や国営企業などとの協力協定、さらにはインドネシア国外の金融機関のニーズとなりやすい政府保証の確保などを検討することが重要となる。特に、金融機関からの融資を検討するために、政府保証の確保、共同融資または金融商品の買い取り保証など国営企業との連携が求められる。

5.2 LULUCF セクターのレビュー

5.2.1 泥炭火災対策

インドネシアの LULUCF セクターの概観を再レビューする。

インドネシアの LULUCF セクターの最大の問題は、大規模な森林・土地火災及びヘイズの予防と言える。1980 年代後半から、断続的に発生し続けてきている。1990 年後半から、ドナーや ASEAN により森林火災対策協力が強化されたが、未だ抜本的な解決モデルが得られず、インドネシア政府も未だコントロールできていない。強いエルニーニョの影響を受けて異常乾燥状態となった 2015 年に、大規模な火災とヘイズ被害が発生した。その結果、大規模な森林・土地火災、ヘイズ被害の対策において、ドナーなど国際的な関心も高まり、泥炭管理問題が取り込まれて、泥炭火災問題としてクローズアップされ、泥炭対策がその火災対策にも役立つという考え方が主流になりつつある。

表 5.2.1.1 に示すように、2015 年は、例年ホットスポットが多いリアウや西カリマンタンよりも南スマトラ州、中央カリマンタン州の焼失面積がかなり占めている。南スマトラ州、西カリマンタン州、南カリマンタン州では鉱質土壌地での焼失面積が上回った。泥炭火災対策だけでは、2015 年大規模森林・土地火災、ヘイズ害の解決につながらないと推察される。

森林・泥炭地火災は、もともと人口密度が低い地域に発生しやすいため、人口密度が高い地域で発展してきた従来の消防技術・消防制度による効果が発現し難い。そのため、コミュニティベースにより日常生活を通じた土地管理の中で火災予防・火災対応を組み込むことが効率的であるととともに、現地に即した手法といえる⁵⁹。

今後の JICA 協力では、インドネシアにより適正でより有効な泥炭地火災の予防に係る方法の開発に資するため、ドナーが着目するトレンドの課題、アプローチ、方法だけでなく、現場の実態に基づく課題、アプローチ、方法を重視した、プログラム提案の検討をすることが望まれる。

⁵⁹ 環境林業省森林土地火災対策局では、2020 年ごろまでにコミュニティベースの火災予防を主流化したい意向があり、確実に効果が発揮できるコミュニティベース火災予防のモデルの確立を急ぎたいニーズがあると推察される（2017 年 6 月予防部門担当課長との面談から）

表 5.2.1.1 火災対策優先 8 州の火災頻発地の概況

火災対策優先州の概要										
州	Riau	Jambi	S. Sumatra	W. Kalimantan	C. Kalimantan	S. Kalimantan	E. Kalimantan	N. Kalimantan	合計	備考
国有林内のHS分布	多い	多い			多い			N/A		
ENSOの影響により乾燥激化	ない	あり	あり	(一部南部)	(一部南部)	(一部東部)	あり	ない		
2015年延焼面積*1 (ha)	110,025	68,493	327,902	31,773	441,279	12,642	11,006	N/A		
□ 泥炭地	73,268	55,397	343,931	60,578	310,609	183,616	64,997			
□ 非泥炭地	183,293	123,890	671,833	92,351	751,888	196,258	76,003			
□ 合計							2014以前減少 □ ヘイズなし			
火災頻発県数*2	13	6	4	11	10	5	5	2	56	平均: 7 県/州
火災頻発郡数*2	42	37	18	80	23	21	22	8	251	
火災頻発村落数*2	127	102	61	193	65	41	90	52	731	
平均 (郡/県)	3	6	5	7	2	4	4	4	5	
平均 (村落/県)	10	17	15	18	7	8	18	26	13	
平均 (村落/郡)	3	3	3	2	3	2	4	7	3	
最優先の森林管理ユニット(KPH)*3 (2015延焼)(ユニット)	23	8	13	11	21	4	**	**	80	
コミュニティ泥炭管理・モニタリング・回復の最優先 (ドーム上 & 2015火災被害)*4(ha); []:郡; <>: 村落	0 [0] <0>	3,695 [5] <17>	30,854 [5] <55>	6,193 [4] <22>	113 [1] <1>	6,319 [5] <14>	983 [2] <3>	0 [0] <0>	48,157 [22] <112>	
総合優先度	2-2	1	1	2-4	2-1	3-1	2-3	3-2		

Sources: *1: Ministry of Environment and Forestry, Republic of Indonesia. 2015. Understanding Estimation of Emission From Land and Forest Fires in Indonesia 2015
*2: Surat Menteri LHK S. 203/Menlhk/PP/4/2016; *3: Dit. RPPWPH, Ditjen. PK-TL. Jun. 2016; *4 Dit. PKG. 2016

出所: インドネシア国森林・泥炭地火災に係る情報収集・確認調査JICAミッション.2016

出典: インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション. 2016 (8月現在) 60

5.2.2 泥炭荒廃対策

BRG は、2020 年までの 5 年間だけ対象 7 州の回復優先対象地の回復に係る企画・調整などを行う。実行にあたっては、他省庁や、州に設置する州泥炭地チーム TRGD を通じて関係機関の協力を得ることになっている。一方、もともと全国の泥炭管理行政を担当していた PKG は、BRG が管轄できない地域の業務を行っているが、BRG の解散後、以前と同様に、PKG と地方政府の環境局 (DisLH) が行政管理を担うことが予想されている。

上記 2.2.2 で検討したように、泥炭地管理 (水位モニタリングを含む) 実施者は、企業地については「企業」、企業地以外については「森林管理ユニット (KPH)」と「コミュニティグループ」となる。その予算源は、企業地については「企業」、企業地以外については中央・地方政府負担 (環境業務は地方政府の義務業務) であるが、企業地以外の泥炭地管理については、地方政府としては具体的にはこれから具体的な検討に入るというところがある。

今後の JICA 協力では、政策・制度構築へのインパクトなど社会実装に資するためにも、BRG、環境林業省 PKG など中央レベルの泥炭技術機関を主体とした泥炭地管理協力だけでなく、企業地以外の泥炭地管理の実施者である「森林管理ユニット (KPH)」と「コミュニティグループ」を主体とした泥炭地管理協力を行うことも重要になる。これらの企業地以外の泥炭地管理の実施者に対する予算を確保すべき地方行政が実際に泥炭地を管理しながら KPH やコミュニティが現場の泥炭管理を実践することを試行し、その成果を再レビューしながら、プログラム提案の検討をすることが望まれる 61。

60 インドネシア国森林・泥炭地火災に係る情報収集・確認調査ファイナルレポート (2017年5月) .2.2.1.章

61 「インドネシア国日本インドネシア REDD+実施メカニズム構築プロジェクト (IJREDD+)」では、以前、西カリマンタン州で泥炭水位モニタリングを含む州レベルのモニタリング体制の検討の支援を行い、ステークホルダーとの議論にもとづくモニタリング体制について提案している (REDD+計画調査業務完了報告書[2016年4月]参照)。IJREDD+プロジェクトの州レベルの活動を通じて提案を生かした試行の促進な

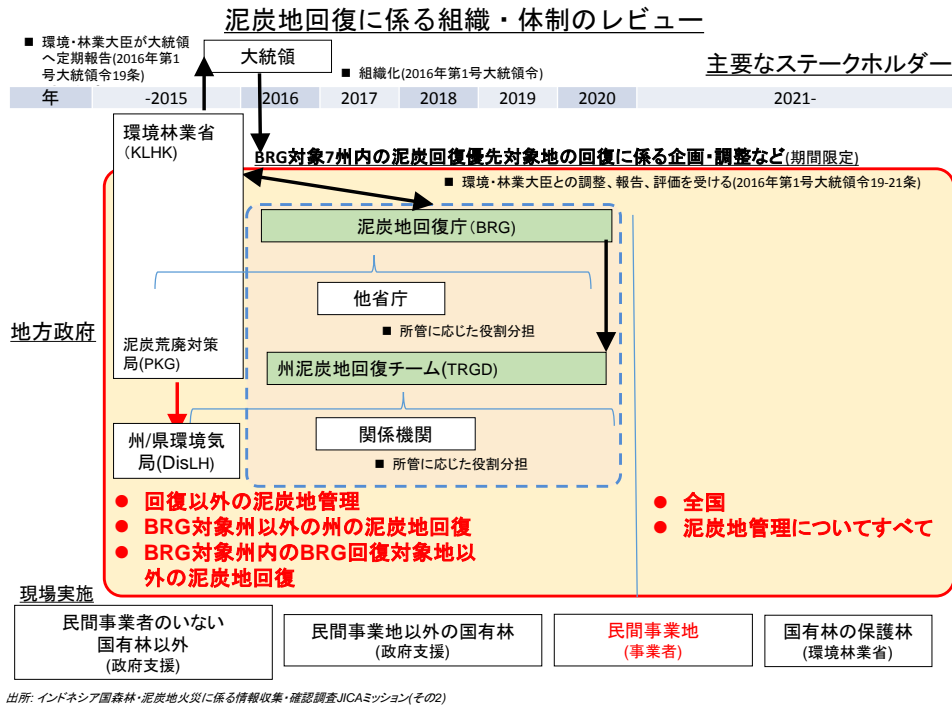


図 5.2.2.1 泥炭地回復に係る組織・体制の概観

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

5.2.3 グリーン経済対策

(1) グリーン経済成長に係る政策・法制度

インドネシアではグリーン経済成長に向けた開発戦略を模索している。関連する政策・法令は、下表に示すとおりである。

2009年32号環境保全管理法の経済的インスツルメントに関する規定に基づき2014年から、グリーンファイナンス面で政策・法制度の整備が始まっている。2017年51号OJK令により、大規模企業からグリーンファイナンスの実施が2019年1月から義務付けられる。

表 5.2.3.1 インドネシア国におけるグリーン経済成長に係る政策・法制度
 (2017年7月末迄の収集分)

年	政策・法制度	機関	要点/特徴
2009	環境保全管理に係る法律 2009年第32号 ⁶²	KLH	<ul style="list-style-type: none"> ● パラグラフ8で経済的インスツルメントについて規定 ● 42条で、政府に環境機能の保全のために、中央政府および地方政府に、以下のような経済的インスツルメントを設けることを義務付けている。 <ol style="list-style-type: none"> 1) 経済活動・開発の計画 2) 環境資金 3) インセンティブ/ディスインセンティブ 金融機関、資本市場のグリーン化や環境サービス支払い制

ど実践経験は、社会実装、たとえばBRGの管轄地域における泥炭モニタリングにかかる政策・制度構築支援にも役立つと考えられる。IJREDD+の州レベルの活動とその成果が目される。また、IJREDD+の現場レベル活動などでのコミュニティグループによる森林モニタリング促進の実践経験なども、泥炭モニタリングにおけるコミュニティによるモニタリングの促進方法の開発に役立つと推察される。

⁶² Undang-undang No.32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup (3 Oktober 2009)

年	政策・法制度	機関	要点/特徴
			度、環境保険制度、環境ラベル制度などを含む。
2014	インドネシアにおける持続的ファイナンスのロードマップ ⁶³	OJK	<ul style="list-style-type: none"> ● 2015-2019 の中期と 2020-2024 長期に区分 1.) 中期: 基本法規制フレーム・報告システムの整備、理解・知識、金融サービス業界の人的資源のコンピテンスの増強、インセンティブの供与、調整などに焦点。泥炭回復に関係した戦略的な活動計画として、 <ul style="list-style-type: none"> a) グリーンファイナンス商品、グリーンボンド、グリーン指標の開発 b) 優先セクターにおけるグリーンレンディングモデル c) ポテンシャルインベスターに対するグリーンファイナンス商品のキャンペーン 2.) 長期: 総合リスク管理、企業ガバナンス、銀行のレーティング、持続的ファイナンス総合情報システムなどに焦点
2015	インドネシア繁栄のためにグリーン成長を政策、計画、投資のロードマップ ⁶⁴	Bappenas-GGGI	<ul style="list-style-type: none"> ● 泥炭回復に関係した項目として 1) 再生可能資源 <ul style="list-style-type: none"> b) 森林・土地管理の改良 <ul style="list-style-type: none"> i. 森林・泥炭地管理の革新的なモデルのスケールアップ ii. 荒廃泥炭地、泥炭火災を優先 c) 海洋生態系の維持 d) 持続的サプライチェーンの開発 e) 食糧安全を進める 2) 新しい自然資本ベースマーケット <ul style="list-style-type: none"> a) エコツーリズムのスケールアップ b) 自然資本ベースマーケットの同定 c) 生態系サービスへの支払いの設定 d) 国際・国内のカーボンオフセットを加速 e) 森林カーボンファイナンスを動員
2017	金融機関、上場企業、公開企業に対する持続的ファイナンス適用に関する OJK 令 ⁶⁵	OJK	<ul style="list-style-type: none"> ● 持続的ファイナンスの適用を企業のランクにより段階的に義務付ける（大手、外資など 2019 年 1 月 1 日から。遅くとも 2025 年 1 月 1 日から）（第 2 条） ● 第 2 章で持続的ファイナンスの適用を規定 1) 持続的ファイナンスアクションプランの作成、プランに準じた実行、アクションプランの株主などへのコミュニケーションの義務化（第 4～6 条） 2) 持続的ファイナンスに位置づけられるプロジェクト、金融インスツルメントに対する出資、投資のポートフォリオの向上または創設を含む持続的ファイナンス商品/サービスの開発を優先（第 7 条） 3) 泥炭回復に関係する項目として。再生エネルギープロジェクト（バイオマス発電など）、持続的農業（有機農業、自営コンポスト肥料製造など）、環境ツーリズム（生物多様性改良のための観光など）も持続的ファイナンスに位置づけられるプロジェクトといえる（第 7 条の補足） 4) CSR も一部は持続的ファイナンス適用活動を支援することが義務化（第 8 条）

⁶³ OJK. Roadmap Keuangan Berkelanjutan di Indonesia 2015-2019. 2014（Desember）

⁶⁴ Bappenas and Global Green Growth Institute. 2015. Delivering Green Growth for a Prosperous Indonesia A Roadmap for Policy, Planning and Investment

⁶⁵ Peraturan Otoritas Jasa Keuangan Nomor 51/POJK.03/2017 tentang Penerapan Keuangan Berkelanjutan bagi Lembaga Jasa Keuangan, Emiten dan Perusahaan Publik（27 Juli 2017）

年	政策・法制度	機関	要点/特徴
2017	環境保全管理のための経済インスツルメントに関する政令（案）	KLHK 現在、 国家官房	<ul style="list-style-type: none"> ● 企画官庁:環境林業省森林計画・環境規制総局地域・セクター政策環境影響予防局⁶⁶ ● 環境保全管理に係る法律 2009 年第 32 号のパラグラフ 8 経済インスツルメントの具体化 ● すべての関係官庁のアンブレラとなる。 ● 詳細は各省庁令で。 <ul style="list-style-type: none"> a) 環境保全を担保する費用の内在化 b) 環境荒廃責任者負担原則の明確化 c) 税制でのインセンティブ/ディスインセンティブ d) 環境サービスへの支払いの具体化 e) 保険における配慮

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション. (その2) (2017年7月現在)

2009 年 32 号環境管理保全法の施行を促進する政令案「環境管理保全に係る経済的インスツルメントについて」は、環境林業省から国家官房へ提出され閣議決定の準備中である。この政令が施行されると、さらにすべての経済セクターにおいて、環境保全・管理に係る経済的アプローチを加速させることができるようになると予想される。

(2) グリーンファイナンス促進に係る組織体制

グリーン経済成長促進に係る組織は、4.3.1 で検討した企業事業投資の促進、4.3.3 で検討したコミュニティ事業投資の促進に係る組織に類似する。本論では、グリーンファイナンスの促進面からファイナンスに関する組織の概況を示す。

表 5.2.3.2 インドネシア国におけるファイナンスに係る組織
(2017 年 7 月末迄の収集分)

機関	要点/特徴	備考
金融庁 (OJK)	<ul style="list-style-type: none"> ● 金融セクターの規制・監督・検査・捜査機関 ● 独立機関で国会へ報告 ● 銀行、キャピタルマーケット、非銀行金融機関（年金、保険、ファイナンス会社、ベンチャーキャピタル、保証会社、マイクロファイナンスを含む） ● 8 地域事務所、各州レベルに OJK 事務所 ● バリ持続的ファイナンスセンターを設置 (2017 年 7 月 12 日) 	
インドネシア銀行 (BI)	<ul style="list-style-type: none"> ● 金融政策、マクロ保険規制、支払いシステム、外貨交換の担当機関 ● 独立機関で国会へ報告 	
財務省 (Kemenkeu)	<ul style="list-style-type: none"> ● Bappenas とともに中央予算の決定・管理 ● 金融政策の策定・法制化と施行 ● 負債管理総局 (Direktorat Jenderal Pengelolaan Utang) が政府の負債管理を担当 	
インドネシア預金保険機構 (LPS)	<ul style="list-style-type: none"> ● 全銀行が加盟すべき預金保険 ● 20 億ルピアまでの預金は保険でカバーされる。 	
インドネシア証券取引所 (BEI/IDX)	証券の売買、決裁、上場企業のコンプライアンスをモニターする	民間企業
インドネシア清算・決済	証券売買に対する保証を決済・清算する	有限会社

⁶⁶ Direktorat Pencegahan Dampak Lingkungan Kebijakan Wilayah dan Sektor, Direktorat Jenderal Palonlogo Kehutanan dan Tata Lingkungan, KLHK

機関	要点/特徴	備考
保証会社（KPEI）		
インドネシア中央証券預託会社（KSEI）	インドネシアマーケットにある株式、債券を保管振替する	有限会社
金融業界団体	<ul style="list-style-type: none"> ● インドネシア証券投資者協会（Asosiasi Perusahaan Efek Indonesia） ● インドネシア年金ファンド協会（Asosiasi Dana Pensiun Indonesia） ● インドネシア一般保険協会（Asosiasi Asuransi Umum Indonesia） ● インドネシア相互ファンドマネジャー協会（Asosiasi Pengelola Reksa Dana Indonesia） ● インドネシアクレジットカード協会（Asosiasi Kartu Kredit Indonesia⁹） 	

出典：UNEP. 2015. Towards a Sustainable Financial System in Indonesia. をもとに作成

(3) グリーンプロジェクトファイナンスに係る金融機関の能力開発ニーズ

グリーン投資の中でポテンシャルが高く理解しやすい再生可能エネルギーセクター事例にプロジェクトファイナンスに関する調査結果⁶⁷から、以下のように金融機関に対する能力開発ニーズが提言されている。

- a) 関連する事業についてのプロジェクトファイナンス実施ガイドラインの整備
- b) 関連する事業のリスク分析・評価実施ツールとガイドラインの整備
- c) 関連する事業についてのプロジェクトファイナンスに係る研修プログラムの実施および銀行に対する定期研修カリキュラムへの組み込み
- d) 関連する事業について銀行アクセスによるプロジェクトファイナンスの事例の収集・調査
- e) グリーンファイナンスに取り込むパイロット銀行⁶⁸の参画による関連プロジェクトのパイロット事業を実施
- f) 関連する事業へのプロジェクトファイナンスに関心を持つ銀行に対する技術支援

上記の検討から、グリーンレンディング(環境保全事業に対して融資・貸し付け)、グリーンボンドによる泥炭地回復事業の資金調達開発のポテンシャルはある。例えば、PE (Private Equity) ファンド⁶⁹などによりプロジェクトファイナンスを支援する投資モデルの経験があり、泥炭回復事業への適用の可能性に関心を示している銀行系の証券会社⁷⁰もある。

5.3 LULUCF セクターに関する中期戦略/協力プログラムの再構築

5.3.1 民営化支援（官民連携）アプローチの強化

これまでの検討を踏まえ、先行調査で検討した中期戦略「インドネシアにおける火災からのGHG 排出とヘイズ被害の抑止に貢献する、ステークホルダーの総括的な能力開発」において、

⁶⁷ OJK-GIZ.2017. Kajian Project Fiance untuk Pembiayaan Infrastruktur Hijau di Indonesia. Ringkasan Eksekutif.

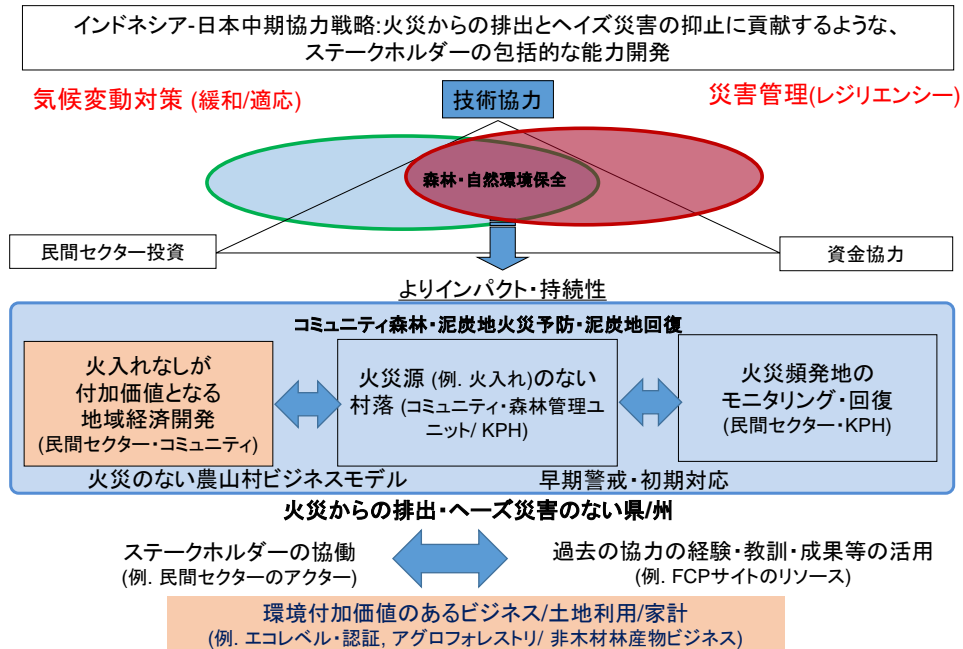
⁶⁸ OJK's Pilot Project Firest Movers on Sustainabel Banking by 8 domestic banks: PT. Bank Artha Graha International Tbk, PT. Bank Central Asia Tbk., PT. Bank Pembangunan Daerah Jawa Barat dan Banten Tbk., PT. Bank Mandiri (Persero) Tbk., PT. Bank Muamalat Indonesia Tbk., PT. Bank Negara Indonesia (Persero) Tbk., PT. Bank Rakyat Indonesia (Persero) Tbk., PT. Bank BRI Syariah

⁶⁹ 投資家から集めた資金でプロジェクト運営会社などの未公開株を取得し、その経営に深く関与し、企業価値を高めた後に売却するもの。

⁷⁰ 本邦企業関係では、SMBC 銀行系の PT.NSI 社など。インドネシアルピア建ての場合年利 7%以上、US\$建ての場合年利 5%程度を目標とした US\$建てのグリーンボンドを「ヘイズ予防ボンド」などの名称としてシンガポールなど ASEAN の個人投資家から資金を集めることができる機関投資家と協力して発行することなどの検討が想定される。

さらに短時間で効率的に広域に持続的にインパクトを発揮できる効果的な協力を行うために、以下のように民間セクターと連携し、ビジネスとして対策を推進する「民営化（官民連携）」アプローチを強化する（下図の赤色のボックス参照）。

中期協力戦略案の提案



出所: インドネシア国森林・泥炭地火災に係る情報収集・確認調査JICAミッション2016

図 5.3.1.1 LULUCF セクターの中期協力戦略案（先行調査結果の再掲載）

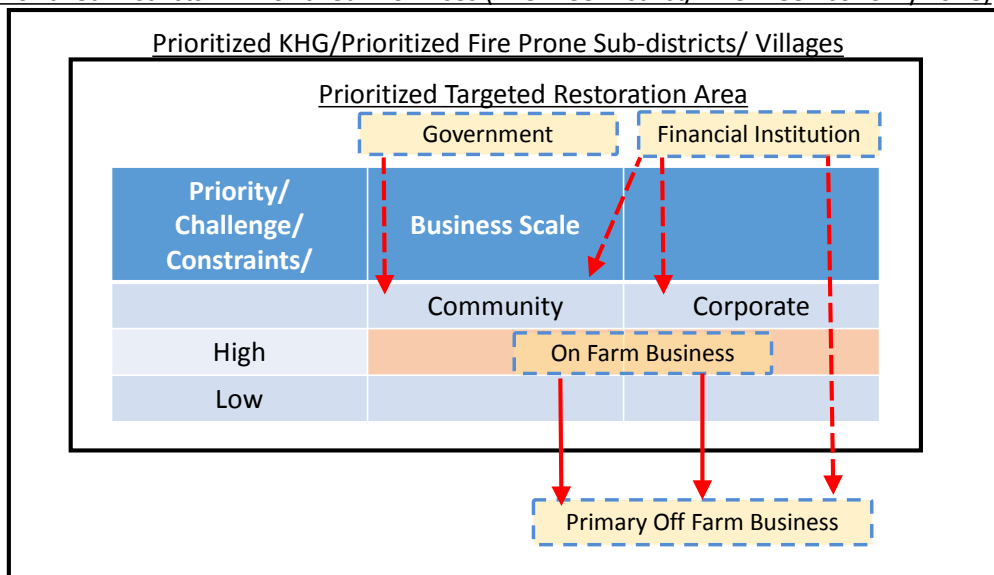
出典: インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション⁷¹

- LULUCF セクターの事業は、短期的なリターンを見込むことが難しいため、コミュニティや企業会計面から、事業の実効性、妥当性、持続性が高くないため、波及しにくいものと考えられる。そのため、環境保全効果、たとえば火入れのないこと、泥炭地水位が高いことを付加価値として内在化を図るビジネスモデルの主流化を促進する。
- 泥炭回復が優先される箇所、火災頻発地を中心に、火入れのない、泥炭地水位が高いことが確保されるコミュニティビジネスモデルの開発と促進を図る。企業による投資が可能なところでは、企業ビジネスモデルの開発と促進を図る。
- コミュニティビジネスについて主に政府の支援、企業ビジネスについて主に金融機関の支援との連携を促進する。これにより、当該分野の対策に係る歳出の効率化にも寄与できる。また、JICA の資金協力、特に有償資金協力の要請が得られにくいインドネシア国の LULUCF セクターにおいて、金融機関との連携により技術協力の成果のスケールアップや協力成果の波及、さらに広域インパクトを発揮できる課題解決モデルの開発にも役立つ。

⁷¹ インドネシア国森林・泥炭地火災に係る情報収集・確認調査ファイナルレポート（2017年5月）.2.2.1.章

Public-Private Investment Potential Classification

Prioritized Districts in Prioritized Provinces (Fire Free District/ Fire Free Economy Zone)



Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration in Indonesia (Phase 2). 2017

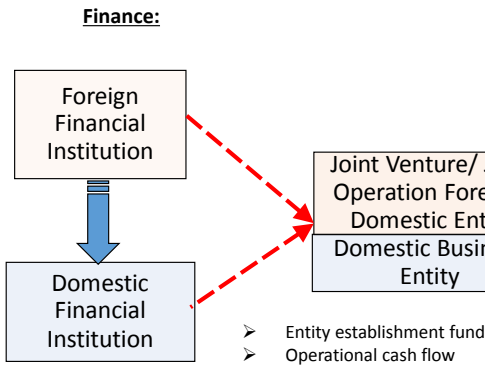
図 5.3.1.2 LULUCF セクターにおける民営化/官民連携アプローチ強化の概要

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

- d) 上記の産物・サービス、または土地廃棄物を買付け販売する、高次利用して、火入れのないこと、泥炭地水位が高いことが確保されていることを示すエコラベリングを伴う下流部門を行う企業ビジネスを促進する。
- e) 上記ビジネスに対する金融機関のファイナンスを促進し、上記のビジネスにおけるキャッシュフローの持続性を向上して、上記のビジネスの持続性と波及を図る。

Investment Potential to Business for Forest & Peatland Fire Prevention and Peatland Restoration

Financial sustainability of business operation



Business Operation covering fire prone sites and peatland restoration targets:



Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration in Indonesia (Phase 2). 2017

図 5.3.1.3 LULUCF セクターにおける金融機関対策の位置づけの概要

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

5.3.2 LULUCF セクター協力のロードマップの再構築（案）

上記の検討結果をもとに、先行調査で検討した森林・泥炭地火災予防に係る将来の協力案件の形成にかかるロードマップ（案）をもとに、LULUCF セクターに関する将来の協力案件形成にかかるロードマップを下図のように再構築することを提案する。

10 年後の 2027 年までにインドネシアにおける火災からの GHG 排出とヘイズ被害の抑止に関する課題解決を達成できるように、以下のような協力成果を発揮することを目標とする。

- a) 泥炭地管理に関わる技術機関として、BRG、環境林業省（PKG 局、MRV 局）がある。本調査を初めとして、現在 BRG を主体に泥炭地に関する協力を開始し、将来的には環境林業省に協力の主体が移行していく。
- b) 企業管理地以外についてはコミュニティベースで自発的に泥炭管理をするニーズが想定される。本調査の先行調査⁷²で検討したように、環境林業省との森林土地火災対策に関する JICA 協力（FCP など）を通じてファシリテーション手法/社会的なモデル（TPD モデル）が開発されており、当ニーズへの適用性も示唆される。人口密度が低く休閑地が多い泥炭地域において自発的に火災予防という環境にやさしい行動への変容を促進することに貢献し、泥炭回復行動に対する外部依存の予防にも貢献できる可能性がある。これから開始する「コミュニティ森林・泥炭火災予防協力」での活用が期待される。

⁷² インドネシア国森林・泥炭地火災に係る情報収集・確認調査ファイナルレポート（2017 年 5 月）.2.3.1 章参照

Proposed Mid-term Roadmap for Future Cooperation in LULUCF Sector (Haze Disaster Prevention & Mitigation of GHG Emission from Fire and Peat)

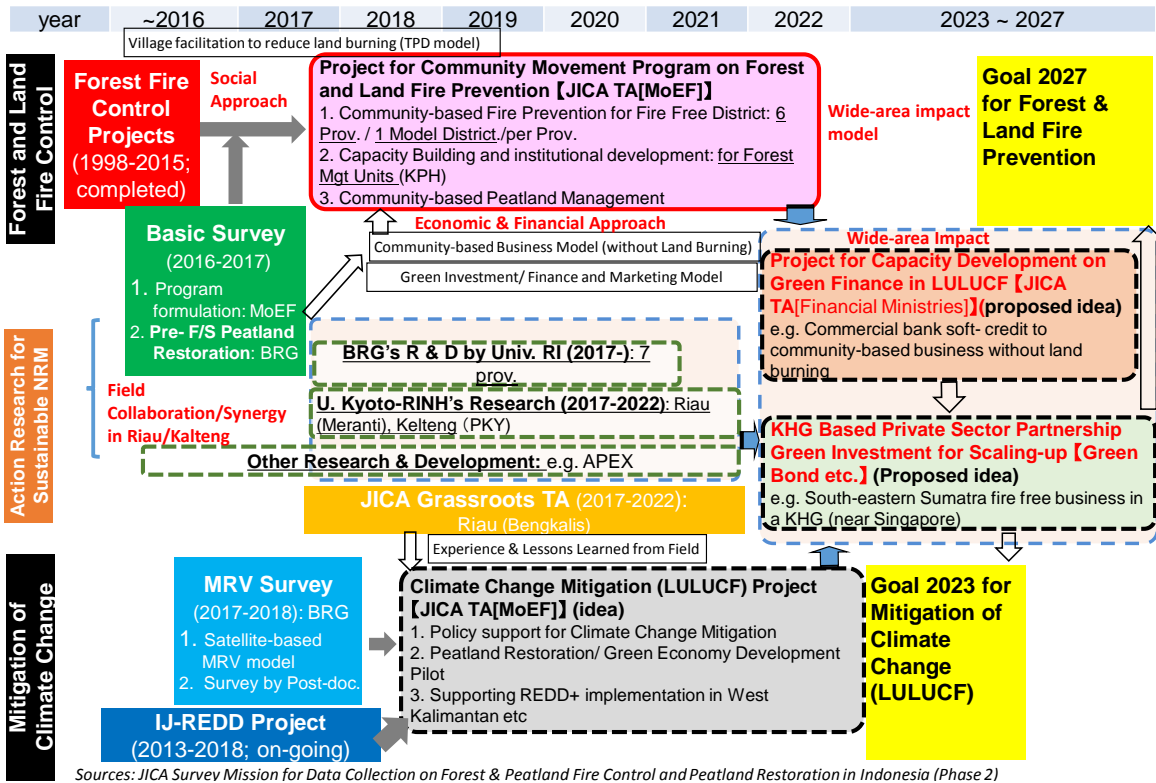


図 5.3.2.1 LULUCF セクターにおける案件形成ロードマップ（再構築案）（2017年9月現在）

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

- c) 一方、本調査で検討を開始した泥炭回復に資するビジネスモデル、こうしたビジネスを支えるマーケティング・金融モデルの開発は、今後、試行・改良を継続することにより、自発的に森林土地火災の原因となる火入れの減少、泥炭地の回復に寄与するコミュニティベースビジネスモデル、こうしたビジネスを支える民間企業による投資・マーケティング・金融モデルの開発にも貢献できる可能性がある。
- d) 「気候変動緩和協力」を通じて、泥炭地の再湿地化や泥炭地火災を緩和した際の GHG 排出の抑止効果を定量的に検証する手法・制度開発に貢献することが期待される。これにより、インドネシアの GHG 削減目標の達成評価の MRV の構築に資する。
- e) リアウ州などにおける京大グループなど日本のアカデミアを始めとした自然資源管理の向上に資するアクションリサーチは、現場のリアリティに基づき実効性、効果、持続性の高い「自然資源管理」手法の開発に貢献し、上記の森林・泥炭地火災予防、気候変動緩和協力とシナジー効果を発揮すると考えられる。

これらの成果を活用して、長期的な取り組みが求められる民間セクターによる森林・泥炭地火災予防、泥炭地回復への投資環境を促進して、スケールアップに貢献していこうとするものである。

5.3.3 火入れなし・泥炭地回復コミュニティビジネスの促進手法（案）

上記の b) と c) に関連したコンセプトを、泥炭地の火入れ行為⁷³の背景など FCP で得られている知見⁷⁴に、本調査を通じて得られた BRG が試行している水稻栽培における火入れなし土地管理（PLTB）のデモンストレーションプロットの現場からの情報⁷⁵を加味して検討した。水稻以外の土地利用への適用・発展を行いながら試行・改良を継続するとともに、企業ビジネスとの連携を図ることにより、自発的に泥炭地火災の原因となる休閑地火入れを減少させるコミュニティベースビジネスモデルの開発にも寄与できる可能性が示唆されている。これから開始する新規技術協力「インドネシア国森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」での活用・発展も期待される。

下図のように、人口密度が低いことにより、労働力や社会資本が低下する。人口密度が低いことは、土地生産性が低いこととも関連する。こうした要因の影響により、植物残渣などの可燃物が多い休閑地が増加するとともに、こうした箇所におけるコミュニティの社会的監視が低下する。これにより、火災の原因となる管理されない火の使用が増加する。こうした背景により、都市部に比較して人の通行が少ない休閑地で火災が頻発する傾向が顕著化すると推察される⁷⁶。

Trends of Background of Land Burning Behavior in Peatland and Proposed Approach for Land Management without Burning/PLTB

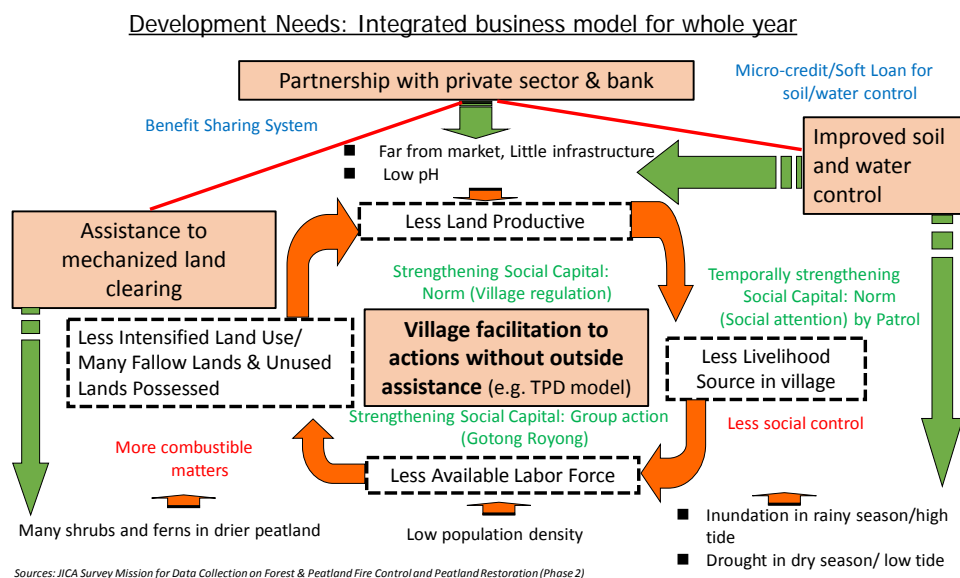


図 5.3.3.1 泥炭地における火入れ行動の背景の概観、適正な火入れなし土地管理促進アプローチ案

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

⁷³ 休閑地に耕作を再開するための火の使用以外に、土地利用の既得権益を主張しやすくするため、地利が上げより高い価格で売却しやすくするためなど営農以外の土地管理目的の火の使用を含む。

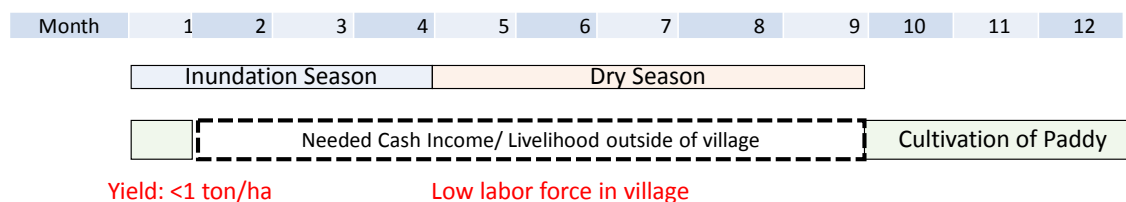
⁷⁴ 一般社団法人日本森林技術協会（久納泰光）.2015.泥炭湿地林周辺地域における火災予防のためのコミュニティ能力強化プロジェクト（コミュニティ火災予防）専門家業務完了報告書附属（専門家業務結果報告書邦訳版）「村落火災予防モデル:森林・泥炭火災及びバイオマス燃焼からの GHG 排出とヘイズ災害リスクの軽減に係る効果的な手法の示唆」

⁷⁵ BRG が実施する PLTB のデモンストレーションプロットにおける現地モニタリング・フォローアップ調査への支援・参加などを通じた地元コミュニティからの情報など。

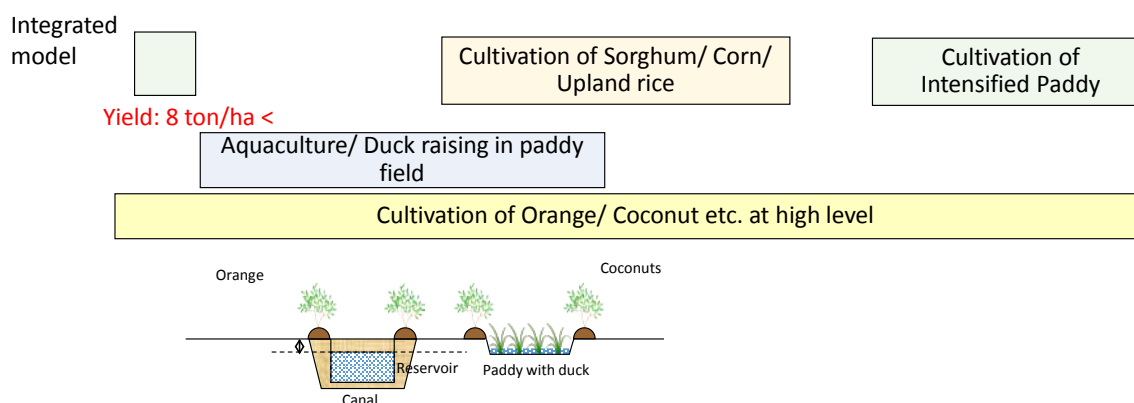
⁷⁶ 出火時の目撃情報に欠けるため、タバコが出火原因とされやすい傾向にある。

BRG が同県のデモンストレーションで試行している火入れなし土地管理 (PLTB) は、泥炭地を地表整理した際に発生する雑草木を有機物分解促進菌により分解することにより火入れが不要になり、pH の緩和もでき、水稲栽培ができる。しかし、上記 3.2.2 で検討したように、自発的に水稲の保育を継続することが困難で持続性が低いと見込まれる。また、外部からの無償支援がないと普及しないと予想されている。こうした現象は、下図に示すように、休閒地が生じる背景に適正でないためと推察される。コミュニティの生活パターンに適正な PLTB が求められている。

Needs of Integrated Land-based Business in Peatland Restoration



BAU



Sources: JICA Survey Mission for Data Collection on Forest & Peatland Fire Control and Peatland Restoration (Phase 2)

図 5.3.3.2 中央カリマンタン州 Pulpis 県泥炭地水稲栽培に係る火入れ行動の背景、適正な火入れなし土地管理モデル案

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

上記の負のスパイラルを断ち切ることは、TPD モデルのような社会的アプローチだけでも可能であると示唆される。しかしこの場合、機械化を持続的に支援できる企業との連携、土壌・水管理を促進するマイクロクレジットの支援など、コミュニティのビジネスモデルに変革を引き起こせる経済・金融的なアプローチを併用することが必要である。

これにより、環境林業省森林土地火災対策局のニーズとなっている効率的により県単位など広域に、より持続的に火災予防効果を発揮することができるモデルの開発に役立つものと想定される。上記で検討している特区アプローチも併用して、県全体などを「ヘイズ・火災フリー経済特区」などの名称で指定して他地域と差別化を図ることも考えられる。

5.4 LULUCF セクターにおけるグリーン経済成長向上の支援協力案

5.4.1 経済官庁をコアとした LULUCF セクターグリーン経済成長ファイナンス能力開発技術協力

(1) 協力ポテンシャルの背景

上記で検討したように、短期的なリターンが見込まれない土地ベース環境事業における企業会計を持続的にするためには、土地ベース環境事業に対する融資・貸付に躊躇する金融機関が土地ベース環境事業を理解し査定できる能力などの向上、土地ベース環境ファイナンスを促進する制度、長期間の土地ベース環境ファイナンスに対する保険制度の構築などが求められる。

本調査を通じて、以下のように経済官庁との協力により、こうしたニーズに対する対応能力の改善に向けた協力ポテンシャルが示唆されている。

- a) 上記 4.1 で支援した泥炭回復投資促進インセンティブ・ファシリティ検討ワーキンググループのメンバーとなっている経済・金融及び投資促進行政機関は、グリーン経済の具体化に向けて積極的な議論を行う傾向にある。特に、経済調整部門大臣府は、環境保全・回復へ経済特区を適用する試みの具体化に積極的である。現在準備中の経済的インスツルメントに関する政令の施行により、グリーン経済協力のニーズが高まることが推測され、経済調整部門大臣府をコアとした協力戦略が効率的と考えられる。
- b) また、金融庁は、グリーン経済成長に向けた持続的ファイナンスを推進したいが、要員に限界があることから、他の行政機関との協力・連携ニーズが高い。泥炭回復投資ファイナンスのガイドライン作成のニーズがあり、共同調査実施コンソシウム（現地再委託）によるプロファイル調査で案を提案することで BRG との連携を模索している。さらに、金融庁の「バリ持続的ファイナンスセンター」の開所行事（2017年7月12日）の招待状では、他ドナーとならんで JICA も招聘リストに記載されている。式辞では将来的に JICA との協力・連携も模索したい旨を発表したとの情報がある⁷⁷。
- c) BRG の計画・協力部門では、現在検討中のマルチドナートラストファンド（MDTF）の予算において、本調査のステークホルダー調整会議を通じて支援してきた活動をフォローアップできる予算を見込む可能性もある。これにより、本調査で開発してきた成果を他ドナーとともに継続して開発していく可能性も予想される。

上記を考慮すると、今年終了する「JCM 協力」から得られる教訓・知見、これから開始する新規技術協力「気候変動対策協力フェーズ2」の進捗などと総合的に連携しながら、本調査の成果も活用・発展し、経済・金融及び投資促進行政機関のニーズに答えるグリーンファイナンスに関係する能力向上に寄与する JICA 技術協力の形成も長期戦略の一つになると考えられる。

(2) 協力内容

経済部門調整大臣府をコアとして、グリーン経済、グリーンファイナンス及びグリーン投資の促進に係る行政機関との協力により、LULUCF セクターのグリーン経済成長に資するグリーンファイナンス能力開発に対する技術協力について、以下のように提案される。

⁷⁷ 2017年7月金融庁で行った共同調査実施コンソシウム（現地再委託）代表との打ち合わせにおける情報

Tentative Proposed Idea

Capacity Development Program on Green Finance in LULUCF Sector

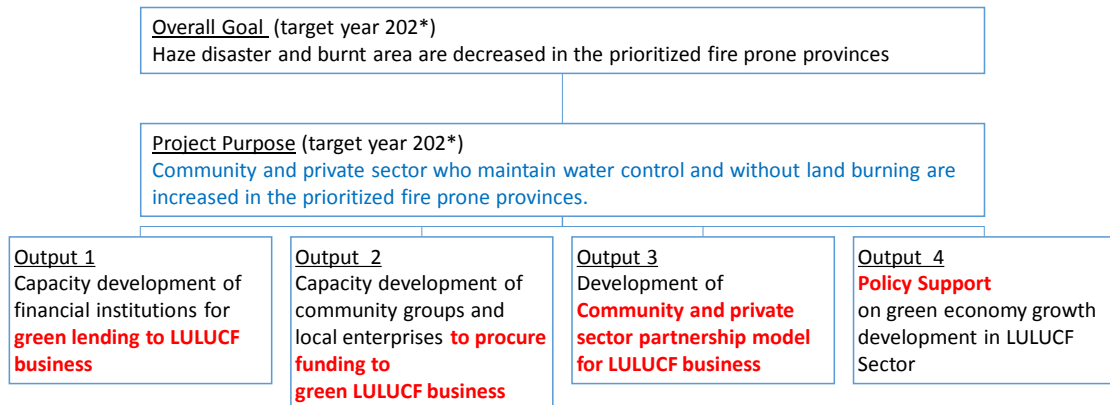


図 5.4.1.1 LULUCF セクターグリーン経済成長ファイナンス能力開発
技術協力の PDM イメージ（案）

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

5.4.2 LULUCF セクター広域グリーン経済開発支援官民連携資金協力

(1) 協力ポテンシャルの背景

本調査の対象地域外であるが中央カリマンタン・南カリマンタン両州の境界 4 県に位置する Sungai Utar-Sungai Serapat 泥炭水理単位（KHG）について、今後の官民連携ビジネスモデルをブレインストーミングするワークショップが 2017 年 6 月 13 日に開催されている。2 州間に位置する KHG は地方分権にもとづく地方政府による泥炭地の保全・管理の実施にあたって中央政府による調整が重要になる。先行調査で検討した「インドネシア国森林土地火災予防のためのコミュニティ運動プログラム実施体制強化プロジェクト」において、PKG 局長が KHG の総合管理の重要性を指摘していたことも考慮すると、先行調査で収集されていた企業管理地以外の泥炭モニタリング体制を中期的に整備するための無償協力のニーズだけでなく、KHG の総合管理に係るニーズも取り組んで協力内容を検討していくことが考えられる。

以下のように、泥炭水理単位（KHG）全体の一体総合管理に対する官民連携の資金協力の開発ポテンシャルが示唆される。

- a) 本年度 BRG の国家予算について、当初認められた半分に相当する予算、主に再植生化（Re-vegetation）関係については環境林業省執行に移行され、その後、歳入不足もあり、さらに失敗を恐れるため再植生化への予算執行が難しくなっているとの情報がある。一方、現在検討中の MDTF による予算計画も、世銀がファンドマネジャーとなっており、世銀の規定に準じながら、資金は財務省を通じて流れ、予算の執行が難しいことも予想されている⁷⁸。
- b) こうした状況も考慮すると、計画どおり 5 年間でドナーの支援や国家予算だけで BRG の泥炭地回復対象地 200 万ヘクタールの回復を完了することは難しく、長期的には、資金の流れがより速い民間資金の導入が必要になる。とくに、泥炭回復対象地の大半はコンセッション地域でコンセッションの負担で泥炭回復を行う必要があり、さらにコンセッション権を返上した地域は森林・泥炭管理のガバナンス面から早急に民間投

⁷⁸ 2017 年 7 月 30 日時点の情報。

資を促進し、オープンアクセスを予防できる民間事業者が事業実施することが重要になる。

- c) こうした地域に対して、たとえば IFC のファンドや ADB 協調ファンドなどの公共金融機関がコアとなり、民間金融機関が協調融資して、大規模な資金を集め、泥炭地回復や火災予防だけでなくマングローブ保全や生物多様性回復なども含む、広く土地ベース環境保全に貢献する土地ベースビジネスへの投資を促進する資金協力内容の検討を行うことが考えられる。

(2) 協力内容

- a) ASEAN 協力などとも連携して、インドネシア国のグリーン経済開発も支援できる「グリーン経済開発支援機構」などを構築する戦略が考えられる。

JICA 以外に公的資金を扱う本邦機関（株式会社国際協力銀行（JBIC）など）や民間支援機関（日本政策投資銀行など）とこれらが出資するファンドなど、さらに公的資金を扱い民間支援を行う国際機関（IFC など）、その他、グリーンファイナンスに関心のある民間金融機関などから出資を募ることが想定される。

直接資金を融資する以外に、融資の際に求められる保証サービスを補強することが考えられる。LULUCF セクターのビジネス、特に地元に密着し持続性の確保に寄与する中小企業は、融資審査で求められる投資格付け、5 年以上黒字の財務記録を提供することが難しいためである。

- b) グリーン経済、グリーンファイナンス及びグリーン投資の促進に関する行政機関と民間金融機関の協力により、ヘイズ被害に関連して、シンガポールに近いスマトラ島南部の州にある KHG を対象に、KHG を一体管理による LULUCF セクターのグリーン経済成長に資する資金協力が以下のように提案される。

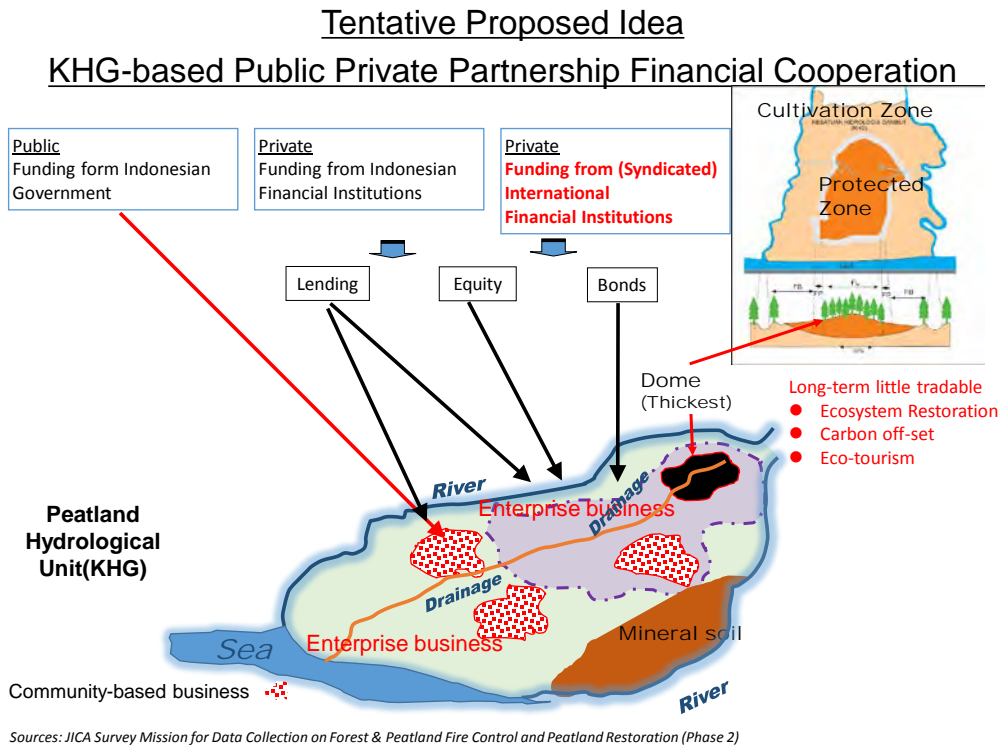


図 5.4.2.1 KHG ベース LULUCF セクター総合グリーン投資
 官民パートナー資金協力のイメージ（案）

出典：インドネシア国森林・泥炭地火災に係る情報収集・確認調査 JICA ミッション（その2）

インドネシア国
森林・泥炭地火災に係る
情報収集・確認調査
(その2)

ファイナルレポート
＜付属資料＞

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1 Outline of Mission

1.1. Cooperation Plan

1.1.1 Minutes of Meetings (11 Nov. 2016)

MINUTES OF MEETINGS
BETWEEN
PEATLAND RESTORATION AGENCY
OF THE GOVERNMENT OF REPUBLIC OF INDONESIA,
JAPAN INTERNATIONAL COOPERATION AGENCY
FOR
BASIC INFORMATION SURVEY
ON
PEATLAND RESTORATION IN INDONESIA

Japan International Cooperation Agency (hereinafter referred to as "JICA") and Peatland Restoration Agency (hereinafter referred to as "BRG") had a series of discussions on the Preliminary Information Survey on Peatland Restoration in Indonesia.

As a result of the discussions, JICA and BRG agreed on the scope of the Preliminary Information Survey on Peatland Restoration as attached.

Marakkesh, November 11, 2016



Mr. Kenichi SHISHIDO
Senior Deputy Director General,
Global Environmental Department,
Japan International Cooperation
Agency



Ms. Myrna A. Safitri
Deputy for Education, Socialization,
Participation and Partnership
Peatland Restoration Agency,
Government of the Republic of
Indonesia

Witness:



Prof. Dr. Mitsuru OSAKI
Hokkaido University

ATTACHMENT

1. Background

Peatland Restoration Agency (BRG), established by Presidential Decree Number 1 of 2016, has main mission to accelerate the rehabilitation of degraded peatlands and restore their hydrological function in systematic, directed, integrated and comprehensive manner. BRG shall coordinate and facilitate the overall peatland restoration, including planning, controlling, mapping and determining zonation for protection and production, focusing those that have been damaged by the recent forest fires.

In carrying out its mandate, BRG shall coordinate and strengthen policy for peatland restoration, develop peatland restoration plan and cooperation, conduct peatland hydrological unit mapping, determine peatland zonation, construct re-wetting infrastructure, review permits and license over the peatland burnt areas and its management, carry out socialization and education on peat restoration measures, and supervise the construction, operation and maintenance of peat management infrastructure in the concession. Collaboration and support is required from all stakeholders, including the community groups, NGOs, universities, ministries and agencies, and private sectors. The international development partners and donors can play part towards achieving the goals according to their respective roles.

2. Purpose

This survey aims at producing peatland restoration options in the four priority districts which could be adopted or adapted to the other priority restoration areas.

3. Duration

One year from the date of signature

4. Target Area

The survey will be targeted at four priority districts;

- Kepulauan Meranti District (Riau Province)
- Ogan Komering Ilir District and Musi Banyuasin District (South Sumatera Province)
- Pulang Pisau District (Central Kalimantan Province)

5. Major activities

BRG and JICA agreed to conduct the activity in three major components as follows:

- 1) Set up trial measurement and monitoring for baseline peatland hydrological conditions of the target area;
- 2) Survey for preliminary feasibility assessment on biophysical and economy urgently required to facilitate peatland restoration investments;

3) Investment engagement meetings to promote peatland restoration to relevant stakeholders.

6. AOB

JICA and BRG recognized the importance of technical assistance (including technical support, survey methodology and investment engagement participations) based on the Memorandum of Understanding (MOU) among BRG, Hokkaido University, Kyoto University and Research Institute for Humanity and Nature (RIHN) signed in Jakarta on 10 August 2016.

(END)

1.1.2 Proposed Work Plan from BRG (28 Octv. 2016)



**BADAN RESTORASI GAMBUT
REPUBLIK INDONESIA**

Alamat: Gedung Kementerian Sekretariat Negara Lantai 2
Jl. Teuku Umar No. 10 JAKARTA 10350, Telp (021) 31901268

LTN : S.167/BRG-KB/10/2016 Jakarta, 28 October 2016
Attachment : 1 (one) exemplar
Subject : Proposal of Urgent Cooperation Action Plan 2016-2017
between BRG-JICA

To
**Leader of JICA Survey Mission for Data Collection on Forest & Peatland Fire Control
and Peatland Restoration in Indonesia/ Japan Forest Technology Association**
di
J A K A R T A

Dear Sir,

Regarding the results of dialogue between Head of BRG and the representative of JICA HQ's Mission headed by Mr. Shishido on 15 September 2016, we would like to propose **BRG-JICA Urgent Cooperation Action Plan**. This proposal has three major components as follows:

1. Trial baseline measurement and monitoring of peatland hydrological conditions of the target area;
2. Profiling surveys of the target area and quick preliminary feasibility study for facilitating peatland restoration by private business investment;
3. Stakeholders' coordination meetings to promote private business investment on peatland restoration.

We hope this cooperation can be started immediately, especially about the installation of water logger than can have field experience like SESAME, prior to mid-December.

We look forward to working together with you. Thank you for your attention and kind cooperation.

Sincerely,



NAZIR FOEAD

Head of Peatland Restoration Agency of Republic of Indonesia

CC:

1. Secretary of Peatland Restoration Agency of Republic of Indonesia
2. Archive

BRG-JICA Urgent Cooperation Action Plan (2016-2017):

Pre-feasibility Study for Peatland Restoration Investment in Four Most Prioritized Areas in Indonesia

TOR

BACKGROUND

Peatland Restoration Agency (/BRG), established by Presidential Decree Number 1 of 2016, has main mission to accelerate the recovery of degraded peatlands and restore their hydrological function in systematic, directed, integrated and comprehensive way. BRG has duties to carry out coordination function and strengthen the implementation of restoration works, planning control, mapping and determining protected zones and restoring peatlands which have been damaged by the recent forest fires.

BRG performs several steps for peatland restoration action. The first step that BRG has to do is adjusting the peatland zoning by scientific justification based on peat depth and how critical the area is, which help in identifying the target area for peatland restoration action. Peatlands have to be wet, and BRG is crucial to develop canal blocking to restore dry peatlands to be wet, and to stop peatlands being converted into drainage. Another important step is BRG has to lead on water management implementation based on peat hydrological unit to manage the hydrological ecosystem in peatlands in order to avoid the peatland degradation and to improve the quality of peatland ecosystem. BRG has to identify the best practices of re-vegetation in degraded peatlands which keeps the peatlands wet. To restore the livelihoods of local communities, BRG has to empower them. Last but not least, BRG must aware more on peat fires prevention and peat monitoring. BRG has developed work plan until 2020 for restoring 2 million hectares of peatlands. However, to achieve its goal, BRG needs strong support from community groups, NGOs, universities, ministries and agencies, and private sectors. Role of international partners and donors can play to support BRG towards the success for restoring 2 million hectares of peatlands.

OVERAL GOAL

This activity is a cooperation activity between JICA and the BRG which aim to develop economic models to contribute on climate change mitigation through peatland restoration activities.

OBJECTIVE

This cooperation activity is purposed to develop peatland restoration portfolio options prioritized in four districts which hopefully can be duplicated in other peatland restoration priority areas.

ACTIVITY TARGET AREA

The cooperation activity will be targeted to four priority districts, Kepulauan Meranti District (Riau Province), Ogan Komering Ilir District and Musi Banyuasin District (South Sumatera Province), and Pulang Pisau District (Central Kalimantan Province).

PERIOD

This activity will be conducted from December 2016 until May 2017.

MAJOR COMPONENT

BRG and JICA **Survey Mission** agreed to conduct the activity in three major components as follows,

1. Trial baseline measurement and monitoring of peatland hydrological conditions of the target area;
2. Profiling surveys of the target area and quick preliminary feasibility study for facilitating peatland restoration by private business investment;
3. Stakeholders' coordination meetings to promote private business investment on peatland restoration

WORK PLAN

No	Activity	Place	Expected Outcomes	Expected Output	Timeline	Implementer	Remarks
1	Trial baseline measurement and monitoring of peatland hydrological conditions of the target area						
1.1	Harmonization in national monitoring system	National	Minister of Environment and Forestry and Head of BRG hold a consensus dialog after coordination meetings	MOU between Ministry of Environment and Forestry and BRG on harmonization of peatland hydrological monitoring system	End of November 2016	BRG involves PKG, Ministry of Environment and Forestry	With Matrix on Sharing Task/ Responsibility in overall monitoring process.
1.2	Building consensus on detail monitoring plan (location, responsibility demarcation, etc.)	Four districts	Each party realized their own authority and responsibility on peatland restoration	MOU on peatland hydrological monitoring tasks (authority and responsibility) by each party	Beginning of December 2016	BRG involves UNSRI team	<p>a) BRG provides base peatland restoration map and water logger installation location plan maps (with coordinate) in seven KHG</p> <p>b) BRG should secure the place for water logger installation with TRGD</p>
1.3	Training of Trainers (TOT) for stakeholders on peatland hydrological monitoring	<p>a) Jakarta for in-house training</p> <p>b) Four districts while installing</p>	Capacity of stakeholders on peatland hydrological monitoring is built	Report on TOT on peatland hydrological monitoring	December 2016	UNSRI team involves BPPT	<p>a) BRG provides concept of TOT, budget for</p> <ul style="list-style-type: none"> ➤ All budget at Jakarta training ➤ Training at each district of trainers' transport and accommodation at four districts <p>b) JICA budget covers participants' transport and accommodation of training at each district</p>

1.4	Installing water logger real time to monitor peatland hydrological	Seven peat hydrological units (/KHG) in four districts	Peatland hydrological in seven KHG is monitored	Installed water logger real time in seven KHG (two units of equipment for each KHG); <u>SESAME due to various experiences in peatland environments</u>	December 2016 (E.g. 5-15 Dec.)	JICA Survey Mission involves vendor	<p>a) BRG provides budget for the representative of BRG/TRGD for installation (including tele-communication) and maintenance</p> <p>b) JICA budget cover procurement and installation of 14 units of water logger real time at the places secured by BRG/TRGD and trainers from vendor</p> <p>c) Official Transfer Document (Berita Acara Serah Terima): JICA Survey Mission-BRG; BRG-Local Government (TRGD)</p>
2 Profiling surveys of the target area and quick preliminary feasibility study for facilitating peatland restoration by private business investment							
2.1	Quick feasibility study on biophysical and economic on peatland restoration to develop peatland restoration portfolio	Four districts	Portfolio on peatland restoration based on biophysical and economic study is developed	Peatland restoration portfolio	December 2016	UNSRI team	This activity will be conducted by UNSRI team which consists of several experts from other universities and agencies
2.2	Related to point (2.1), conducting market research and cost benefit analysis on the proposed peatland-friendly species plantation development associated with potential business development	Four districts	Cost benefit analysis and market potential for peatland-friendly commodities are identified	Design on market for peatland-friendly commodities	January 2017	UNSRI team	This activity will be conducted by UNSRI team which consists of several experts from other universities and agencies

2.3	Identifying the location for implementing peatland restoration portfolio based on quick feasibility study	Four districts	Location for implementing peat restoration portfolio is mapped	Map on peatland restoration portfolio	January 2017	UNSRI team	This activity will be supervised by BRG
2.4	Designing and establishing demonstration plot for peat restoration	Four districts	Peat restoration implementation design is developed and demonstration plot for peat restoration is established	Design of demonstration plot for each district and demonstration plot in each district	January 2017	UNSRI team	This activity will be supervised by BRG
2.5	Monitoring and evaluation on demonstration plot	Four districts	Established demonstration plot is monitored and evaluated	Report on monitoring and evaluation for each demonstration plot	January - April 2017	UNSRI team supervised by BRG	This activity will be supervised by BRG
3	Stakeholders' coordination meetings to promote private business investment on peatland restoration						
3.1.	Regular coordination meetings	Jakarta	Investment environment is enhanced	Cooperation proposal from related ministries & agencies as well as business associations to enhance investment on peatland restoration	December 2016 (E.g. 1 Dec.); February (E.g. 1 Feb.) and April (E.g. 3 Apr.) 2017	BRG and JICA Survey Mission	a) JICA budget covers for meeting room and meals
3.2	International Symposium on 'Toward Integrated, Structured and Massive Peat Restoration Action In Indonesia'	Jakarta	Draft of cooperation action plan on peatland restoration developed by BRG and JICA is shared to	Cooperation proposal related to investment on peatland restoration	December 15&16, 2016	BRG and EO	a) BRG cooperates with several donors for implementing International Symposium b) JICA will be one of the donors

			audience during International Symposium				
3.3	Open Seminar 'Investment on Peatland Restoration'	Jakarta	Peatland restoration portfolio is shared to local investors	Business proposal from local (/Indonesian) investors on peatland restoration	March 2017 (E.g. 2 March)	BRG and JICA Survey Mission	BRG provides concept of Open Seminar, provides invitation letter for participants/ a) BRG provides budget for transport and accommodation for participants b) JICA budget covers for meeting room and meals
3.4	Open Seminar 'Investment on Peatland Restoration'	Tokyo	Peatland restoration portfolio is shared to Japan investors	Business proposal from Japan investors on peatland restoration	April, 2017 (E.g. 27 April)	BRG and JICA Survey Mission	JICA budget covers concept of Open Seminars, invitation letter for participants. a) BRG provides honorarium for Indonesian participants b) JICA budget covers airfare and accommodation for Indonesian participants;

RECAPITULATION BUDGET PLAN

No	Component	Total (Rp.)	Remarks
1	Trial baseline measurement and monitoring of peatland hydrological conditions of the target area	2,073,200,000	Managed by JICA Survey Mission
1.3	Training of Trainers (each district)	480,000,000	Except Training at Jakarta area (e.g. BPPT) and the airfare, accommodation fee and professional fee for trainers at each district that will be funded by BRG
1.4	Water logger real time procurement & installation	1,512,800,000	Depending on quotations
2	Profiling surveys of the target area and quick preliminary feasibility study for facilitating peatland restoration by private business investment	1,880,000,000	Subcontracted to UNSRI by JICA Survey Mission
2.1 2.2	Feasibility study on 1) Biophysical and economic on peatland restoration; and 2) Market potential and cost benefit analysis on the proposed peatland-friendly species plantation development	280,000,000	
2.3 2.5	Demonstration plot development	1,600,000,000	
3	Stakeholders' coordination meetings to promote private business investment on peatland restoration	625,000,000	Managed by JICA Survey Mission
3.1	Regular coordination meetings	150,000,000	This is the amount which BRG proposed to JICA
3.2	International Symposium on 'Toward Integrated, Structured and Massive Peat Restoration Action in Indonesia'	300,000,000	This is the amount which BRG proposed to JICA
3.3	Open Seminar 'Investment on Peatland Restoration' (Jakarta)	150,000,000	This is the amount which BRG proposed to JICA
3.4	Open Seminar 'Investment on Peatland Restoration' (Tokyo)	200,000,000	This is the amount which BRG proposed to JICA
Total		4,753,200,000	

Notes:

- 1) Basically all cost for mobilization of BRG personnel (including professional fees/ honorarium) should be covered by BRG.
- 2) The budget will be required to add to cover the cost for JICA Technical Implementer's Management and Survey Activities and other costs.

1.2. Coordination Meetings

1.2.1 March 31, 2017 <Watertable Monitoring Strengthening>

**Minutes of
Focus Group Discussion
Technical Meeting Development of Ground Water Level Monitoring System on Peatlands
Peatlands Restoration Agency Office, Gedung Sekretariat Negara Lantai 1 (Ruang OASE),
Jakarta Pusat
Friday, March 31, 2017**

Summary

Focus Group Discussion activity is conducted in order to discuss any technical aspects in research and developing ground water level monitoring system in peatlands and also to elaborate the cooperation and synergy among the related agencies and guarantee the sustainability of the system itself. Focus Group Discussion is established by the cooperation between BRG, BPPT, PKG, and JICA. The discussion aims to gain solutions and recommendations related to the monitoring system which can be developed in peatlands and also proposed to the company and investor. The expected outcomes are the research and development elaboration of technical aspects in monitoring system and also the synergy and sustainability of ideas. This meeting is attended by 17 participants from the related agencies in peatlands restoration.

FGD started by the welcome speech and a short explanation related to the discussion by the representative from BRG. Discussion session started with the presentation of discussion matters. The discussion matters are mentioned below:

- BRG concerns as one of important agency in peatlands restoration
- The proposal of tools/equipment that will be used in peatlands monitoring system

Subsequent to the presentation of introductory matters. Discussion continued by the proposal of SESAME tool for peatlands monitoring. Discussion matters are delivered by JICA Expert. The discussion matters include the detailed of SESAME tool for the benefit of peatlands restoration.

The next session is panel discussion. Panel discussion include Q&A session are discussing about the concrete steps that will be taken in the near future for peatlands restoration. Participant are already given the discussion matter which is including the background of discussion. This document will be proceed to be used as guidance in decision-making process related to development of peatlands monitoring system. Panel discussion is closed by delivering the summary of discussion.

Minutes of Meeting

Agenda overview:

- A. Welcome speech and directives
- Welcome speech
 - Directives

B. Discussion Panel 1

Explanation related to BRG target in developing monitoring system of peatlands and the presentation of ideas and also recommendations from JICA expert related to the SESAME tool.

C. Discussion Panel 2

Explanation of ideas from MORPALAGA tool and the discussion related to the concrete steps that will be taken in the near future.

D. Closing

Summary presentation and important notes related to the outcomes of discussion.

Welcome speech and directives

- Opening and thank remarks
- A short explanation of the background activity
- Explanation of the discussion matters

Welcome speech: Dr. Haris Gunawan

(Deputi Litbang BRG – Deputy Research and Development of BRG)

- ✓ Peatlands monitoring system is assigned to BRG mostly at Department 4.
- ✓ We should find the strategy to develop monitoring system
- ✓ BRG still learning from BPPT and international agency especially from Japan
- ✓ BRG needs help to strengthen and enhance this monitoring system
- ✓ BRG is a new agency who needs a broader cooperation with BPPT (who has been working with JICA)
- ✓ There are 2 things we would like to accomplish: practical needs to update and inform rapidly and accurately related to the peatlands conditions and strategy to build and develop this monitoring system
- ✓ This year BRG is assigned to monitor the peatlands condition in 23 KHG (spread on 6 provinces, except Papua)
- ✓ BRG has to install the ground equipment which is minimally represent the peatlands condition in 23 KHG
- ✓ BRG also would like to develop monitoring system which could cover broader area and build the models. This is the main reason why we need recommendation from Prof.Osaki
- ✓ Ground water level condition should be recognized from spots where SESAME and/or Morpalaga is located
- ✓ Prior to the installation of the tools, BRG should get the determination letter from the ministerial. This is based on ministerial regulation No.15 2017
- ✓ The selected tool/equipment is expected to recognize not only peatlands condition before and after the restoration but also could answer the needs of BRG to develop baseland carbon emission estimation
- ✓ State Budget has been allocated for this project
- ✓ Report and the installation of integrated monitoring system should be delivered to president before July
- ✓ Central control room is going to be build for this monitoring system
- ✓ The monitoring system is also expected for scientific development (expected output: international journal related to the monitoring system is published this year, on cooperation between BRG, BPPT and JICA)
- ✓ The combination from this technology is expected to increase BRG confidence in order to inform the peatlands condition and progress of the restoration to President
- ✓ We have 2 main speakers :
Prof. Mitsuro Osaki
Dr. Albert

Panel Discussion (Started at 9:24 AM)

1st Session

Facilitator: Abdul Karim, SE ME

(Kapokja Pengembangan Data dan Informasi-BRG/Head of Data and Information Development-BRG)

Discussion matters:

- ✓ Information system of peatlands monitoring that is going to be developed by BRG
- ✓ BRG has to consider the components that are going to be developed and stakeholders who already built this system such as; KLHK, PKG and BPPT
- ✓ Monitoring of ground water level is one of the most important components related to this system
- ✓ We are also going to discuss other possibilities related to this monitoring system which can be offered by BRG, and also considering the technology which has been controlled by stakeholder outside of BRG agency
- ✓ System that is going to be developed:

-
- ✓ Ground water level monitoring in peatlands, BRG is going to install GWL equipment in some locations with telemetry system and also use one of providers then will be delivered to BRG's server
 - ✓ Water logger already being installed in peatlands location then will be transmitted through GSL and reach the server
 - ✓ KLHK and BPPT already developed this kind of system
 - ✓ We should find the method to integrate the server
 - ✓ Possibilities: join server, informasi dan aplikasi (BRG, BPPT dan KLHK)
 - ✓ Here are some possibilities that we could execute: join the server, information and application among these agencies (BRG, BPPT and KLHK)
 - ✓ The important things that we need to recognize in the short term are how many water logger already being installed and what agencies which is already used this tool.
 - ✓ We need to inventory the usage of water logger to gain information as quick as we can to be reported to president
 - ✓ Integrate the server, KLHK already built this system. But has not been used telemetry technology. KLHK is only using the data from companies and they're not providing real time data
 - ✓ BPPT is going to deal with the logger data from SESAME and/or Morpalaga
 - ✓ BRG is now going to develop the server. Do we need develop the server? Or we can use the existing server? BRG still needs to consider to built the server as personal storage to save the data related to peatlands utilization
 - ✓ In case BRG would like to integrate the data, do we have to uniform the data format?
 - ✓ Informations that we can gain from the tool are: ground water level, temperature, relative humidity, soil moisture, precipitation. Are there any more information that can be obtained from the tool? For example, the tool which is already being developed by BPPT; it is equipped with sensor to detect fire earlier.
 - ✓ This tool is also expected to predict the coverage of peatlands rewetting

Monitoring system that will be developed:

Ground water level monitoring with Morpalaga and SESAME is expected to develop early warning system of fire. Ground water level monitoring in peatlands can be developed with radar image ALOS PALSAR. We have to consider how possible this can be developed? If it possible, the installed tool in location is only used for reference and validation. BRG is going to make some boreholes to predict the groundwater conditions in peatlands through remote sensing. For the monitoring system related to the result of rewetting intervention which is done by the installation of canal partition or by the rewetting through the boreholes. Are they can be predicted by remote sensing? This could be so helpful to assess the work done by BRG.

Opening 2nd Session : (Mr. Kubo Hideyuki)

Data from the ground is provided and can be downloaded by the telemetry system. The challenge that we are facing now is how to integrate. And also in order to add the information we are going to use the satellite. The model of those kind of technology is not available yet. But the presentation from Prof.Osaki is going to answer how to integrate the system.

1st Speaker : Prof. Mitsuru Osaki

MRV System for Peatland Restoration

- ✓ As the form of next step from technology transfer that has been done for a long time between Indonesia-Jepang
- ✓ The principles: informatics – sharing information in one open platform
- ✓ Concrete approach through water, carbon and vegetation monitoring
- ✓ Local approach through land management
- ✓ Semi-concrete approach through the biomassa usage and analysing the market
- ✓ Key topic : MRV System on Ground-truth and Remote-sensing Survey in Peatland
Topics from MRV dan Mapping:

1) SESAME

MRV land survey to manage peatlands and estimation of carbon balance, SESAME can reduce the usage of excess instruments for land survey on targeted area. Lowest ground water level results a high number of hotspots, based on MODIS image. The solution is by executing rewetting of peatlands so we can keep the peat wet and prevent the fire. Ground water level monitoring and precipitation is already being done successfully.

2) Water Table Mapping / Pemetaan Muka Air

Ground water level prediction by using soil moisture simulation with WRF model in Indonesia. Use global data set of soil moisture. Basic training is already being executed with participants from 16 agencies. Manual of the peatlands tropical management is data collecting which consists of peatlands map, set of remote sensing data, measurement on the ground then analysis of the land coverage data, groundwater level and burn area. Those analysis of data can produce model carbon emission from peat decomposition and fire on peatlands. Dataset is updated everyday, WRF can read the data from FNL easily.

3) Canal Detection System

4) Topography for Dome Structure

5) Vegetation Mapping

Hyperspectral sensing by using HISUI, realtime sensing system by using LCTF.

6) Fire Inventory

Canal map and vegetation as basic information, long-term weather prediction in 6 months ahead by BMKG, groundwater level daily map, weekly prediction model on groundwater level by SESAME, estimation of the depth of fire by using PARSA II.

7) Network Systems / Sistem Jaringan

Some of SESAME network options in Indonesia; On-premises server, Amazon Web Service (AWS), Biznet GIO Cloud.

Dr. Haris Gunawan

- Ideas for integrated system as the form of cooperation between BRG and other institution is already clearly delivered by Prof.Osaki
- PKG could not attend this focus group discussion
- Concrete step and timeline have to be prepared for the state interests and the report could be delivered to Mr.President before July

Discussant: Dr. Bambang Setiadi

This FGD is technical meeting not a policy meeting. I was assigned to make sure that BRG is dealing with their tasks to restore peatlands perfectly. We have lots of problems in peatlands, it begins from the derivation of groundwater level and cause fire. BRG is mandated to report the occurrence of ground water level derivation, burn area and non-burnt area of peatlands. Basis of all these reports are the technology that we're discussing of. Target 2.4 million ha, 1.4 ha is protected area. The preparation is described on ministerial regulation No.57, 2017. BRG is mandated with a massive task to restore the derivation of groundwater level under 40 cm.

Issues:

There is no references for peatlands management in tropical country such as Indonesia. The targets are 4 districts with area coverage 600.000 ha, 104 villages, and 23 KHG.

Questions:

- How to integrate the technology?
- Are there any other information we could gain from the tool?
- How widespread the area could be covered by rewetting?
- Can we measure the groundwater level by using satellite?

Required reference by SESAME tool is hotspot, the depth of groundwater level is determining the amount of hotspot and conversely. Those are the strongest parameter. The ability of SESAME to predict can reach up to two months. SESAME could monitor the dome system which is one of the issue faced by BRG. There are two technology that SESAME and MORPALAGA. Issues/problems that faced by Mr. Abdul Karim is the selected tool should be proposed through a tender mechanism. The tender should be based on research and specifications required by BRG. I suggest to spot one or two covered area on peatlands, apply the usage of those tools (SESAME/Morpalaga) and compare which one is the best. If we chose one of the tools but it doesn't suit to our required specification, our action could be classified to criminal act. There is no other competitor towards this technology of SESAME and MORPALAGA. Now we are dealing with very limited time, we have to consider that time is one of the most limited factor.

Dr. Haris Gunawan :

Important notes;

- How to combine existed resource to quickly answer and giving solution in peatlands restoration both restoration that is succesfully executed or not.
- Information how technically the steps related to the proposal from Prof.Osaki and BRG's requirements.
- The result of this FGD should find a concrete follow-up as references how BRG build integrated monitoring system
- Presiden needs transformation from scientific data to something which is can be easily understood as concrete step. Simplification of information could be transform into visual display and those kind of visual information is highly requested for a quick policymaking
- On early July, there will be hundreds of GWL monitoring system installed in 23 KHG. At least half of this target is already being installed on June.
- The expected information is not only sourced from GWL but also from Prof.Osaki's ideas. The ideas could be applied in BRG's developing system of monitoring.

2nd Session

Facilitator: Dr. Eli Nur Nirmala Sari

2nd Speaker: Dr. Alberto

The first thing that we should make is system. In case BRG has instrument such as server and so on, system can be built in one month. The data required to build this system are only soil maps, and soil moisture. As the answer of president's request on July, we could report the progress. Data can be collected from the installed instrument. Soil moisture data from WRF and NCAR could be combined with the equipment, based on ideas presented by Prof.Osaki and those already corresponded to my idea. Based on this information we could predict how much carbon emission can be reduced through this restoration program. By using the existed data we can give the progress report and result without installing many instruments on the ground. The most important thing is build the system, but beside that by using the GWL information we could also start to develop FDRS. By using the existed data we could build insitu early warning system. It can be proceed from the data collected by MORPALAGA and/or SESAME.

Dr. Eli Nur Nirmala Sari

Requirements:

1. The instrument used should suit with the standards created by BRG
2. The instrument that will be proposed on tender mechanism should follow what BRG needed
3. Not only monitoring the GWL, GWL is one of the important parameter. Soil moisture on peatlands is also needed to monitor, the changes that is occur on peat such as, subsidence and canal conditions.
4. BRG is limited to install many tools on the ground, considering the accessibility of the location and also the budget
5. BRG should build and develop the model
6. BRG is going to make the system first for peatlands monitoring

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7. There is no guarantee that SESAME and/or MORPALAGA suit to the standards established by BRG
 8. The standards set forth by BRG will be announced

Related to the EWL (Early Warning System), canal visualisation is really needed to show the vulnerability of fire. We do need the data from today but also the prediction of peatlands conditions on a month ahead. Considering our limitation, it will be really helpful if we can build a modelling equipment. Methods that have been delivered by Prof.Osaki is really useful in carbon emission estimation, moreover if it can be applied in BRG's system. BRG is going to discuss with TRGD in every province to start build EWL with the technology presented by Prof.Osaki. BRG is only going to install 200 units this year. Methodology that will be used by BRG is a standard which has been set by KLHK. Methodology for carbon emission estimation which has been delivered by Prof.Osaki is really useful, moreover if we can apply and built it into our system.

Prof. Mitsuro Osaki :

International standard used must be given into this project. Considering that international publication will also be done by BRG. SESAME has international standard. We have some ideas for discussion, including the SESAME's ability in estimating carbon emission.

Dr. Eli Nur Nirmala Sari :

BRG has to make standardization on April. BRG has to give training and find the solution how to build this system. The challenges that companies are facing is the cost of equipment is really expensive. Some of them can not afford this. That is why modelling could be so useful as solution, so that we do not need to install many installation on the ground.

Mr. Witnyo

- The first thing we have to do is building the system. If BRG has the required instruments, the system can be developed in one month
- According to the information, we can count how many carbon could be restored
- Adopt early warning system based on GWL as the form of insitu data
- Dr.Haris is mandated to accelerate the procurement
- Personnel are also important thing that we have to notice. For collecting and reporting the data. From now on, we have to consider about the human resources who can do this job (local people training)
- Processes for the open meeting/tender take moreless about 2 months
- Concrete step that we could take in the near future is making and pointing specification and also standards.

Mr. Susilo

- Instrument that is going to be used is a tool to measure and make sure the peatlands restoration being done successfully or not
- I am worrying this haste cause mistake in decision-making
- We also have to notice about safety side
- We have to know about the overall system, that is our strategy
- We can use the existed data from installed water logger to build the system and give report to president
- Use the existed data, install the sample, give the report to minimize mistakes
- Any movement in procurement always dealing with some problems and issues, we have to consider every aspects.

Dr. Eli Nur Nirmala Sari

- The equipment budgeted for this project is expected to accommodate restoration area out of company's coverage
- BRG already installed 20 units, 12 units from BPPT and 8 Unit from JICA
- Obstacles found on the ground, some tools require GSM signals so that we need to move the location of tools from the important point to another point which is the signal available

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- BRG will choose the tool which could fulfill and accommodate what BRG needs
 - BRG responsible to do this processes as soon as possible
 - BRG also try to find another alternative, company is required to install detection tool of GWL even though it is not based on telemetry system
 - The step that will be taken is setting the standards off and giving some training. Any tools that will be installed on the ground should fulfill BRG's requirements
 - Company has many options of product, but still the system and its standards should follow what BRG has set off
 - On parallel, BRG is going to propose tender and also do those options as alternative way
 - The needs of procurement can be achieved, monitoring and also target is expected to be achieved too

Mr. Susilo

- The mechanism of procurement on the ground should has been set off by knowing the receiver. It necessary to establish MoU so we can guarantee the tool is not abandoned after we installed it.

Mr. Aris Pramudya (Balai Penelitian Agroklimat dan Teknologi Bogor)

- It is important to know the output from the installed tools
- According to Prof.Osaki's presentation, the output of SESAME are; GWL, precipitation and soil moisture data
- This data still need a tranformation or need a develop model related to hotspot and dryness. So that we are going to know on what level of groudwater the potential of fire could happen
- We have to consider that the value of GWL score is different depends on area
- Related to the tool installation, the limited signal is one of our big obstacle. The solution; we could establish the extrapolation from the spotted point to the point at the outside of spots.
- Related to the developing towards EWS, we can use the precipitation data, this is closely related to the dryness. BMKG always deliver the spatial information of this data
- Every 3 months, we analyse the row of dry days and we could inform the report of our analysis
- We also join the discussion with BMKG about the early-season predictions
- The beginning of dry season 90% falls on May-June 2017, so that expected the information we could gain on June give more pictures related to the dryness on peatlands

Dr. Eli Nur Nirmala Sari

- What have been delivered by Prof.Osaki is relevant and useful in monitoring and carbon emmission estimation system development
- Data that is required by president is a visual data. We can not accomplish the visualization by only using GWL. By developing the model which is proposed by Prof.Osaki, we can achieved a visualization of data.

Mr. Kubo Hideyuki

Recommendation as the form of concrete step:

- Fix the model before July, with the result an hour prior to and six hour prior to. Because the data only can be downloaded every 6 hours from NCARS.
- BPPT, BRG and PKG can directly assign person who will be in charge to fix the models. The person should know about programming, technical things and so on.

Mr. Abdul Karim SE, ME

- If only water logger still can be identified and we can download the result, this could be a short-term solutin for us
- On Monday, a tripartite meeting between BPPT, BRG and KLHK will be held.

Dr. Eli Nur Nirmala Sari

- The next meeting is necessary to be held on the third week of April with Prof.Osaki as the from of finalization of standards

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- Communication with Prof.Osaki will constantly organized via email, so we can get the suggestions to make our standards

Summary of discussion:

- Standard for telemetry system will be made by BRG in cooperation with KLHK
- BRG, BPPT, and KLHK will finalize the standard
- Communication with Prof.Osaki will be done via email correspondence
- The next meeting/discussion will be held on the third week of April to finalize the standard
- Target: do not install too many tools/equipment on the ground and develop the model
- In Tokyo, Japan there will be held further discussion related to the technical steps that should be taken in the near future
- Setting up server should be done too in order to integrate the system
- We expect this project could be executed on time prior to the dry season

Closing

Dr. Haris Gunawan:

- Display should be installed on the end of June, or on the early week of July for the latest
- The cooperation between BMKG, BRG, BPPT and LAPAN should be accomplished for this display
- Concrete step that should be taken in parallel, include the realisation of installing 280 water logger
- At least half from total water logger should be installed and reported to presiden on early week of July

End of discussion.

1.2.2 April 3, 2017 <Investement Facilitation>

**Directed Discussion Group
Promoting Private Investment Facilitation scheme in Peatlands Restoration
Oria Hotel, Jakarta
Monday, April 3, 2017**

Minutes of Meeting

Agenda overview:

a. Opening and directives

- Opening
- Directives

b. Main Content

Presentation about opportunities and constraints in developing sago community-based businesses in Meranti Islands

c. Panel discussion

Presentation about incentive approach for investors / entrepreneurs in peat restoration activities, financing facilities for business approach and business models that contribute to peat restoration

d. Closing

Summary Submission and important notes about outcome of the meeting and gratitude to facilitator and participants.

Opening and Directives

- Welcome and gratitude to participants of the discussion
- Brief explanation about background activity
- Explanation about direction of the discussions and important notes

Facilitator opened the event by giving a speech and gratitude to participants and gave a brief

presentation on the agenda of discussions.

Facilitator: Dr Eli Nur Nirmala Sari

(Program Expert Deputy of Research and Development BRG)

Pembukaan: Dr Haris Gunawan

(Kapokja Deputy of Research and Development BRG RI)

This activity is a third event for equalizing steps and strategies in the development of investment, especially private sector. The purpose of this activity is to explore the theme to give thoughts and ideas in connection with the facilitation investment in peat land restoration activities. Peat Restoration Agency has a mandate 2M hectares and as calculated there is 2.4 Million hectares and 1.4 million hectares into the primary target or targets A, so with big potential the private sector role should be explored to play a role in peat land restoration.

Directives and important notes of discussion:

- Prepare mechanisms and strategies for the private sector (domestic and foreign) to invest in the peat land restoration
- Weakness of OJK version that investors prefer to invest in businesses that already-established in the market as well as infrastructure
- Challenge: create a document that can be translated among investors to be invested capital for peat land restoration
- Create a pilot one or two commodities which one of them is sago
- Solution to be observed that SCCM (Sustainable Commodity Compensation Mechanism) and Green Bond
- Make an investment guide for banks
- There is one concrete commodity that can receive one model of how the peat land restoration projects based on sago commodity can be used as an example and is developed for other commodities

The activity will be continued by a meeting with the private sector from Japan and Indonesia which will be conducted in May 2017

Main Content

Opportunities and Constraints in Developing Sago Community-based Businesses in Meranti Islands

Speaker : Drs. Irwan Nasir (Regent of Meranti Island)

Meranti island districts in Riau province Malacca Strait coast directly bordering to Malaysia. The strategic location in the Malacca Strait makes Meranti Islands bring the mission as a advanced and excel commercial district, and one that will be featured is sago.

Size of the community sago plantation is 38 614 ha with productivity 9 tons / ha / year with the number of community sago mill is 68 units. Sago is one of the power sources of food community. Sago has been processed into lempeng, sago noodles, brownies, rendang, sempolet, cendol etc. and has been made the sago jump event in the Bokor village that already can bring in tourists. Roof of the house and grounds of road construction made from sago leaf midrib (Uyung sago).

A. Opportunities

- Length Fiber Sago Meranti Varieties is superior seeds
- The forest area consists of 118 427 ha is still free and not burdened with any concessions
- Business and breakthroughs government has done is product 369 type of food products and get MURI record with most types of food products
- The area of sago development is still extensive
- Investments on dried sago processing and there is closeness with foreign investment
- The main business products that can developed soon is analog rice
- Preparation of liquid sugar from sago

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- Ujung (sago skin) can heating boilers and raw materials for furniture (flooring, roofing and table)
 - Repu sago can be used as animal feed
 - Sago Meranti almost 90% brought to Cirebon and in small quantities export to Malaysia

B. Constraints

- Many of the canal made to pull out the timber. The impact of peat water down to the sea and dry makes forest fires. Blocking the canal needs to be done
- Limited production road facilities making it difficult for farmers to distribution of goods
- Abrasion (10-25 M / yr). Conditions today, abrasion reach 500 m and reduce Meranti area of Indonesia and the islands. Solutions Breakwater
- Moratorium peat affect the potential of development area of sago.
- The lack of infrastructure
- Limited of community technology ability to process sago
- Limited access to markets monopolized by cooperatives in Cirebon
- Repu untapped and become waste

C. Expectation

- Revision of Presidential Decree No. 8 of 2015 concerning the delay granting new licenses and improving governance of natural forest and peat
- Growth of new investors who are interested in the downstream industry and sago waste treatment and renewable energy
- Meranti Islands can be designated as a national center for the development sago
- Support infrastructure and technologies as well as development capital sago in Kep.Meranti
- Presence of central government support

Sessions Questions, Answers, and Comment Session Main Content

Hanni Adiati, Msc

- The Papua sago Company only managed to export 1 container / month, sago investment still in early stage
- Related to the Sampoerna group, Sampoerna is the richest in Indonesia and damages caused by an error in selecting the location and management
- Business there are constraints rules, in forestry sago equated with wood so great fare and presentation does not comply with sago flour rendemen
- Nomenclature should be amended so the tax is not equated with wood
- Type of derivative sago in East Tebing Tinggi supervised by KPHP and will be supported for the increase in human resources and infrastructure
- Will be made parquet and the wall from sago skin and will be combined with nimbang will be a shingle and a gazebo that has been exported to Malaysia and Singapore
- Training should be enhanced to improve the human resource capacity of small industries
- Disconnect Syndication of sago flour is not easy but make their own market
- Many other opportunities for sago products. Sago can be used as a substitute for plastic for exclusive packaging and dry noodles
- Moratorium no relation with sago because endemic plants

Dr. Haris Gunawan

- The main target is to facilitate the sector to work because a base for community empowerment

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- Commodities sago already become consensus on the internal BRG into one of the commodities that are conditioned for the private sector wants
 - Sago is considered by investors and should translate such oil palm
 - Need to be delivered to investors that the Regent was very welcome with investments in Sago
 - Packaging and product markets sago still not touched

Bapak Utama (Wakil Masyarakat Sagu Indonesia)

- Formed Sago Indonesia consortium which has two main targets, namely in the form of instant glass noodles and biscuits such as sago glass slab (sagon) which had been coordinated by UNHCR and FAO which will be used to overcome the shortage of carbohydrate needs of refugees
- Ease granted by the State to facilitate the licensing and regulatory harmonization because frequent disharmony between central and local regulations

Panel Discussion

Presentation about incentive approach for investors / entrepreneurs in peat restoration activities, financing facilities for business approach and business models that contribute to peat restoration

Fasilitator :

Ir. C. Nugroho S Priyono, Msc

(Head of the Research Working Group Badan Restorasi Gambut)

Ir. Noviar, MBA

(Head of the Planning Working Group Badan Restorasi Gambut)

Hanni Adiati, Msc

(Special Staff of the Ministry of Environment and Forests)

Ir. C. Nugroho S Priyono, Msc

- There are several parties involved and especially for sago learned from Meranti
- Village fund which will support the activities

Ir. Noviar, MBA

- There are three terms of Restoration that Reweeting, revegetation and Revitalization
- Many other potential that can be developed as sago like silvofisheri
- The management unit peat restoration there are several, including government agencies through the local budget, the private sector, people who have land, planted forests have an obligation to implement restoration

Hanni Adiati, Msc

- BRG formed because there is a crisis, causing damage to the ecosystem of peat land and forest fires and into emitter No. 3 in the world and their complaints and threats and environmental damage dr neighboring countries and domestic
- Restoration delivered the need for legal discretion declaratory positioning of this crisis
- There are several barriers BRG and the legal field will design a solution
- As venture capital, there are some things that cannot be applied in Indonesia to restore peat land with only revitalization oil palm on peat land
- Funds that exist in the oil palm can support the restoration of peat non existing oil palm plantation with other types like jelutung, pepper, nutmeg, chilli and not monoculture
- Public Service Board which is already in the Secretary of State for accommodating foreign funds related to the environment will be entered into a single package and manager from KLHK and control from Ministry of Finance

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- People do not have the capital for collateral. There are two scheme, namely, grassroots and incentives
 - There are opportunities for the private incentives to develop commodity for peat restoration
 - Restoration of peatlands into plantations will be conducted Land Swap and replaced with mineral soil
 - Strategic Commodities exist in the realm of Coordinating Minister for Economy

Sessions Questions, Answers, and Comments

Staff Menko Perekonomian

- There is a section to discuss about implement restoration of peat in Meranti district
- Commitment to local and central government have a great effect
- Make piloting at Meranti District
- The model of cooperation can be added Private CSR, financial institutions, international organizations, ministries, agencies
- How could produce something already common perception and can be implemented with perfection
- It should be clear measurement when piloting

Ir. Noviar, MBA

- At 2017 will be made piloting for sago
- For the restoration not only R3, the main thing is the canal must be blocked and given incentives for people to want to keep
- Ideally, when the company set the location and there are canals, the company obliged to carry out restoration
- financing mechanisms have to be found for blocking canals
- Is there a possibility to get tax relief for PBB ?
- Restoration activities is the mandate for companies

Drs. Irwan Nasir

- Sago Existing Condition management of people in the district. Meranti, incentives for the exemption PBB is already happening and did not get any local taxes because people sago plantation planted in forest areas that do not have permits
- For the economic development of the people, there is no cooperative system because long harvest period can be up to 10 years
- Post-harvest needs to be considered because the natives wanted to build the plant but does not have capital
- Cooperation can be established after the harvest and provided capital to establish cooperative factory
- Easy to sell sago to be sold besides in Cirebon and Malaysia
- Need to be mapped constraints in public forests
- It should be given support like chilli
- Need affirmation policy alignment between the district and the city with the provincial government and moratorium law enforcement
- When UU 23 applied illegal logging rampant

Hanni Adiati, Msc

- Must fix livelihoods with an inventory
- If want restoration successful it is not just physical but social capital issues and illegal logging is a beginning problem

Pak Utama

- At Meranti island, sago plantations in forest areas

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- Sago is a clump
 - The role of private sector in the restoration of peat for restoration, revitalization and production
 - The government's role is dominant in restoration activities
 - After restoration and granted tenure in the private sector the responsibility in the private sector
 - Revitalization of the local residents and the private sector to invest
 - Local knowledge of socio-cultural and community role is the most important studies
 - Can keep the fish in canals and horticultural crops can be grown at embankments using volcanic ash
 - Protection of the State to investors ie the rule of law, equality between national and local policies, tax holiday, access to financial institutions

Staff pihak keuangan-pajak

- There are two kinds of PBB at local government level and central government
- Peat included in community plantations in forest areas into the productive land managed by the community and government can be taken a tax
- UU PBB written to productive land cannot be cultivated because such a thing like built public facilities is exempt and not taxable
- Facilities for the investment tax is set at PP No. 18 of 2015 and its implementation in PEMKA No. 89 in 2015 is mentioned about any field that gets the tax facility
- sago plantation has not been entered into the criteria to get the facility but can be changed by performed addendum
- Taxes are not authorized to determine what areas could be given tax facilities
- Facilities at PP No. 18 of 2015 contains sago (natural sago flour), but the locations are limited in Maluku, Papua and West Papua
- Mechanism of proposing a tax allowance through the builder sector and sago industry through by ministry of industry with director-general who handles through sago
- It is recommended to create a scheme of the sago industry business processes in peat land from planning to produce
- Tax allowance only have a term of 6 years and maximum 10 years

Tim Tata Ruang Kabupaten Meranti

- Need to performed to provide guidance in the community
- There is a non-concession forest areas which into illegal logging activities and the need to follow up immediately
- Need protection against sago farmers so that prices are not too fall
- Blocking canals must be carried out for all regions
- Community who does not have a lot of sago plantation anymore because it was debt bondage. Need to of special treatment for sago farmers because the bank instituted a reserve so the community will continue to apply debt bondage and need stimulants like intercropping

Closing

Dr Haris Gunawan

At 2015 due the haze, dispute 200 billion is lost. Need to process to reach the target and need inventory input and ideas. Keywords of this activity is a breakthrough that is a breakthrough SCCM and not only land-based and wait 10 years but also will sell services at sago plantations.

End of discussion.

Technical Meeting
Preparation of TOT Water Upper High Monitoring Tool
Peat Telemetry System
Badan Restorasi Gambut Office, Graha Mandiri Jakarta
Thursday, April 27, 2017

Minutes of Meeting

Agenda overview:

A. Welcome and referrals

- Greeting
- Referrals

B. Overview of Telemetry TMA monitoring system

C. Review of Standards for Peat land Management Systems

D. Revised Guide and Preparation of TMA Monitoring Tool Technical Guide for Telemetry System

E. Preparation for TOT activities

Technical related exposure to the implementation of TOT, the preparation of the agenda and the preparation of TOR

Opening

By: Eli Nur Nirmala Sari

BRG has water level monitoring activities with water level and real time. This activity needs to monitor real time standards with tools. TOT had been done before, but it is constrained because of expensive equipment and difficult to provided it in the field, so that the needed strategies for each company has the tools with the standards set by the BRG. The thing that needs to be done is to set up a standard tool that will be used in peat restoration and train in order to make the tool itself with predefined standards.

Overview of TMA telemetry monitoring system

By: Abdul Karim Mukharomah (Chair of the Data Development Working Group)

- There are several tools installed and there are 2 tools from Japan
- The installed now does not represent the area to be restored
- The 2017 update is 200 morpalaga and 80 other units
- 80 units will be converted into local products and it becomes a challenge, because of which has been installed 8 units and after checked only in Kalimantan show good results while the results in Riau are not good
- KLHK wants the server to be in KLHK so that the server in KLHK must be connected with the equipment to be installed, need further discussion to KLHK related to server and equipment standards
- KLHK asked BPPT to do system development
- Related to the auction will be the problem because it was 2 to 1 but after revised will be scheduled on May 2, submitted to BCA
- There are other options to be included in the e - catalog, if success get in to e-catalog then no need to use auction system
- The auction will be open to the public
- Before the auction, need a qualified tool that can give maximum results and include the type of sensor in use
- It is important to make a standard tool that will be used, whether the tool is a pressure sensor or ultrasonic sensor
- TOT target participants are required is in charge of businesses in the concession area and outside the concession, namely KPH
- Related to interface data, there is no funds available

Review of Standards of Peatland Monitoring Systems

By: Awalludin, MSi (BPPT)

- The mechanism of data transmission is: There is a tool in the field that will record data entered into the server and will be published via the internet
- Sensors are literally feel or perceive stimuli or stimulus and then converted into electrical signals that can be read, there is a physical quantity and can be measured
- There are 2 sensors that are active and passive and the same principle as satellites
- In a set unit that integrates existing sensors, the sensor element (solar cell and telemetry), the sensor system
- Selections phase: choose the amount of stimulus, specification of physical quantities, ensure the accuracy of the process, environmental considerations which will be installed, the sensor calibration
- Cyclic is a sensor behavior to the environment
- At the time of sensor selection, it is important to see the specification of sensor size, so that when the data entered can be seen the accuracy of incoming data
- All incoming data can be measured whether the data is accurate, precise and have a good quality
- Precise but inaccurate data can be caused by misalignment or in tool configuration and human error
- Precision is not good and is not accurate then the distribution of the data will not approach the normal value and the fluctuation is quite dynamic
- Not precise but accurate can be used as a type of data quality at the 2nd level because it is around the normal value but not precise and has a slightly away
- Precision and accuracy are good and tend to the normal region with small deviations

Presentation tools already made

By: Cecep Sujana

- In general the tool's brain can use arduino or mini computer and its power source in the field can use solar panel
- For data transmission can be used signal GSM / GPRS, WIFI or radio signals
- For display can use LCD
- The choices once made are carbon monoxide, oxygen, nitrogen and SO₂
- Regarding calibration there is usually a program as a benchmark
- If calibration with gas, there is already a standard gas before the data entered then the data will be calibrated with its standard gas
- Data control specification 2 does not use LCD

Revised Guide and Preparation of TMA Monitoring Tool Technical Guide for Telemetry System

- Related availability of tools in the country, tools is available but data results is less accurate
- The tools must be standard and must be implemented, not just simulation
- Standards are determined on the basis of restoration requirements rather than adapted to specific tool standards
- At the time of training it is important to mention the brand because it will determine the quality to be recommended to the participants
- Part of the standard tool will explained into the module and SOP how to make the tool
- An environmental approach will be used to view the accuracy of the data
- There will be an index alarm that will indicate if there is a problematic tool and adjusted for an indication of the quality index

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- How to ignore data that is not appropriate by way of interpolation of error data
 - The index alarm will compare data obtained with data outside the system

Preparation for TOT Activities

By:

- **Dr. Albertus Solomon**

- **Awalludin, M.Si**

- **Cecep Sujana**

- **Prabu Kresna Putra, ST**

- Standards must be calculated: water level, peat soil moisture, rainfall, temperature and humidity
- In a water management system, within the same fluctuation level of the deviation shall not exceed 10 cm
- Interval to take tidal data retrieval at least 1 hour. If far from tidal hence, minimum data taken once a day at 9 am before evaporation for recording and not averaged right.
- The delivery interval will refer to the temporal resolution, the extent to which the tool can respond to environmental surfaces. If the environment changes its temporal homogeneity 1 minute then the delivery interval is recorded at least 1 minute
- The more intense the data transmission the higher the operational cost
- The best data is the average data is not just data on that day only
- Data sent is not average data but overall data
- For sending data will be sent directly to the server
- For regions not covered by GSM signals can use WIFI or radio signal
- The data format depends on the resolution without rounding of previous numbers
- Data is stored in CSV format with 1 hour of internal data retrieval
- Pipe must be planted until mineral ground and sensor 2 meters from ground level
- When pipe at sinking conditions, using pressure sensors will not be a problem. Different if using ultrasonic sensors
- The price of ultrasonic sensors is cheaper than the price of pressure sensors, but it is more realistic to use pressure sensors in peat lands
- Need to make a pipe design so that no mud enters and damages the sensor membrane so data can change

Technical Implementation and preparation of TOT agenda

- There are 3 tools will be used in this activity. Tool 1 is used as a practice presentation tool, the second tool is used for demo in the field and the 3rd fragmented tools will be distributed to the participants so participants can assemble themselves
- TOT activities are assembling and installing in the field and ensuring the tool works properly
- Scenarios to be taken are 2 groups. One group worked on ultrasonic and another worked on the sensor pressure and there was a sensor to be used by the instructor
- Tools that are simulated in the class will be installed in the field
- TOT is expected for 5 days
- Technical installation of components to make RAB and will be submitted to each party and the sensor refers to the standard that has been agreed
- There will be a training module for participants and SOP (technical guidelines)
- Criteria participants: Can operate the computer, good communication technology / informatics system, understand IT / electro
- Maximum of 20 participants (there are 13 companies that are urgent)
- Combination of participants there are technical officers and officials at KASI level (policy makers)
- TOT will be held in South Sumatra at the end of June after Eid for 5 days

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- There are 7 Instructor (Mr. Awalludin, Mr. Albert, Mr. Cecep, Mr. Adit, Mr. Syaiful, Mr. Prabu, Mr. Taufik)
 - RAB submission deadline: Tuesday, May 2, 2017 (given the tool information will be purchased which, whether in Jakarta or indent) also include timeline of activities
 - Standard tool deadline: Thursday, May 4, 2017

Closing

End of discussion

1.2.4 May 2, 2017 <Profile Study>

Coordination Meeting Peatland Restoration Agency Office, Graha Mandiri Jakarta Tuesday, 2 May 2017

Minutes of Meeting

Agenda overview:

- a. Opening remarks and introduction of participants
- b. Presentation from SystemIQ (Introduction and Project)
- c. Presentation from JICA (Introduction and Investment Model)
- d. Discussion of Investment Seminar in July 2017

Opening Remarks

In this session all participants introduced themselves.

Meeting attendance:

1. Mr. Haris Gunawan (BRG)
2. Mr. Kuno Hiromitsu (JICA Survey Mission)
3. Mr. Akihito Sakurai (JICA Survey Mission)
4. Mr. Edison Mansur (BRG)
5. Ms. Ronja Wolf (SystemIQ)
6. Mr. Stuart Rowland (SystemIQ)
7. Ms. Nur Arifatu Ulya (Center for Research and Development of Palembang Plantation Forest)

Introduction to SystemIQ

Speaker: Stuart Rowland

- SystemIQ supports project development in Indonesian peatland for sustainable which will help the economic for long term. Second is stable projects so not only 10 ha, 500 ha but project can be used 10000 ha or more.
- 6 million ha of Indonesian peatland has been lost since 1970s, from Borneo and Sumatera alone. More than 700Mt CO₂ was emitted to the atmosphere in 2015 mostly by forest fire in peatland area.
- Along with BRG we have been building pipeline for Indonesian peatland. We also conducted deep analysis, careful and detailed on the ground field work, working closely with project owners who knows the details of project area and supporting organizations which has been there before to gain a better and sufficient understanding of each project that will be done. The other thing we do is, we de-risk project by working with skilled and qualified human capital to ensure the ecological safety and sustainable of the economic development.

Mr. Haris

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- I wonder if you can input and give us resources?
 - Could I know the mechanism of this concept, is it already done in other area or could you give some success story in implemented this concept?

Mr Stuart

- Two things: we give technical assistant and business support for especially who trying in a larger project.
- We have not done the project in Indonesia but we already done the project in Norway.

Mr. Stuart

- We have not done the project in Indonesia but we already done the project in Norway.
- SystemIQ is still new but it basis is in Europe
- SystemIQ is already in Meranti and sago is a promising commodity in BRG site so I think we have to force the sago business development, not only based the community but also this kind of idea “compensation”.
- Based on peatland Incubator, sago is on stage 3 which is assessment activity and conducted field visits and deeper analysis.
- Before going to stage 3 we carried out stage 2 to identify the project and its potential alignment with investment strategy, criteria, and impact.
- If it is a good opportunity we can go through stage 4.

Mr. Kuno

- This structure, just for peatland incubator project? or can be implemented in other models?
- The structure is only for peatland incubator project. Maybe this incubator project needs to involved other party including JICA.

Mr. Stuart

- Back to stage two that we conducted initial research to better understand the potential impact, if we agree then we go to stage 3 which we come with full concept, conduct deeper analysis of the project including potential risks, green house gas emission and details impact, and stage 4 we start to do the project under partnership scenario, potential funding partners, and detailed feedback from the partners.

Ms. Ronja

- Essentially in the very first beginning we start with ideas, so we hear there is sago potential in the area then we go and see, what did they look like, what economic opportunity remains, then we start assessing the project.
- But in the very first beginning we starts with an idea, and then we take it step by step.
- Every step we assess more details and if we have an increasing detail number of criteria to assess, we look more detail at the site, we endorse the project, take it more forward, then if it is a really good opportunity we get to stage 4 which is concept note.
- We will already have a very detail idea of how to do the project, what is the outcome, what’s the impact, what is the risk, how can we mitigate the risk and what kind of funding type do we need from Japan and some of these.
- So this is why we say only after stage 4 we involved potential investor, because that is information that they need.
- They do not need the first idea of the project they need more information that’s why we have step twice, we collect more data and information and make a path up concept.

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- So this processes are looking for potential investor? After the stage performed so we can invite the investor?
 - So this project involves two things, one side is attract the investor and the other sides measuring the project.
 - The funds can be from public and private, sometimes it is even feasible to have one private and one public player, in other projects it might be more useful to do it only with public player or private player, it depends.
 - So right now, in the process better understanding funding mechanism and funding partners landscape in Indonesia.
 - So we are looking in two different partners that can even give funds or any kind of technically system support that we would need for a project.
 - And as project mature you will know that each project have different stages of development, we usually start with pre-feasibility study then do feasibility study then commercial pilots and if that is successful we can do another feasibility study for commercial scale up
 - This project have different stages of maturity and each stage you need different funding
 - For feasibility study we usually need a grants and for commercial scaled up we need like a loan or investment from public player, so each stage has different packages for funding.
 - SystemIQ is now identifying packages for each maturity stages of the project and finding partners that would be able to fund this certain packages.
 - Usually development finance institution like DFID, UK government an development finance institution or NICFI from Norway they would be able to give clans in certain range but not more than USD 5 million so this is okay for feasibility study
 - But when we go to commercial scale up of the project than we need private player and larger investment, probably some loans, in this case we will ask different investors.
 - Right now we are talking to different funding resources and trying to understand their requirements and criteria and what kind of project they are interested in and what is they can fund.

Mr. Kuno

- How many potential commercial funding for commercial scale up?

Ms. Ronja

- So far I do not know any private player in Europe that would invest in Indonesia, but if you have one I would really happy.

Ms. Nur

- Based on your experience how long the transition of the projects?

Mr. Stuart

- The project takes may be about a few years depends on the stage and project.

Mr Haris

- Can you tell us any experience in other country similar to this project?

Mr Stuart and Ms. Ronja

- These is a parallel activity that SystemIQ is also involve together with other partners and the funding comes from the UK government from DFID and they set up the program which is called partnership for forest across south east Asia but focus in Indonesia and also in Western Africa, actually it is a large scope project.
- The partnership forest set up for 5 years, now we are in 1.5 years.

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- For Incubator, SytemiQ is also work on it but it is different group not our group and also different tools.
 - The partnership forest focus on fighting deforestation and incubator focus on peatland protection and restoration but the set up of the whole incubator is almost the same.
 - They take it through stages like we have and also at some points of maturity of the project they have assess, they take them to DFID. In this case, they only have one investor, that is the difference to what we do. We bring them to different stages and then we are trying to find the best investor that will meet this project's requirements in the peatlands project.
 - And partnership forest has successfully work for 1.5 years focusing on forest project and they have to find the project that fit DFID funding with government because they only deliver the project to DFID or UK government fund.
 - But they have been very successful, they have already 3 concept notes that have received funding from DFID after stage 5. The process has been proven very successfully because after the criteria have been applied you can make sure that only the best project with the best return on investment, less impact, the best value for dollar spend come to this stage while asking for funding.

Mr Haris

- Commodity mechanism models, is it new or already existed before?

Mr Stuart

- This is can be said as a new project.

Mr. Kuno

- We need a real success case, on how to gain an investor from zero until become a successful bussiness. I want to hear a success story from zero to be able to invite investor?

Ms. Ronja and Mr. Stuart

- I think it can be related to ERC's they have manage to get support for management set up for ERC's concession, from ERC's that are currently active in Indonesia we have 8 of them that work together with partnership for forest and SystemIQ. They have been prove 2 stage where they get support from DFID and UK government for they intern management capacities, but DFID can not give grants.
- Success with he stages, Kattingan can be an examples as a success project in Indonesia.
- So far we have 2 investment committee meetings, in each committee meeting we will present one or two projets, then after the meeting they will be a decision wether we take the project forward or not.
- For Sago project it will much take longer, we just starting we can not see the result yet, because it depends on maturity stage. So we need to know the investment criteria, objectives, and funding mechanism of the project whether multi funds or multi nation should be discuss.
- Introduction and Investment Models from JICA

“JICA Mission for Data Collection Survey on Forest & Peatland Fire Control and Peatland Restoration in Indonesia (Phase 2)”

Speaker : Mr. Kuno Hiromitsu

- Pre-feasibility study for peatland restoration investment conducted in four most prioritized areas in Indonesia from December 2016 until August 2017.
- The goal of this project is to develop economic development models to contribute climate change mitigation by peatland restoration.

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- We have 3 major component in pre-feasibility study which are, trial baseline measurement and monitoring of peatland hydrological conditions of target area, profiling surveys of target area and quick preliminary feasibility study for facilitating peatland restoration by private business investment and stakeholders coordination meetings to promote private business investment.
 - We already conducted phase 1 and we are now in phase 2. There will be open seminar in July to promote peatland restoration to private business investor and SystemIQ may be can present the idea on July seminar.
 - Also in July we will enlarge funding proposal by the consortium team which come from local university and R&D.
 - This team were built as the institutional arrangement in this project. JICA study mission is mainly facilitate activity or meeting in peatland restoration between stakeholders and private business investor to achieve the goals on peatland restoration and raising community economy.

“Draft Ideas on Developing Activity Models on the to-be-restored Peatland”

Speaker : Mr. Akihito Sakurai

- Peatland restoration and community livelihood improvement can be done by combining environment improvement, food production such as rice and vegetables, canal blocking to prevent flood and energy securement by produce bioenergy material.
- JICA has been developed 5 models activity for peatland restoration in 4 prioritize district in Indonesia that can approach the goals.
- This 5 models need to be improved by many experience.
- The pictures of each model showed the peatlands condition before and after implementing activity models.
- Product resulting from this models such as agriculture products (paddy, fruits and vegetables), forest product (timber and non-timber), and livestock/ fishery.
- In addition the models also produce non-productive activity such as canal blocking and build the infrastructure to provide ecotourism for neighboring countries and nearest area.
- Lower picture is the image of ground water level before the project and after implementing this activity models for example performing canal blocking as fish are raised in the reservoir, and then the paddy will grow and duck are raised in the paddy as insect predator and also fertilizer. Gamel can be planted as bioenergy material tree to produce wood pellet.
- Based on this draft, investor can choose which models are suitable for the area. This idea can be implemented in Palangkaraya, Central Kalimantan.
- After canal blocking were build, then the activity continue with plant bioenergy materials along canals, and introduce horticulture/fruit tree with poultry. Poultry waste will be utilized as manure for horticulture.

Discussion session

- **Mr. Stuart**
- **Mr. Haris**
- **Ms. Ronja**

- Have the analysis of the area performed? The consortium team will do the analysis and how to scale it up.
- First one we need to successful in restoring peatland, so the models must show how to secure the water table and how to sustain its high water level.
- The major issues in peatland is the water table so the activity models needs to combine several crops or any activity model, because one business models can not sustain in community and community need a shortcut to sell the product to private sector or investor.

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- It is expected that investor around business models can access community economy, so from this idea we can review many approaches or ideas on how to secure high water tables and how to secure sustainability.
 - We have many research result that showed water table can reduce GHG emission, in addition besides selling the product we can also sell the carbon in carbon markets.

Mr. Haris Gunawan

- I expected that we can focus on one major commodity for example industrialize the sago.
- Because sago has many product to promote, not only raw sago but its derivative products such as sago powder or flour and noodles.
- In your business models people only sell the raw sago, if we adding the value by sell it derivative product or for fungi production it will be better.
- If we consider to improve the down stream and upstream, we will need less effort.
- We focus on some commodity/product that the community have known the regeneration.
- If we can quickly invite the investor, the program will soon implemented.
- So, the collaboration between JICA and SystemIQ hopefully will generate and have final ideaa for sago investment.

Mr. Stuart Rowland

- SystemIQ agreed with Mr. Haris, so we can conclude that the first point is to bring water table up in 10 years, second is to secured ten years income with higher economic value and the last point is how to add the value of sago production.

Mr. Haris Gunawan

- In Meranti the owner of the sago plantation usually a boss (private), the community is only a villager or worker. If we developed the peatland restoration, the community can involve in sago plantation and production as the owner of the land. How to add the value of sago production and scale up to 10.000 Ha, as said before in stage 3?
- So in stage 3 we working out of area, field visits and analysis are conducted to detail the information against the TAU's criteria and then we work with projects in concept notes. Before we working out with stage 3, we performed stage 1 and 2.
- For sago transition idea we need to talk to the local village head or local stakeholder.
- The sago transition full models will be shown in 1-2 months later.
- The funding or grants of project for example will channel from world bank to local government then to the project. The money can not channel directly.
- The incubation project obtains the data from local government.
- JICA and SystemIQ can integrated the idea, JICA and SystemIQ will share each other ideas in order to achieve the goals (knowledge shares), then BRG impact project can take to pilot plane.
- After that successful project can line up to the pipeline for potential funding.
- This project can corporate and synergize by adding carbon market with SCCCM work which will lead to carbon project
- SCCM is quite mature project it is initiated with feasibility study if the project is feasible the next stage is project reporting, after that the next step is to work on the project. Draft A has a larger impact than draft B.

Mr. Kuno

- So, Firstly JICA proposed to harmonize incubation process among international partner.

- Second one, to develop harmonize process we start the forum BRG and International partner.
- To carry out the forum JICA wants to involve in Incubation process among BRG and SystemIQ as an observer.

Discussion of Investment Seminar in July 2017

- Toward green investment by integrated food, water, renewable energy, environment business into community.
- Next July we hope that we can bridge potential investor, make investment engagement including strategy and criteria.
- PT. Rimba Raya may present their concept in July Seminar.
- And then in July we also create green investment facility to support the partnership business.
- We are going to audience to BKPM, and SystemIQ will involve as well before the next seminar on 3rd or 4th week of May.
- Some matured concept note/investment proposed in other Area in 4 prioritized districts in Indonesia are carbon credit business in Lampung, Fire free rice business in Central Kalimantan, and Sago transition in Riau.
- Fire free rice business developed in Pulau Pisau project may also be presented in July Seminar
- Participant for visitor Pulau Pisau in may need to be confirmed to Ms. Eli.
- One more participant want to collaborate with BRG and JICA but we do not know the project yet.
- We can map the project at the end of the seminar.

Closing

End of the meeting

1.2.5 May 4, 2017 <Profile Study>

**Coordination meeting JICA and BRG
Peatland Restoration Agency Office, Graha Mandiri Jakarta
Thursday, 4 May 2017**

Minutes of Meeting

Agenda overview:

- a. **Opening**
Opening speech was given by Mr. Nugroho from Deputy 4 BRG.
- b. **Discussion session**
The discussion were facilitated by Mr. Ngudiantoro from Sriwijaya University (UNSRI). The discussion were mostly discuss about the property rights of publication, technical matters regarding TOR work steps, coordination, and field standards, as well as the standard payment of honorarium.
- c. **Signing Contract between JICA and Consortium team.**

Opening

Mr. Nugroho (Deputy 4 BRG)

This meeting is prepared for the signing of a contract between the consortium and JICA, after the signing of the contract the next step of the project and what should be done by each party will be discussed. The current consortium leader team is Sriwijaya University comprising Riau University, Palangkaraya University and also the Forestry Research and Development Agency. The meeting will be started with discussion session lead by Mr. Ngudiantoro then the next session is signing a contract.

Discussion session

Facilitator: Mr. Ngudiantoro (UNSRI)

- Related to the Publication in article 10, property right of publication is in JICA.
- In article 11, if the other party wishes to publish the research, It must be with the acknowledgement and permission of JICA.
- The Government of Indonesia contributes to human resources, laboratories, etc.
- The mechanism for using publications is obtaining JICA permit for publishing and including JICA in acknowledgment.
- University of Riau (UNRI) will conduct a Feasibility Study in Riau Province, while Palangkaraya University will conduct study in Central Kalimantan area.
- I previously apologize that Mr. Robi could not attend this meeting due to another agenda, so it was represented by Mr. Yazid and Mr. Ngudiantoro.
- In relation to funding, funds will be covered by JICA on behalf of Mr. Robi in the form of blank (new) bank accounts in order to ease a fund flow during the project. Account will be closed right after this activity accomplish.
- If the fund flows through the institution, it might be resulted delays in fund disbursement, because slow performance of the bureaucracy, so that it is decided that funds from JICA will be channeled through new account.
- The signature of the contract is scheduled on May 2nd and May 6th.
- Regarding the plot demonstration, the demonstration plot will refer to the TOR with JICA if the R & D conducted a comparative study, then the comparative study should be equated with those listed in the TOR.
- There are 3 main activities that will be done, so that UNSRI, UNRI, UPR and LITBANG need to communicate.
- OKI, Muba, Meranti, and Pulau Pisau, the regional divisions are based on region not individual.
- The point of work step is that the work step becomes an indicator of achievement.
- The draft budget is charged to the consortium teams of each team, such as the consortium team from LITBANG, UNSRI, UPR and UNRI. The consortium team will meet three times a month.
- Consultation with JICA is required and will be scheduled at the beginning of each month.
- Field surveys, consumable goods and honoraria will be made by hour, one person per weeks and how many hours each week they work therefore it is not interfere academic duties, where most of the consortium team consists of academics who have an obligation to perform their obligations.
- The fifth point, related to the executive team member, each member is expected to include a cv, just the core team.
- The mentioned before will be the basis for the realization of the budget.
- The sixth point, related to the work meeting with BRG, the Meeting will be held 4 times outside this meeting, in which case there will be management fund and not from the consortium team fund. The total existing costs divided by 5, so each activity has a proportion of 20% including accommodation and travel cost. This is for quality assurance.
- Proof of financial will be collected and reported at the end of the activity
- Technical report and budget accountability report will be attached at the end of the activity.
- The sample form of the report will be a minutes of meeting form, the MoM will describe the activities that has been undertaken. Initial and final process will be record as MoM and will be the reference of this activity process.
- The basis of this activity is what is actually recorded on the field.
- On May 6th the inception record has to be made where the technical proposal will be detailed further in inception.

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- JICA and BRG Collaboration, JICA requires a feasibility study that will represent the priority area of restoration project, so that consortium team are set up and consist of R & D center and universities.
 - Main output desired by JICA is feasibility study related to the potential of peat commodities, marketing prospects, and available markets.
 - JICA is preparing investors for this activity.

Mr. Nugroho

Mr. Toro has explained the process and mechanism, other consortium team can respond to what Mr. Toro has explained as well as if you have a question to ask.

Mr. Adhy

What kind of material explained during the community assistance?

Mr. Toro

- Community assistance materials include forest and land fires, peatland ecosystem and management, explanation of BRG, TRGD, water governance and others.
- Community assistance and each activity that has been carried out will be recorded in minutes of meeting or notes.
- The minutes of the activity will contain the time, place of activity, the participants, and the activities undertaken, the materials, and the questions. There will be an attachment containing the attendance list.
- Community assistance should be done before the tools were installed, so that the community can provide any input and suggestion if the point of installation tool is not appropriate. Because of some reason the installation were carried out before the community assistance, then come a questions such as who operates the tools and what to do with the tools, and answers to these questions are recorded in the minutes.
- The final section will include the documentation for both minutes and presentations.
- This is as an overview while conducting community assistance in the community, team of escort security will be made at the time of community assistance done.
- Community assistance is objected to introduce the origin of the tool, its function, the owner, and who is responsible of that to the community. Hopefully once community knew this information the community will keep the tool.
- Included in the community assistance activities, we will socialize about community themselves because there are some issues such as the consensus problem around the community.
- Certificates are also made as a proven document that the tools were installed with the consent and acknowledgement of the community.
- After the tool is installed then this tool will be granted to the government of Indonesia. It will require budget funds for data sent and maintenance. The consortium team serves as a facilitator to bridge communications related to this issue.

Mr. Adhy

In South Sumatra tools were installed in 4 different places how is the community assistance? Is it in one place or in each location?

Mr. Toro

Community assistance was carried out in each location of installation tool. The obstacle during the assistance was a high cost of consumption and transport for local community. At the beginning of the community assistance, village stakeholder and local government were emphasized to get more understanding about the project, then the village stakeholder and local government will disseminate it to the community, if all community were invited, the cost will be higher.

Mr. Edwin

R & D parties still confuse in community assistance process and function of TRGD in the region?

Mr. Toro

TRGD is involved to help delivering the material (such as giving opening speech and referrals) the materials will be explained by universities and R & D agency. Related the tool's operation, community in this case are involved as a keeper only, the tools will be operated by the technician.

Mr. Adhy

Is the tools are the same tools in Jatiluhur?

Mr. Kuno

Yes, it is the same tools, and what is being socialized to the community during community assistance is water governance not the tools.

Mr. Nughroho

In South Sumatra and Central Kalimantan, they have at least 2 models, for Riau the demonstration plot will adjust the location, and the discussion about the demonstration plot will be discuss later by Mr. Haris.

Mr. Adhy

BRG is expected to develop sago in Riau, and as long as the discussion with Mr. Toro there is no affirmation yet related kind of commodities that will be developed.

Summary of Mr. Adhy Presentation

In the feasibility study all kinds of sago was introduced both from the garden and refineries. From the plantation sector, the potential of sago is quite large, besides solid waste and liquid waste from the sago industry is also quite potential. Industrial waste refineries from sago has many benefits such as animal feed and fish, as well as bioenergy material or wood pellets. This feasibility study is not inclined to the sago product but the waste treatment from the main product. Demonstration plot is planned to assist the community in waste management training.

Mr. Yazid

Demonstration plot in this case is a land-based and non-land based. Feasibility study is understood as business models which starts at the end and finishes at the beginning. There is a lot of potential are generated but we have to look market availability, then the process and the technology will be reviewed.

Mr. Adhy

Feasibility study on Wood pellets from sago could be carried out, but there is also a part of sago utilize for furniture materials.

Mr. Kuno

However, feasibility study is needed to find the market, whether it is profitable or not. This business should be done by community and investors and also the offered business must be able to restore the peatland. These ideas can be concretized by the financial analysis that convinces investors and the existing marketing guarantees that will accommodate both locally and domestically.

Mr. Adhy

How is the demonstration plot? Is it based on community industries, Is it possible if he demonstration plot is sago packaging activity?

Mr. Toro

In the concept of JICA it is included in non-land base. But in the context of JICA study this concept cannot be performed because of limited time.

Mr. Nugroho

- If you have a plan to develop sago, feasibility has been studied, and its business opportunity the activity can be financed by the consortium, if only the concept that you convey were implemented with the relevant package. Mr. Kuno only delivered up to the stage of planning.
- This fund is only as a preliminary design, for its implementation, other packages are required align to relevant topics.
- For R & D, comparative studies can be conducted in the context of finding markets, and ensuring that developed commodities have their markets, as well as matching their production and market units.

Mr. Adhy

Sago is currently marketed to Cirebon, this sago commodity should not be limited to sago only (one commodity only), but all aspects such as tourism could be optimized on purpose to maintain the ground water level, the business benefits the community and private. It takes a variety of scenarios in this case .

Mr. Edwin

Related to the budget, it will be better if we made a standard, LITBANG itself refers to the standard state budget, what is the standard for this project?

Mr. Kuno

Please set how many needs and the written proof should be attached.

Mr. Toro

Any bills or notes of financial should be reported in financial report. Each team should have 2 copies of financial report, for example the original financial report is archived for consortium team record and the copy are given to Mr. Kuno.

Mr. Nugroho:

What if unexpected things happen that causes funds that have been budgeted is not enough? For example in one activity we use the state budget with daily expense 300,000 - 400,000 . The problem is the local transport. The SBU Standard, for example, is 800,000 but the real spend money in the field is 1.7 million. My suggestion is we meet the standard and bring the money back, by listing the funds 2 times for the rental, if the price of 1 rental is 800,000. This is done because the SBU's local transport fund is very low, so there is a need for flexibility in unexpected funds such as this case, so that the add cost might be applied.

Mr. Adhy

For transportation to meranti there are several roads, which way to follow? And is it possible if we use air transport in urgent situation?

Mr. Toro

Any roads can be used, but choose the economic one. If things such that happened written on the note, most importantly there is evidence or written proof of transportation.

Mr. Ici

Is the bank account new or existed account? There are 3 activities (community assistance, FS, and demonstration plot making) how is the report?

Mr. Toro

Mr. Robi suggests to create a new account so that it will be easier to distribute the funds. The report of each activity includes the design of activities referring to the TOR, then items in the TOR are recorded to facilitate the examination e.g. code 4.1.1 A for community assistance activities, and so on.

Mr. Adhy

A bank account created by personal name or institution name?

Mr. Toro

The new account, Mandiri bank account, and make sure that the account is empty with the individual name, or the name of the activity. It is also a good idea if it is made as the signature of 2 people is team leader and treasurer, or the name of activities with QQ individual names for example.

Presentation of JICA Models**Speaker: Mr. Sakurai**

- Under the consortium we develop some kind of models because i just drafted some possible activiy that we can performed with local community.
- The product in activity are listed as forest related product and also agricultural product such as fruit trees, coffee, rice or paddy, bioenergy materials, and coffee. Forest related products including sago palm, indigenous trees, indigenous plants, and non-timber forest product.
- Livestock and fishery such as water buffalo, chicken, duck, fish fodder cultivation and also non-productive activity are developed.
- This is the information of some models and what kind of possible activity in region.
- For example in Central Kalimantan we recommend to conduct a study. We do duck raising because duck can place inside paddy as insect predator and duck can be a fertilizer.
- After the information from mission official, they also recommend to combine paddy with fish raising also paddy with bioenergy material tree .
- I decide the models by using and based on market and these model should be improved depending of the function on each area. Finally we'd like to prepare this kind of model such as model 1 and model 2.
- In the beginning we start with blocking the canal by canal blocking so the water level will increase, then we can grow some plantation near the canal and and also we can grow bioenergy material tree in shallow peat along the canal. In this area we can introduce poultry inside the area.
- Model 3 develop water buffalo raising, of course buffalo need some kind of food so we introduce fodder cultivation.
- In model 2, in cultivated product we may need to make small amount on the peat for plantation and also for buffalo raising and fodder in model 3.
- Models can be applied both in large area or small area depends on location.
- May be in the site we resulting of some economic issues and we also consider in economic return so we concern about the site.
- We need to conduct some preparation work that take cost a so that we need to concern to economic return.
- In small area the economic value not so good.
- And if we work in concession area, we need to talk to concession holders,
- New area also can be utilize for some kind of economic utilities in line with peatland restoration.
- In that case we need to propose some kind of alternative timber business in peatland area and also some of non-timber forest product production can be applied in concession area such as apiculture, this is just sample so we would like you to consider more possible activity.
- The last one is peatland friendly ecotourism, in case of there are some school near peatland area but the students in the school not so familiar with the function of the peatland. So that this kind of eco-tourism can be applied.
- Some productive activity especially for Riau area, because it is near to Singapore and Malaysia we may be able to introduce some kind of eco-tourism area for neighboring country so in this case we introduce some kind of productive activity

we ensure agro eco-tourism, we may be able to introduce this area as recreational area.

- This type of models just an overview from our observation, we likely to consider what kind of activity can be introduced and combined in each area.
- Site of each activity such as sago plantation or fodder area depend on suitability of product in each area.
- The need of buffalo and plantation in the area has not been detailed yet.

Mr. Adhy

What kind of bioenergy material will planted in activity site?

Mr. Sakurai

This moment we talk about Gamal, gamal can use as wood pellet.

Mr. Adhy

If we plant gamal, for example after 3 years the tree will be cut and how about the soil condition after harvesting the wood? I think wood pellet can also made by agriculture waste such as from sago waste, sago agro planting may be better than gamal.

Mr. Sakurai

That's good also and may be it is good to plant that kind of tree. But in case in other area if there are no suitable trees for introducing in the area, gamal can be planted for producing wood pellet, it depends on the utilization.

Mr. Adhy

As I said before, from sago plantation industry waste can be used as wood pellet. Because the demand of wood pellet world is quite high and we have not utilized optimally.

Mr. Nugroho

There is a wood pellet factory in Wonosobo, wood pellet made from twigs while the main stem for wood industry. Wood pellet products then absorbed by Korea companies, because the regulation of fuel use in Korea does not allow the use of coal.

Mr. Toro

What pattern use for integrated activity models? It depends on local situation and local materials for canal blocking? Yesterday we discuss a lot about canal blocking, one structure needs hundreds of trees to be cut, and it should be considered if we used the wood material to build the canal blocking more trees need to be cut, some of us advice to buy woods from other area. Despite the material of canal blocking, your models are excellent and inspiring us on what pilot project that we will set up.

Mr. Yazid

In order to build the canal blocking we need so many local trees, so in which models that you proposed showed the plantation of local tree?

Mr. Sakurai

Actually I didn't improve that kind of activity but such kind of that activity can be included to the models. For example gamal tree can be replaced by other tree in other area, not only for bioenergy tree but also timber product.

Mr. Yazid

For example in South Sumatera the width of the canal 20-40 m u can imagine how many trees were being cut, and the length of the canal almost 15 km, how many canal blocking unit we should build? Canal blocking are build every 400 m, almost 40 canal blocking and times how many trees, it is about a hundred tree might be cut.

Mr. Sakurai

Actually I could not conclude the plantation nor timber tree, for example for this boundary area we can also plant timber tree, depends on the necessary, if we or they need timber tree we can change bioenergy tree to timber tree. So we can choose both of them.

Signing of A Contract

Mr. Nugroho

We reverse the agenda of the meeting, the first session is discussion and the next agenda is signing of a contract.

Some of the points discussed in the previous discussion are:

- General matters in this context, we concentrate on the issue of publication, Mr. Kuno has given an agreement that all constituents / consortiums could publish their publications on their research results by the terms that they inform JICA and put JICA in the acknowledgment on their publication, so there is no need to put co-authors and others.
- The discussion was productive lead by Mr. Toro, technical matters regarding TOR work steps, coordination, and field standards, about the executive team members and the standard payment of honorarium has been discussed.
- The Forum agreed that a coordination meeting is likely to be held in Jakarta, Palembang and other approved places, probably more in Jakarta.
- Another thing that has been discussed is about Substantive, it has been agreed that the result of our research for 4 months is feasibility study about potential commodity that can be developed in the area then also Mr. Sakurai presented some activity model or integrated activity which might be emphasized on potential commodity.
- The Consortium activity has been generated FS (Feasibility Study) of potential commodities and also the design of the development. Currently only until the design and has not been implemented yet.
- Regarding to integration of activities if the consortium get packages from partners on relevant topics, the implementation can use it, but the design and FS are using JICA model, if the topic they receive is irrelevant from this then it will be continued next year. But at least we have the facility to compose the FS and the design, I think that's the important thing we get at this meeting.

Mr. Haris

- The first, we would like to convey a few things related to information updates that have been submitted by Mr. Nugroho.
- Certainly this consortium team has been intensely discussing some information about the institution and we have agreed that the activities and work is led by minister and the implementation model of this activity or program is carried out by a consortium collaborative.
- Substantively I would like to highlight that the undertaken activities should have the update information. It has also been discussed with Prof Robi, the update is not only a things that feasible to be published but the newest update or result that are responded by the community, because the data is taken in the community.
- Plans to be undertaken and sampling selection need to be a matured stage such as determining the location and commodity being lifted not to replicate such as the existing documents in other reports.
- Plans to be performed and sampling selection need to be in a matured stage such as the determination of the location and the developed commodity should not be repeated or have replication as there are documents in other reports.
- Because this activity is not for the benefit of individuals but for the community in the sampling area so the concrete result on what the team has done has to arrive to the community.

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- It is expected that the team communicate intensely and with the support of JICA this becomes monumental for activities related to alternative breakthrough efforts.
 - I see that the pilot project is limited to design and not in form, is there any concrete result like the collection of 1000 seedlings or tree planting as much as 200? is there a form? According to Mr. Kuno information it is not there and also timing cannot be done because July is a very dry month if the planting is risky.
 - What if the procurement of seedling? Procurement of seedling can be done if there are seedling available.
 - The action research is indeed capturing problem solving and problems such as economic alternatives.
 - The need for BRG is very clear: tree seedlings. For example, if we want to develop sago in the area we should provide sago seedling, or other commodities such as wood, so there is a real and concrete form, is there a budget?

Mr. Kuno

If the cost and design studies are quickly completed, it can be done, but the problem is we have a less time. Related to procurement of seedling, if feasibility studies already exist, the market is available, the benefits are already calculated, nurseries can be carried out. But do not start the nursery activities without any evidence and trust based on the results of feasibility studies.

Mr. Haris

The forest specialization has its science and technology on how to develop it.

Mr. Kuno

It is not the science but its feasibility, its advantages, and the market. If the model meet the feasibility study criteria the nursery can be built.

Mr. Haris

- If so why do not we leave it to Gadjah Mada University and why we ask local university (UNSRI, UR, UPR). It is because this is semi feasibility study and the people involved have known the ins and outs also the potential of their regions. So that is not really necessary to do so and we only have to execute and package this as a research with existing data.
- We are not hypothetical, and if the sampling is in the community we just have to move it.
- If the project were carried out by the system proposed by JICA is a good idea, but it should be have a concrete result or real form in 3 months.

Ms. Hening

From the budget provided by Mr. Kuno, within 3 months if the feasibility of his study is completed in 1.5 months then in 1.5 months the action can be performed.

Mr. Nugroho

Both Community and us has already known the location and the project, we just look for the market, look for the value of measurement income, after that we can start the project soon.

Mr. Haris

- It is like the value change, the data obtained already half-finished, but after the field action upward such as market action has not been done.
- There are interesting breakthrough, such as the existing commodities in Palembang, Riau and Kalimantan, We could touch the market not through traditional markets but we make the market based on IT networks.

Mr. Edwin

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- It is like the development of cafes and emerging markets. But whether within 3 months we can ask farmers to plant the coffee is still impossible.
 - Hopefully the discussion result can his result can be followed up in November using another scheme.

Mr. Haris

I agree with what Mr. Nugroho has said, but I just want to add the concrete output as if a foot prints in this JICA project.

Mr. Yazid

Wood for construction such as the model presented by Mr. Sakurai can be applied in South Sumatera where the planted commodity is the gelam tree. And if we are going to make canal blocking we need a lot of wood and the market already exists that is BRG..

Ms. Hening

However, planting this wood requires at least 10 years.

Mr. Edwin

Forestry R & D center has an experience inn planting gelam tree (malaleuca or white paperbark), it is better to develop the plants by natural regeneration than planting in nursery. That's a problem in the field, but the harvest exceeds the natural regeneration. Farmers will collect it all, so it would be better if we manage it.

Mr. Haris

- It is one of the potential market / economy that is not from zero is gelam tree in South Sumatra. This gelam tree will be sampling in what village, whether the form is forestry approach such as silviculture technique or silviculture treatment approach with a nursery. These concrete result such as nursery can be use by BRG next year, so that there is continuity form of this JICA program.
- In Riau, for example, seedling of peat swamp forest trees is quite potential because it is very rare to find tree seedlings in the peat swamp forest in large quantities from nursery. It is then packaged not in traditional marketing but through the media and IT.
- Success story came from tourism activity, mass or social media can increase tourist coming to Raja Ampat and Komodo Island as much as 3000 tourists/year as a result of thematic KKN proposed by college students. The student is set to promote the area according to his field of expertise such as IT for promotion.

Ms. Hening

I would like to share the experience I encountered on the river duet Riau. When there is UNDP with KLHK, a large jerry can of honey in Riau river, purchased for 400,000. This honey is obtained from the forest then taken through a small truck and was bought by Malaysia. Honey bought by Malaysia then sold in the form of small packs in Indonesia as a snack for children and the selling price were increased. If you want a value change, a program such as daily school children drink honey every day initiated by the health service can be solve this problem. When there is a regulation that regulates it as well as assistance or training from the government for the processing of honey and its marketing it is not impossible that this market can develop and this is a challenge because it is located on peatland area.

Mr. Adhy

In Riau there is also a kind of honey named “klukut honey” derived from "stingless bee" with selling price in Malaysia about Rp 700,000/liter. At Meranti, Tanjung Pantai, Tanjung Sari, the community has started marketing this honey and asked experts to assist them on how to culture the bee. We will insert this activity in the program that we discuss yesterday in Palembang.

Mr. Haris

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- It can be carried out in the project, but the most important things is in 3 months there must be a concrete form of consortium work, which areas are more likely to develop a commodity must be reviewed, either in South Sumatra or Central Kalimantan, as well as the developed commodity can be a nursery of local fish.
 - Marketing system should be built, e.g. converting conventional market to IT based market. So that community know and see that there is a concrete result of consortium's work.

Ms Hening

Other products can also be made from gelam. Handicraft products such as handbags and hats with addition of style or decoration could increase the selling price. Then it sold in big city such as Jakarta and being promoted by mass or social media, I think it is quite a good business opportunity.

Mr. Haris

- Nursery is also important, the Deputy 2 could be a target of market. Large scale nursery has not existed nowadays, so nursery business is potential to be developed.
- Community's nursery is still a conventional, so it needs to be improved and given any advance science and technology.
- The market for seedling is BRG.
- The second example is fish nursery, if BRG project were succeeds, the canals can be filled with fish even though only until the seeding stage and not until the mature stage, but this still can be considered.
- At year-end science festivals, the consortium of 'Sandi 44' should be able to demonstrate the results of their work.
- The consortium team may decide the models, whether fish nursery, wood tree nursery, gamal seedling, Purun or honey can be decided through internal discussions. Therefore, the progress of the project is not only the collection of FS data approved by Mr. Nugroho (Deputy 4) and JICA through a long step, but we can combine it with the APBN and our shortcuts so that there is a concrete form, not just documents.
- I want to strengthen this team with de-feasibility study for 3 provinces.
- All that I have to say, I just want to have a concrete result. Hopefully all of us are still keep in touch. Maybe occasional meetings on the site will be better.

Signing a Contract

The signing of the agreement was conducted by JICA and the consortium team.

List of Participants

1. Mr. C. Nugroho SP.
2. Mr. Adhy Prayitno
3. Mr. Ici PK
4. Mr. Muhammad Yazid
5. Mr. Ngudiantoro
6. Ms. Hening Parlan
7. Mr. Kuno Hiromitsu
8. Mr. Akihito Sakurai
9. Mr. Haris Gunawan

Closing

End of the meeting

1.2.6 May 23, 2017 <Investement Facilitation>

Notes on

Annex-1-44

**Focus Group Discussion on
Designing Facilitation and Incentive Schemes for Private Investment in Peatland
Restoration
Oria Hotel, Jakarta
Tuesday, 23rd May 2017**

Minutes of Meeting

Agenda overview:

- a. Opening and Statements**
Opening
- b. Panel Discussion Session 1**
Presentation of case history on potential fisheries business, potential facilitation and incentives for investors related to peatland restoration as well as an integrated example of sago waste utilization. After the presentation, discussion on the design of facilities or business incentives that contribute to peat land restoration were carried out.
- c. Group Discussion**
Participants were divided into two groups based on the topics related to their field. Group A discussed on business scope that contributes to peatland restoration while group B discussed on the basic design of facilitation and incentives to increase financing on businesses that contribute to peatland restoration.
- d. Panel Discussion Session 2**
Submission of discussion result and continued with discussions on the next step or future action.
- e. Closing Remarks**
Important notes of the meeting, conveyed appreciation to participants and thanking the facilitators.

Opening and Statements

- Welcoming address from facilitator and organizer
- Brief explanation of background activities
- Explanation of the discussion activities and important notes

The facilitator commenced the event by giving a speech and thanking the participants as well as giving a brief presentation on the discussion agenda.

**Facilitator: Dr. Eli Nur Nirmala Sari
(Expert Program Deputy of Research and Development, BRG)**

**Opening: Dr. Haris Gunawan
(Kapokja Deputy of Research and Development, BRG)**

The 3rd FGDs were called as preparations aimed to encourage RAN, especially the private sector role in attracting business investment in the context of peatland restoration activities. This year there should be concrete steps that can be used as an investment pilot that minimizes the occurrence of damage and does not cause a fire on peatlands.

Important notes of discussion:

- In July 2017 there may be businesses that will make concrete investments of at least 8 billion
- Some economic opportunities in peatlands for example fish in South Kalimantan
- South Sumatra has a community wisdom that is fish business, Riau has the potential of sago, water in peat that can be used as mineral water and carbon trading
- This year there has been at least no concrete investment / investment in carbon-based peatland, commodities or land
- Discuss about leaflets or documents that can be socialized in July related to businesses in harvest that do not pose a fire risk can be implemented
- Participants could agree on how much can be targeted for investment this year

Proposed Concept Investment Engagement Seminar for Peatland Restoration

Speaker: Hiromitsu Kuno - JICA Mission

- To support peat restoration a preliminary feasibility study is underway to develop investment facilities in peat restoration in 4 districts and 3 provinces
- There are 3 approaches to strengthen water governance, business models that can help peat restoration, develop incentives for peat restoration
- In Japan incentives will be required before developing and opening
- It is expected that the parties in Indonesia can start creating facility schemes or incentives for investment including financing for industries
- Private investment potential is 1. Protected area that must be maintained and if there is HTI then after harvesting must be restored 2. Community-based business eg private can bridge the community business with market 3. Location of concession
- In business development there is a synchronization of public interest and private interests and short-term and long-term income. There are aspects of environmental services, land, water and energy
- Based on the usual cooperation plan, a seminar will be held in order to increase the investment of peat restoration which can be held in July
- Seminars are held to increase public interest in developing an investment climate for peat restoration
- Improvements are made to convey business concepts that help peat restoration, sharing incentive discussions for peat restoration
- The agenda that is expected after the opening is to create a private partnership for peat restoration and then there is time to create a green growth investment for private partnerships and communities to invest
- It is expected that today's FGD can convey concepts to increase investment in peat restoration.

Panel Discussion Session 1

Facilitator: Hanni Adiati, Msc

In everyday life we have enjoyed the results of the cultivation carried out in peat such as medicine containing more than 80% of its adhesive is sago flour, soun and cosmetic products from sago. It needs more attention that the restored peatlands can produce more and more environmentally friendly products.

Example of Integrated Sago Waste Utilization

Speaker: Prof. Dedy Sujerman (Founder of Agribusiness Based on Organic Waste)

- All organic waste can be used but sago has great potential to be an environmentally friendly and sustainable business
- Indonesia has a large comparative advantage due to high temperatures and high humidity and wetness
- Used flies, bacteria, miselum mushrooms, sago worms
- Indonesia is an agricultural country that has sago waste, the oil palm that produces the largest sago starch in the world
- Black Soldier Fly (BSF) is an agent that breaks down market waste, restaurants and households
- BSF flies can be used as animal feed
- Straw Mushroom just exist in Indonesia and is a great potential for business
- Mushroom waste can be used as feed ducks plus BSF flies
- Worms have 75% of protein and can be used as medicine and cosmetic ingredients
- Japan offers to provide 2 tons of worms per month and sago waste can be used as a medium for worm cultivation
- Potential high endemic sago mushroom fungus to be developed as a business opportunity that can also be developed in Meranti island
- Sago mushroom grows in the stem so it is not exposed to pesticides
- Wastes mushroom mixed soil can be used as organic fertilizer that can produce 27 tons of rice in 1 hectare area
- Can be developed sago mushroom
- Mushrooms have a 21% profit potential and BSF has a 64%

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- The advantage of worms has a 100%
 - It takes 1.5 billion for training
 - Investment of 3 billion agribusiness based on waste starting from mushroom, duck, organic fertilizer and organic farming by stimultan
 - Worms can be used for feed, medicine and cosmetics
 - The need for mushrooms in the world has a market share of 270 trillion and mushrooms can't be produced in other countries
 - Sago waste if fermented then the protein increases and can be used as animal feed
 - Mushrooms can be developed to herbs tofu, sausages and various meat substitutes processed

Examples of Potential Facilities and Incentives for Investors Relating to Peat Restoration

Speaker: Dendy Priyandi (Kasubdid representing Director of Facilities Facility Investment Coordinating Board)

- Incentives at BKPM are more specialization to industrialization
- BKPM only being executor of the existing regulation is not a policy maker
- Incentive facilitation that have been implemented: fiscal and non fiscal facilities
- Fiscal facilities: 1. exemption of import duty for the import of capital goods and merchandise, 2. tax allowance and tax holiday facilities,
- Non-fiscal facilities: licensing acceleration including 3 hour service, green line facility from BKPM recommendation so no need for physical examination in the field so that process is faster.
- Fiscal facilities for exemption of import duty are based on 3 legal bases:
- Regulation of the Minister of Finance No. 176 of 2009 related to the laws of industry and industry that produce services. For industry there is assistance from the government if necessary import of capital goods in realizing the industry then there is exemption of entrance fee for 2 years during period of facility period.
- Regulation of the Minister of Finance No. 66 which is more specific in the field of electric power business. There are exemption facilities of import duty.
- Changes to the Regulation of the Minister of Finance No. 110 which is No. 259 to the provision of facilities to the exemption of import duty to mining companies based on contract of work or contractual agreement.
- For businesses in the peatlands, there is more to do with tax allowance and tax holiday
- Tax allowance under Government Regulation No. 18 of 2015 which issues facilities for certain business and region. The facility is a 30% reduction in material income tax as a 5% annually cut 5% which is integrated with other facilities namely loss compensation and accelerated depreciation.
- Tax allowance process for 25 days.
- Tax holiday is limited with minimum investment value of 1 Trillion Rupiah or for telecommunication sector of 500 billion rupiah
- Tax holiday should be a pioneer company and can be 20-100% for a period of 5 -15 years.

Example of Potential Fishing Business by re-wetting the Peatland

Speaker: Mr. Donny - Sub-Directorate of Fisheries Resources, Representative of Directorate of Fish Resources Management, Ministry of Marine Affairs and Fisheries

- Currently no private sector has entered to the existing fish resource management sector on land, except those in Lake Toba.
- KKP has a policy that supports the peat restoration program named CBF.
- The purpose of CBF is to utilize public waters, perhaps peatland is included
- Stocking of fry or juveniles come from the cultivation.
- The target of CBF is public water body which fishery management is controlled by individuals or groups.
- Benefit of CBF:
- Utilization of water resources without disturbing the function and construction of water reservoir building (water body).

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- Utilization of fish by local or private communities. The private sector should involve the community in managing the partnership system. Management is controlled by individuals or legal entities.
 - Requirement for CBF:
 - Nursery or farm pond is public water, must be fertile and uncontaminated.
 - Have minimum facilities such as fry source and must be close to the seed/fry source to minimize operational costs.
 - There are CBF managers (CBF groups) that have been recognized by local government and local communities.
 - CBF's example: the harvested milkfish in Jatiluhur has a weight of 150-250 grams/ individual with a growing period of 4-6 months.
 - CBF is harvesting the fish without feeding, if it is developed on peatland, the fish do not need to be fed.
 - The business analysis at Pangandaran showed positive results: although the proportion of caught was only 25.25% but the profit earned was almost 100%.
 - In general, CBF can optimally produced if they meet the requirements of proper preparation, good management and well-maintained.
 - Preparation; CBF developed by private parties should involve local government and community, community are involved to prevent pilferage of fish, destruction and conflict. Furthermore, the procedure of selecting fish species and stocking up the fish harvesting must be agreed and prepared.
 - The government (KKP) plays a role in controlling CBF activities and the types of fish developed. The KKP should know all activity of the private sector on the peatlands which conducted CBF project.
 - Recommendation of fish species is obtained from the KKP as not all fish species can be stocked on peatlands.
 - The recommended types of fish are blue gourami (sepat), climbing perch (betok), snakehead murrel (gabus) dan giant gourami (gurame).
 - All fish managed by CBF should be reported to the Directorate General of Aquaculture or Directorate General of Capture Fisheries and will be submitted to the local Marine and Fisheries Office.
 - Another scheme that can be developed on peatland is "BEJE" which is a local wisdom in Kalimantan.
 - BEJE is a type of water insulation where the bulkhead will be lifted temporarily when water were raised while the fish will be harvested when the water were decrease.
 - Based on the working mechanism there are 3 types of BEJE:
 - Natural public, unmanaged terrestrial waters (public property)
 - Natural privat, managed by private or certain groups
 - Artificial
 - Natural private may be the best fit for peatland restoration projects. The canals in inline or outlet when water is rising or flooding will be closed so the fish can stay in the pond.
 - Simple analysis showed that the BEJE scheme generates a profit about 30%. If the juveniles of the fish were distributed as much as 100,000 with the price Rp 1000/individual, the cost for equipment was Rp 1,000,000 and the fish had 50% Survival Rate with 3 months of harvest cycle, then the net income earned by the public or private sector was Rp 64,000.
 - This scheme showed that the fishery business is quite promising.

Q&A Session (1)

Mr. Rubianto

- Nowadays chemicals such as fertilizers, herbicides and pesticides are on the critical level. The approach of back to natural microbe is very promising and we have tried that approach in a farmer demplot by using bacterial fertilizer derived from cow urine mixed with coconut water. It only cost Rp 300/ha and provided better production.
- The problem is the mindset of the farmers, we must work together to assure eco-friendly farming.

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- In Palembang there were rice, maize and watermelon farmers in tidal area, agricultural waste generated was burned and became a problem, if the waste was processed with microbes it would be very promising.
 - Change in mindset and policy is needed in order to make fish as the main commodity.
 - For Mr. Dendi, we are now looking for the ways on how to frame the business opportunities in peatland area to attract the investors.

Mr. Ahmad - UNRI

- What is the procedure if you want to involve foreign investors? For example with investments amounting 50 billion and probably not a big investment.

Mr. Agus – Directorate General of Plantation

- Since 2003 we have been doing organic farming and by 2016-2017 we have targeted 1000 organic villages.
- Regarding to utilization in peatlands frameworks, from 1000 villages, we have Liberica coffee community located on the peatlands in Tanjung Jabung Barat, Jambi.
- The problems faced by the farmers were the availability of fertilizers and seeds also their products have not been recognized by the investors.
- We may also need empowerment on making organic fertilizers. Perhaps these opportunities can be considered.

Mr. Dedi

- We should think “back to nature”, because world trends will lead to organic products. Therefore the idea on how to make organic fertilizer simultaneously came from that consideration.
- This products were expected to produce higher product compared to only fertilizer product and could reduce various negative impacts from waste.
- Sago will be a biofuel when fossil fuels were run out and its waste can be processed by 4 organisms.
- This coffee problem urgently requires organic fertilizer, this problem can also be solved by recycling the waste started from the fungi.
- Fungi production could also support existing industrial systems such as SRI, in the past SRI was fail due to the unavailability of organic fertilizers.

Mr. Donny

- This issue has been discussed in Coordinating Minister for Economic Affairs. The Coordinating Minister for the Economy also wants to change the public’s mindset from eating beef to fish. I will email the files to the Committee.
- Data analysis showed that fish protein is higher than other, moreover it also has a lower price.
- The government and industry players have to promote the importance of fish consumption for health.
- In 2017 we will revitalize the management of catch fisheries in 10 locations and by 2018 we want to plan in 20 locations.
- In 2017 some of project were located in same region with peatland restoration project such as Riau, Jambi, South Sumatera, West kalimantan and Central Kalimantan.
- One of our programs is local fish stocking (native species) such as blue gourami (sepat), climbing perch (betok), snakehead murrel (gabus) dan giant gourami (gurame) which can live in acid waters.

Mr. Dendi

- When we talk about incentives it will be fiscal and non-fiscal.
- Fiscal incentives will be utilized after the realization of the investment.
- The dominant parameters of facilitation before starting a business such as markets and other data should be explored, confirmed, and clarified.
- There is a special unit in charge of developing an investment climate to increase investment in Indonesia.

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- Easiness of setting up the business is one of the factors that could attract the investors to invest.
 - Clear and measurable procedures, markets and funds are the major factors considered by investors when starting a business compared to incentive facilities. Only a few investors such as Japan, Korea and China which more detailed to fiscal incentives.
 - Investment procedure associated with Mr. Dedi business field, if the type of investment is foreign investment, after all licensing such as principle and business license, facility and etc. has been fulfilled then establishment of business entity could be processed in Indonesia Investment Coordinating Board (BKPM center).
 - Domestic investment could be administered at BKPM or the Capital investment and one Stop Service Investment and Service Office (DPM-PTSP) in province or regional level.
 - Refers to local government regulations, FDI and domestic investment are still limited by the investment value of 10 billion to differentiate FDI and domestic investment.
 - After that there must be clarity in the field of business known as the closed or open KBLI business code based on Presidential Regulation no. 44 of the latest 2016 as a negative list of investments (DNI).
 - Investor will see KBLI and its business field. This is regulated in Presidential Decree No.40 of 2016.
 - One example of business on peatland is integrated pineapple farming with livestock by PT Great Giant Pineapple.
 - Most importantly, the business entity must have a principle permit, if the investment is more than 100 Billion or employ 1000 workers, the business owner can directly come to the BKPM office and will be served directly by bringing all requirements.
 - Requirements for opening the business are:
 - Clarity of business, sector, KBLI
 - After the establishment of a business entity, principal license will be issued (as granting of fiscal facilities for investor from the Government)
 - Later Business License will be obtained as permanent permit.
 - This facility might be used to import machinery equipment after the issuance of principle permit, when it is commercially ready (after a business license) then the enterprise can obtain other raw material facilities.

Ms. Hanni

- Three approaches (3R) in peatlands restoration:
 - Rewetting
 - Revegetation or natural succession
 - Revitalization, strengthening the economic community around peatland area
- As a result of the 2 million ha project, the BEJE was ruled out and the existing peatland ecosystems were damaged.
- Government regulation (PP) 57 of 2016 explains the task of the Peatland Restoration Agency (BRG) as an operational agency for peatland restoration.
- BRG has 4 deputies in synergy with the Ministry of Environment and Forestry.
- There are 7 priority province in peatland restoration: Riau, South Sumatra, South Kalimantan, Jambi, West Kalimantan, Central Kalimantan and Papua.

Q&A Session (2)

Mr. Kusumo Nugroho - Ministry of Agriculture

- The Ministry of Agriculture has MOL to develop eco-friendly farming, for example bio-activator made by farmers to accelerate decomposition.
- Indonesian Agency for Agricultural Research and Development has also produced a lot of bio-fertilizer.
- Sugar cane plantation framework in tidal areas including peat is inappropriate, peatland area is not suitable for sugarcane.
- Investors were still wondering about the sustainability of the business on peatlands regarding to Government regulation (PP) 57 on KHG.
- Is there any action from BKPM to participate in providing solutions to these problem? The investors were doubt whether the palm oil business is still feasible or not.

Mr. Rahmat Firdaus - Deputy Assistant of Forest Governance, Coordinating Ministry for Economic Affairs

- There are two main references that can guide us on this theme:
 1. The Little Forest Finance Book published by Australian Govt., UN REDD and UN ORCHID which contains forest management arrangements, equity, loans, bonds, grants and balance sheets, organizations related to forestry sector financing (cooperatives, non-profit international organizations, national public funds, trust fund for community organizations and environmentally friendly forestry activities and syntheses on good practices for the forestry sector including property, stock exchange, clearing, technical assistance, insurance, certification, environmentally friendly agreements, domestic laws and agreements, base prices and incentives taxes, that all of these factors constitute the content required in this discussion.
 2. Initiation of 3 States (Indonesia, Malaysia and Brunei Darussalam) in managing the Heart of Borneo Landscape. Many business plans, investment schemes are exemplified in Indonesia but were fast moving in 2 other countries. We were still trying to assess how Indonesia benefits from the other two countries.
- This integration in preventing forest and land fires can be seen in Kalimantan where communities maintain the core trees in harvesting rattan so that rattan can grow well at certain periods of time.
- This is one of promising alternative to NTFPs utilization.
- Regulation of the Minister of Trade No.35 of 2011 incriminates rattan farmers and causes bankruptcy of local farmers so that rattan exports are constrained.
- There should be an effort to review the regulations related to the government's partisanship and the management of the environment.
- Related to the Green Economy that would be implemented in July, it would be interesting if this continued to be national green economy policy.

Mr. Dendi

- There were several discussions about this regulation, we had submitted recommendations regarding the PP.
- Sustainability of investments in peatlands, if looked from the positive side there were Article 8E and Article 23 stating that if the permit had been issued and operated before the enactment of PP no. 71 of 2014 and the amendment of PP No. 57 of 2016 the permit remains valid until its expiration with obligatory to implement spatial layout of IUPHHK and HTI.
- The second case if the permit was issued before the enactment of PP no. 71 of 2014 and the amendment of PP No. 57 of 2016 but activity has not been performed hence the permit remain valid but not allowed to do land clearing, planting and had to make spatial adjustment and RHU-IUPHHK.
- It was incriminating that existing crops could be harvested one cycle and could not be replanted.
- There was injustice related to plant cycle.
- BKPM had a role in re-ensuring land that belongs to the peat moratorium, conveying the harvest restriction policy from one cycle to one business cycle.
- The palm oil industry should wait until 30 years until the efficient period of the plant where within 30 years it can be harvested several times. While the pulp and paper industry only had one cycle harvest.
- We tried to bridge and provide certainty and amenity for existing investors.
- Our recommendation are a 20-25 year oil palm cycle and can not be extend, also oil palm plantations must be sustainably managed.

Ms. Hanni

- Corruption Eradication Commission (KPK) had investigated the palm oil business in Indonesia, the irregularities would be exposed such as forest-land grabbing, illegal permits granted by regional government without recommendation of the Ministry of Agriculture, and without HGU from ATR BPN.
- In terms of company's age, they were worried because they must did replanting in their area. The cost of replanting was expensive and cause the company prefers influencing the

government to expand the oil palm plantation of about 5 million Ha. The enterprise must be orderly and planted in a fixed land.

- Ownership of palm oil stocks in Indonesia 80% is foreign-owned. The government was working with foreign corruption eradication commission in investigating this case.

Mr. Haris

- Peatland is wet because of its nature is a swamp.
- For 18 years, when there was a haze of human rights violated.
- The Government is looking for a solution to maintain the existing economic activities while preventing peat fires so that it needs to be evaluated and corrected.
- Peatland Restoration Agency was formed regarding to PP No 57.
- We are trying to change the nature of peat for that purpose.
- The economy derived from palm oil was beneficial but the country loses 220 trillion so that this restoration effort should be intensified.
- KHG is a Peatland hydrological unit composed of water located in mineral canals and domes used as a protected zone.
- Coordinating ministries is very progressive in looking at peatlands opportunities and I agree about the rattan business, although its productivity is not massive but it could prevent or reduce fire and expected to have premium price.

Ministry of Transmigration

- Based on my experience, peatland can be used after Y + 5 for planting food crops purpose.
- BRG might be able to invite the Ministry of Public Works and the Ministry of Village and Transmigration in discussions because they have experience in peatlands.
- Investors are still hesitant in investing.
- The first step was involving Ministry of Public Works in land management, then human resources entered, then after t + 3 crops can be planted.
- Projects that have been proved successful was in Lampung.

Mr. Utama Kajo

- There is no clarity from BRG related to location, land status, and whether the area has been managed (PU already entered) or not.
- These things are very important for investment, especially legality, as investors will be linked to banks, local governments as well as the community.
- This is what has not been discussed yet in previous meeting. Please show the specific location of the business unit, the area (ha), land status and tools using period.

Mr. Haris

- This will be answered in the discussion later with deputy 1 and related legal status there will be discussed in FGD with KLHK.

Group Discussion

Introduction

Speaker: Dr. Budi Wardana – Deputy for Planning and Cooperation, BRG

Structure of Investment Facilitation of Peat Restoration

- Determine the criteria for peatland restoration is the initial step in gathering idea of an project activity
- Peatland restoration is a cost factor so that peatland was not directly restored but we changed it for economic activities.
- Outcome of the activities should be able to contribute to the 2.5 million hectares peatland restoration target.
- The cost for peatland restoration is not fully funded by the state budget, so that new investment is needed for environmentally friendly peat utilization.

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- Existing concession holders can change the behavior of peatland used by changing the behavior of water management or changing their business model (e.g: pulp and paper become reducing carbon).
 - Restoration criteria are high level investment criteria, consisting of carbon impact, land impact area, social impact, scalability, and return over resources.
 - Carbon impact, there is a market opportunity in reducing carbon emissions.
 - Land impact area, there should be a number of land affected by the investment.
 - Social Impact, activities without social impact will not be sustainable.
 - Scalability, something built into the model must be in a larger scale or expanded in other areas with similar economic, social, and biophysical characteristics or some innovation could be added if the characteristics were different.
 - From the economic side it must generate return over resources.
 - Project screening from idea to investment is required (projects that can be invested economically).
 - The first stage of project idea starts from project identification and screening based on high level investment criteria.
 - In the second phase further study and field review related to the feasibility of the idea to enter to the idea development stage or the maturity stage which stating that the project is attractive to investors.
 - BRG has completed the idea identification stage of the sago management project at Meranti Islands in Riau Province, carbon compensation conducted by RSPO, REDD + project in Katingan and WWF Forest Honey.
 - There were several new projects has entered the idea entry such as bio-decomposers for rice development as well as projects in the fisheries sector.
 - The matrix will be constructed in Ideas screening phase which containing the location, summary of project description and activity.
 - Potential impact assessments will continue until 2020.
 - All High level criteria and impact of the entire project will be reviewed.
 - If all aspects were in green color, it means the impact of the activity is good.
 - Project that has been screened was the transition of sago plantations in KHG Tebing Tinggi, Riau.
 - Assessment of the idea score, sago plantation has a medium to high score, but has a low score on the business case criteria as there is no detailed business plan developed until now.
 - WWF forest honey project's score tends to be higher due to increased in community income from harvesting honey and the absence of forest clearance.
 - BRG has a role in monitoring, controlling activities, paneling and screening as well as seeking potential investment such as village fund (program of Mr. Jokowi), IFAD and Green Planet Fund.
 - BRG also approached existing funding sources such as OJK.

Group Discussion

- Group A discussed on business scope that contribute to peatland restoration consists of KLHK, Ministry of Agriculture, Ministry of Marine Affairs, Ministry of Tourism, Ministry of Industry, BKPM and BRG.
- Group B discussed on Facilitating and Insensitive Basic Design topics to increase financing for businesses contributing to peatland restoration comprising the Coordinating Ministry for the Economy, OJK, Ministry of Finance, BKPM, Ministry of Industry, Ministry of Trade and BRG.

Group A: Business Scope Contributing to Peatland Restoration

Facilitator: Prof. Robianto - Consortium Team UNSRI-UNRI-UPR-LITBANGHUT

- Commodities and services differentiated by wet peat, rather wet and dry
- Wet peat is suitable for stagnant commodities such as sago and rice
- Services that can be developed environment and ecotourism
- On the Ministry of Agriculture map there is land that should not be planted with palm but still planted so that there is overdrain governance of peat so that there is a fire
- Many people are still under poverty so there must be integrated management

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- If the canal is made it will remove the most water and want block again
 - If water drops to minus 40 there will be a hotspot
 - Minus 40 should be maintained in accordance with the presidential mandate
 - Kepulauan Meranti daerah terluar, tertinggal dan terdepan adalah kemiskinan. Transmigrasi, menko, perikanan bisa ikut terlibat tetapi ditentukan siapa yang akan membuat matrix programnya
 - The burning of Padang Island due to slash and burn slaughter area
 - The problem of Meranti Islands is the outermost, lagging and leading region is poverty.
 - Transmigration, economic ministries, fisheries can be involved but determined who will make the matrix of the program
 - Restoration solution is the integration of ministry programs of related agencies
 - Communities in contact with forests are now encouraged to protect forests
 - KPH institutions are placed in front because of KPH at the site level
 - From the land tenure aspect depends on the management
 - In Riau there are 5000 ha of illegal oil palm plantations within TN Tesso Nilo area
 - If you want to open a peat land there should be water management planning with 2 approaches one of them is intensive shallow drainage
 - Palm oil, sago and palm commodities must be clear where they are
 - In managing the water system there are 3 levels: micro, macro, infrastructure
 - Burning is over drain overweight
 - Restoration does not have to use blocking channel but with its integrated approach is integration
 - The concept of social forestry, indigenous peoples will gain the land
 - If the restoration is in the peat then what needs to be done is to raise the water level

Ms. Happy – Director General PHPL Ministry of Environment and Forestry

- There are already 16 companies that have adopted a new paradigm that applies timber harvesting after ecosystem balance (20-30 years)
- While waiting for the ecosystem condition to be stable again the company is seeking non-timber forest products such as sago, rattan, sap, honey and ecotourism and carbon services
- From several existing companies, there are some companies that purely use the environmental services like PT Rimba Raya Konservasi and PT Limbah Makmur Utama that is carbon and non-timber forest products
- In restoration activities in addition to restoring its biodiversity as well as the stability of ecosystems that must be restored
- In addition to managed businesses there are ecological governance such as key species and wildlife corridors

Prabowo - Direktorat APLL Kementerian KLHK

- Linkages to the management of peat have been tried to cover the peat distribution with the FMU (Forest Units Processing) map of the existing peat land area in KPHL and KPHP. There are about 1.2 million ha in 20 KPHK, 5 KPHL and 15 KPHP
- There are 3 KPHs: KPH LINDUNG, KPH PRODUKSI, KPH Konservasi
- South Sumatera KPHL Banyuasin there are 13.000 Ha, in Jambi there is KPHL Beram Hitam River 13,6rb Ha, in Riau there are 3 KPHP, in Kalteng there is KPHL Kapuas area of approximately 94.000 ha
- FMUs to carry out their activities are encouraged to be able to independently manage forests with the management of NTFPs
- If future management of its business scope peat other than outside forest areas and communities, it is expected to be encouraged for the involvement of FMU in the business of peat restoration
- FMU is a site-level forest management
- Encouraging One KPH One Product program

Directorate of Environmental Services Conservation Forest

- Products from environmental services are almost identical only by region status

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- Activities that can be carried out in conservation areas for the utilization of environmental services in accordance with PP 108 of 2015, environmental services that can be utilized in conservation areas comprising nature tourism environmental services, water environment services, carbon environmental services, geothermal environmental services, environmental services Wind and solar environmental services (sun)
 - Existing ministerial regulations so that environmental service activities can be carried out are nature tourism environmental services, water environment services and geothermal environment services
 - Conservation areas that can be used as the utilization of environmental services namely National Parks and Nature Parks
 - Activities for the development of environmental tourism services without building facilities and environmental water services can be conducted in the wildlife reserve area
 - For the benefit of environmental services can only be done in the utilization zone
 - The obligation for the holder of the environmental services business license is required to provide protection and security in the area provided and in the vicinity including the activities of restoration and prevention of forest fires

Department of Plantation

- It should be agreed whether this is community land or business actor
- The first thing to highlight is the status of the land which should be a sign of the cultivation list
- What is worrisome if included in the scope of restoration turns out there are areas that enter into the area
- Community socialization related to non-oil commodity change due to restoration
- Coconut and sago commodities can contribute significantly to peatlands

Haningrum – Department Aquaculture

- Fisheries on peatlands there are 4 commodities namely sepat, gabus, gurame
- Lele and nila need special treatment such as calcification and pH below 7
- Ogan komering Ilir will be done TBF in peatlands

Mohammad Nur - Director General of Food Security of irrigated and swamp rice subdid

- Peat identic with tides and swamps and can be applied to organic swamp rice
- Organic rice can be for ecology and export

Department of Horticultura

- Horticultura has a high potential value both the land, or in the peat
- For peatlands need water management and peatland type appropriate with horticulture type C and D with water height of approximately 50 cm
- Examples of orange area development in peatlands focus on South Kalimantan, West and Central Kalimantan
- Horticultura can increase people's cashflow
- Land status used for the development of holticultura is land owned by the group and most of private land is not rent or HGU.

Mr. Utama Kajo

- If the problem of using the type of canal (wet / dry) is not completed then the private sector will not want to invest
- Who resolves canal issues? BRG or who? And where is it?
- If BRG has managed to restore damaged land due to what will the fire be returned? Because sago needs water? Sago stores water and is combined with Indonesia's future food barns (swampland)
- The private sector will not be able to invest if the land status remains unclear and has not been resolved
- Community land that has been successfully restored is expected to be distributed to indigenous and private communities to play a role in directing

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- It is expected that land restoration can be used as agrarian reform
 - The private sector does not want visibility but wants a baseline study of what is happening in the region

Mr. Haris - BRG

- BRG has a mandate of 2.49 million of land that will be restored with four criteria: burnt land by 2015, dome with canal, domes without canal and aquaculture zone and there is forest areas, APL, concession areas and community governance
- For concession areas, authority in the Ministry of Environment and Forestry or related Ministries
- BRG provides technical implementation of conservation of peat restoration and advice
- Directly undertaken by the BRG is in the community management room both APL and private status
- If the status in the concession area is the company that is obliged to carry out the restoration but through BRG guidance
- If the company does not restore it will be subject to sanctions

Group B: Scope Business Contribute to Peatland Restoration

Facilitator: Mr. Budi Wardana

- There are 2.5 million Ha of land to be restored, 1.4 million Ha is in the concession
- If we want to facilitate investment for sustainable peatland use, we should focus on 2 things:
 1. How investment facilitation could change the existing pattern of peatland use in forest concessions or ecosystem restoration concessions?
 2. How to encourage the peatlands management in plantation land, especially oil palm plantations?
- Idea notes that are being developed to arrive at the investment stage
- The discussion that will be conducted in this group is how to encourage investment facilitation in both concession and community areas.

Mr. Erdirio - Representative of Deputy 1 Coordinating Ministry for Economic Affairs

- Investment is more related to BKPM, while we are related to financing.
- Framing restoration activities should be in inclusive approach as this year the activities of each ministry and institution should embrace inclusive approach.
- The inclusive approach contains the value that the activities could increase community income, provide extensive employment opportunities, and reduce the number of poor people.
- Micro and small enterprises in the peatlands need clusters such as culinary, handicrafts, edutourism, conservation, processing industries, health, livestock, agriculture, honey bees, etc.
- Data clusters of this business can be used as a pilot.
- The government cooperates with banks to allocate 110 trillion rupiah for this financing and the government also allocated subsidy funds about 10 T.
- Small micro businesses are charged 9% interest rate and the deviation is subsidized by the government with the 10 T fund. In addition the president also suggested to lower interest rates for small medium enterprises.
- Other funds that can be used for peat financing are village funds, funds allocated by the government are around 1, 4 billion per village.
- At the central government level it is recommended that each ministry and agency and authority agency (OJK) when in a joint activity should have a SK POKJA from the head of the BRG.
- In pilot project area we ask the Governor or head of district to create a piloting working group with the decree of governor or head of district.
- Encouraged not only macro investments but also micro or small business investments to avoid social gap.
- So that there will be added value obtained from the project such as the number of small micro business in peatland, increase of income, number of labor that can be absorbed, and reduced number of poor society (there is social approach).

Mr. Budi

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- Regarding to the proposed of Decree of working group (SK POKJA) to encourage inclusive development we strongly support the proposal and we will discuss it.

Mr. Edi Setiawan - OJK

- Since the end of 2014 OJK has a financial roadmap policy
- OJK oversees commercial funds and becomes a transmission for a large number of non-commercial funds to better monitor and target
- The third type of fund was the mix fund, which is one level higher than the social fund or public fund, using commercial funds and social funds.
- Mixfund could be implemented on smallholder farmers who plant long-term crops, so farmers get additional funds for survival until the harvest time.
- OJK had performed capacity building to financial service institutions by introducing green business; After the introduction it was expected that LJK perspective might change.
- The Capacity building was structured but not massive.
- The introduced Green business include: green energy, green building, organic farming and ecotourism.
- OJK has not entered the BRG project because there is no guidance yet.
- The major guideline should include: introduces peatland related businesses and economic and risk assessments.
- After the guideline was made then the next stage was capacity building and piloting.
- To increase the participation of the financial services sector, OJK successfully invited 8 banks in this sustainable plan last year. On the next year the bank plans to invest some of its investment into the green sector. This is an opportunity.
- There should be two efforts: guiding the financial services sector and guiding the farmers.
- Farmers will be guided in the preparation of project proposals
- Previous experience, many banks received poor project proposals with inadequate feasibility studies as a consequence the credit was being stucked.
- The second cause is the absence of an accurate fund. For example: micro hydro project.
- OJK persuaded the financial sector to enter the green sector as well as government and business sectors will be invited to work together to solve the problems that occur in the field.
- In the future OJK will issue a rule requiring all sectors of financial services to support sustainable finance by applying the rule that all sectors of financial services are required to make sustainability reports.
- This will be the transparency of financial services activities in the green sector and as the data portfolio of banks that are categorized as green or social friendly.
- CSR funds can be set aside to finance sustainable fund programs.
- Mixed funds can be combined with BRG fund, furthermore BRG can work with many Financial service institutions (LJK) to produce models that can be replicated in some region.
- It is expected BRG's steps to cooperate and involve the LJK in optimizing commercial, social and mix funds.

Mr. Heru - Directorate General of Taxation

- Tax facilities for sago industry were available in PP no. 18 of 2015.
- Currently, the contents of PP No.18 of 2015 were being revised, this is an opportunity for BRG through ministry which hold BRG to propose the sector to be included in PP No.18 of 2005 as well as the reasons should be included, for example: propose tax allowance for sago industry in Meranti
- If you want to add other industries, the proposal could be included and the reason should be reinforced the proposal.

Mr. Dendi

- KPBU can be an example for this pilot project proposal.
- We can choose a pilot project/showcase project which representing various sectors. E.g.: Kuala Namu airport project.
- We could select the showcase project then we can make it as a joint project.

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- Related business fields to be added in PP no. 18 year 2005, when we will change the contents of the regulations there must be accompanied by a study that supports and there must be a leader who proposed.
 - The carbon trade project is regulated in Perpres 77, foreign investment could invest 50% in carbon trade with the classification of KBLU 02049, in Perpres no. 44 of 2016 it was set that 50% for foreigners.
 - It is no longer valid now which means it allowed 100% of foreign investment or 100% for domestic investment.
 - Tax allowance can be proposed as a facility to attract investors or may be social restoration and social services can be performed due to it has not been considered yet and given incentive stimulation.
 - This may be reviewed more deeply and becomes a showcase project to achieve something more concrete.
 - Tax allowance could be a new initiative that is more suitable for peatland and it could be proposed to BKM.
 - Tax allowance is relatively safer than tax holiday.

Mr. Budi

- How does this carbon trade maturity for restoration, rehabilitation and social forestry? Is there already a mechanism and approval by the Minister?

Ms. Hanni

- Regulation of the Minister related to carbon trade will be published in October.
- Until September we receive inquiries from the parties
- I have to check BKPM regulations that allow 100% share ownership while we have an obligation under the Paris Agreement to reduce 29% of carbon emissions which 17% from forestry sector while 11% from other sectors. This has been endorsed by Bapenas.
- This is unusual if the LHK Ministerial Regulation issues carbon trading limits for forest-based restoration while BKPM opens 100%.

Mr. Budi

- The potential to attract investors investing in peatland is quite huge.
- When the peatland exposed, the peat would release emissions annually and the restoration activities will likely increase the emissions.
- So that all wetting activities in peatland must be able to reduce the emissions.

Mr. Utama Kajo – Indonesia Chamber of Commerce and Industry (KADIN Indonesia)

- Rehabilitation of peatlands is a state obligation
- Potential and carbon trade are all true.
- Private sector wondering of the location and where the private sector will be placed.
- Private sector also need to be backed up and must be protected by the state and need legal standing.
- Private sectors always workwith banks and banks require the legality of the land where the business will be set up.
- The private sector can not work with individual capital, so we ask , if private sector were invited to involve there must be a clear and detailed location, definite width area and clear status, then the private will come to BKPM to get the licensing then we can propose it to the bank.
- Simply tell us the details of location, its status, then present it as map and document.
- If only FGD, it is less meaningful.

Mr. Budi

- There is already a list of locations, communities and partners in the 14 locations I mentioned before, in the next phase will be made the feasibility study.

Mr. Utama Kajo

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- We do not really need FS because we will plan what we will do there by ourselves.
 - We only need the location and what is happening there.
 - Requirements such as carbon impact, etc. are already common, so it might not be the feasibility study but the baseline study. Please show the baseline results.

Mr. Budi

- We will give it when the project concept is completed.
- Mr. Utama Kajo
- Land rehabilitation status and the actors must be clear.
- Land rehabilitation requires substantial funds, if we have to do rehabilitation it may take 70 years.
- Then it will be related to land value tax, customs duties, etc.

Mr. Budi

- IUPHHK RE permit generally has longer term period.

Mr. Yusuf (Deputy 3 BRG)

- This year BRG, especially Deputy 3, has a major program “peat caring village” targeting 75 villages and need village facilitators.
- I agree that the UKM sector is also important.
- There are many potential small businesses in the village and we need information regarding the financing scheme.
- One of the existing potentials in peatland is the VCO from coconut, for example: community in Jambi and it needs to be managed in groups.
- We need information on how to grow a micro business and how to integrate with village targets.
- The village government allocated approximately 1.4 billion for the activity.

Mr. Budi

- FGD penting untuk mempertemukan ide dan resource.

Mr. Erdirio

- The average potential of micro enterprises from 75 peat-caring villages can be input to seminars in July.
- The number of villages that can be financed and institutional strengthening and capacity building for microfinance institution in the village can be mentioned in the seminar.
- Community Assistance was good and perhaps assistance from the Ministry of Village can be included in the working group (POKJA).

Coordinating Ministry for Economic Affairs

- For Ms. Hanni about the new regulation, we can discuss it with BKPM then revised it and submitted to the Secretary General of KLHK then the Coordinating Ministry for Economic Affairs will revise it again.
- Every 2 years we revised the Investment Negative List (DNI).

Mr. Dendi

- Related to DNI, BKPM had regulated this through Presidential Regulation no. 77 regarding negative list of investment, then it changed to Presidential Regulation no. 44 of 2016 which carbon trade was regulated by a maximum foreign share investment about 50%.
- The DNI regulates open and closed businesses sector for investment.
- Carbon trade is essentially open business sector, now it is more liberal due to foreign investment percentage is not regulated.
- If it is not regulated, the assumption is that the business field is 100% open for FDI as well as domestic investment.
- This could be a reference to a Ministerial Regulation about the carbon trade.

Ms. Hanni

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- To strengthen the information related to carbon trade will be obtained from the companies.
 - We will have a meeting with Great Giant Pineapple, to find out company history in setting up the carbon trading, as well as ethical code and MoU.
 - It is also related to JCM that has been built up, it will be reviewed so that the carbon trade rules later will be aligned with JCM's ethical code.
 - This new regulation must be well-calculated regarding to reducing emission obligations.
 - We requested the data of Japanese companies who did the carbon trade including the concept and the rules to Mr. Kuno.

Mr. Budi

- There has been some potential for facilitation in peatland restoration based on the information submitted, unfortunately the potential was still spread over.
- There should be a change of land use model.
- In order to change the land use model there should be an investment.
- If later in KLHK study some companies had to change their business model totally then it would need some input from us especially.
- BRG had homework to ensure the location and activities in the restoration area so that the private sector could invest.
- This homework will be presented not only as the map but also the baseline study.

Panel Discussion Session 2

Results Presentation from Group B

Mr. Erdirio

- To ensure investment interest, Investment in peatlands should be proposed to include into opened sector, the businesses were listed then proposed to BKPM and coordinated by the Coordinating Ministry of Economy, especially the deputies 5 so that some types of investment in the sector can be opened whether to FDI or Domestic investment.
- A revision of a presidential regulation concerning tax relief in order to include this business to tax relief proposal.
- It was expected that the business proposal will be submitted in July.
- BRG had conducted guidance on 75 villages in which each village has been assisted.
- It is hoped that BRG will increase financing or assistance for 70,000 micro and small enterprises in 75 villages.
- Piloting should be conducted on the synergy of the development of clusters based on peat restoration as well as on the procedures for partnership between small and large companies, central government and local governments, domestic authorities and foreign authorities so that they can meet at pilot sites.
- The enterprises expect the definite locations that are ready to be offered to investors, especially the legal standing.

Ms. Hanni

- Rules on carbon trading procedures will be drafted and targeted to be completed by October.
- Data of Japanese companies conducting carbon trading in Indonesia, the concept and the rules will be given by Mr. Kuno.
- KLHK will have a dialogue with Great Giant Pineapple Company about carbon trading.

Mr. Erdirio

- We proposed SK POKJA from BRG head whose members consist of representatives from Ministries, Institutions, Authorities, and Universities.
- Ministry of Village need to be involved due to the disbursement of Dana Desa about 90 trillion to the village.
- Bank Indonesia (BI) could be involved as there are several commodities related to price stability and inflation and BI had a social program that can be integrated.
- This year the Policy Committee for UMKM in cooperation with 38 financial institutions allocates a budget of around 110 trillion for small enterprises and assistance if BRG already owns the micro-enterprise.

Results Presentation from Group A

- Discussion results a business scope that contributes to the restoration of peatlands, especially commodities, services and downstream industry integration.
- Downstream industry integration has not been widely responded because the enterprises want clarity of commodity, location, and land status.
- Existing Environmental services were natural tourism, water and geothermal.
- Commodities on restoration land were sago, coconut, palm, and palm.
- It was difficult to determine land ownership and responsible parties if the restoration map is unavailable.
- Palm restoration is improving its governance and requires the enterprises approach and approach from BRG.
- Coconut companies are not interested yet because the location is not clear.
- Commodity maps and baseline data are needed not a feasibility study.
- Management of all sectors whether the plantation or food were expected to affiliate in joint pilot area.
- A map will be provided so that the location is more specific.
- Integrated approach is required in the concept of restoration.

Ms. Eli

- FGD aimed to identify concrete investment concepts in peatland restoration.
- BRG cooperated with JICA to conduct feasibility study in purpose of answering questions arising from investors related to investments in peatlands.
- A concrete example of BRG's activities is the investment in rice development in shallow peat areas.
- The example of this business on a large scale has been implemented by PT Sinar Pangan Indonesia by developing a partnership. They rent community's land and community was given salary and the harvesting crops were divided.
- BRG was preparing a zero fire land management review with a decomposer.
- BRG was trying this program in 2 villages in Padoran Mulya village and Sebangau village.
- Before burning practice prohibition, dry grain yield occurred 1-2 ton per hectare, and after prohibition was applied the harvest yield was 50-75 kg resulting in food insecurity.
- To solve this problem BRG tried a non-burning management program with decomposers and targeted the yields of 6.5 tons/ha.
- This is the business models that we were expected.
- In July we targeted a concrete concept.

Mr. Robi

- Funds are widely distributed among ministries, private and public but those that do not yet exist are physical maps of, actor's maps and ministry maps in target areas especially in the village.
- We have to trace from problem map to solution map and cost sharing.
- I agreed with the POKJA but if the target was 2000 ha it is too wide.
- If the matrix was done then the POKJA can move.

Ms. Eli

- BRG worked based on KHG maps so it would be difficult in measuring if we used administrative maps.
- BRG also concerned about carbon emissions, we manage agricultural activities with the aim of producing a product eventhough the emissions generated will increase. However, this would be better than allowing the soil or land neglected and emitted the carbon, it would be worst if it was burned.
- This showed that restoring peatlands based on KHG is very important.
- In one KHG, the existing peat dome needs to be developed into a protected function, the area was planted and should not be disturbed to produce carbon capture, while in shallow peat areas

were managed for cultivation and could improve community economy so there is a trade off in one unit KHG.

- This will be performed also in KHG Sungai Utara and Sungai Serapat in cooperation with international agencies.

Closing Remarks

Mr. Haris

- It was very clear that this peatland restoration business can be run in 4 districts.
- It was expected that small and medium-sized businesses should be developed not only large-scale enterprises.
- Sago and honey are very prospective in Riau.
- In South Sumatra fish, purun, and gelam were very prospective, especially wood for the channel building.
- In Japan biomass-based fuels are being developed this is also an opportunity.
- It is expected that by 2018 this business can be performed and replicated in other districts.
- Carbon trade was being prepared for regulations and infrastructure.
- The water business in peatland could also be developed by reproduce the peat water into drinking water.
- In July it is expected that there will be a business profile of each target district.
- If feasible, FGDs can be conducted with the local governments in each of the target districts, so that local governments can be involved from the outset.
- Thank you for contributing ideas given to this FGD.
- Facilitation needs to be taken whether the business minds incorporated in the Indonesian Chamber of Commerce and Industry is the same as Mr. Kajo's opinion.

End of Discussion.

1.2.7 June 20, 2017 <Investment Facilitation>

Notes on

Discussion and Formation of Facility and Incentive Team on Designing Investment Scheme of Peatland Restoration

Morrissey Hotel, Jakarta

Thursday, 20th June 2017

Minutes of Meeting

Agenda overview:

- a. Opening and Statements**
 - Opening
 - Presentation from Mr. Kuno Hiromitsu about the summary of FGD activities as well as results and outcomes from FGD and consortium team meetings.
- b. Discussion and Team Formation**

Discussed on investment in peatland restoration and followed by team formation. Participants were divided into two teams (facility team and incentive team) according to the interests and expertise of the members.
- c. Closing remarks**

Important notes of the meeting and conveyed appreciation to participants and thanking the facilitators.

Opening

Facilitator: Ms. Hastin

- Welcoming address
- Brief explanation of background activity

Meeting Attendances:

1. Mr. C. Nugroho (BRG) – BRG
2. Mr. Haris Gunawan – BRG
3. Mr. Kuno Hiromitsu – JICA Mission
4. Mr. Widiyanto - KADIN
5. Ms. Ruth Mitha C N – Kemenko Perekonomian
6. Mr. Denny Latuconsina – Kemendag
7. Mr. Afif Rahmat – Kemendag
8. Mr. Rachmad Firdaus – Kemenko Perekonomian
9. Mr. Utama Kajo – KADIN/DRN
10. Mr. Bayu Putra – Kemenko Perekonomian (Deputi 1)
11. Ms. Ani Suryati – Kemenko Perekonomian (Deputi 5)
12. Mr. Rudy Prasetya – KADIN
13. Mr. Nugroho J. Sutanto – Kemenkeu
14. Mr. Gunawan Pribadi – Kemenko Perekonomian
15. Mr. Anke Dwi – Cultivate
16. Ms. Sri Endang N – BKPM
17. Mr. Haryo Y S – BKPM
18. Ms. Istiana Maftuchah – OJK
19. Mr. Rizky M – DJP
20. Ms. Adisty - Kemenkeu
21. Mr. Dendy A – BKPM
22. Mr. Ariawan C P – BKPM
23. Mr. Abdul Karim – BRG
24. Mr. Erdiriyo – Kemenko Perekonomian
25. Mr. Andi Ismail – BKPM
26. Mr. Nunung Nuryartoyo – IPB

Speaker: Mr. Haris Gunawan (BRG)

- Welcoming address.
- Brief explanation about BRG.
- Explanation of peatland conditions in Indonesia.
- Peatland restoration is one of the Government's efforts in mitigating the risk of fire.
- Peatland restoration was established in 7 priority provinces targeting 1000 villages which its economic development potential will be consider.
- BRG wants to develop peatland commodities to be attractive in investment and economically feasible.
- The meeting aimed to establish a facility team and incentive team that could support the promotion of peatland commodities and their investment opportunities.
- The nearest BRG agenda is the workshop related to finalization achievement in attracting business and investment in July.
- The workshop aimed to facilitate the BRG's study to be promoted to potential investors in Japan.
- BRG and Japan cooperation is prioritized in 4 districts (Meranti, OKI, Muba, and Pulang Pisau).
- I hope there were no conglomeration of individual interest, this pilot is aimed to support community welfare.

Summary of FGD on Facilitation and Incentive Schemes for Private Investment in Peatland Restoration and Consortium Meeting.**Speaker: Mr Hiromitsu Kuno (JICA Mission)**

- JICA mission facilitated preparations of coordination for peatland restoration and peatland fire study.
- There are 3 major components in this project :
 1. Reinforcing peatland hydrology
 2. Supporting research in conducting feasibility studies and model business concept for 4 prioritize district.

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3. Supporting stakeholder's coordination meeting in discussing and establishing incentives and facilities to increase investment on peatland restoration.
- Regular meetings, FGDs and workshops were conducted to support stakeholder's coordination.
 - Based on the recent workshop in Tokyo, it is necessary to improve the approach in attracting foreign investors.
 - FGD on 23 May focused on designing incentives and facilities to support related businesses in peatland restoration.
 - Important notes on FGD 23 May:
 1. Private needs especially land and social aspects must be considered
 2. Revised the regulations related to incentives and facilities in peatland restoration as well as established national demo plot for peatland restoration.
 3. The business model of peatland restoration is primarily community-based and partnership with the private sector.
 - We set up consortium team of local universities and R&D center focusing on potential of peatland inventory.
 - Summary of the meetings with the consortium:
 1. Potential commodities have been inventoried but must be improved on quantitative data, profit analysis and financing scheme
 2. Innovation in the peatland business is needed
 3. There's no clarity of businessmen target and business rules
 - There are 4 integrated aspects in developing business model: Cash flow, landscape aspect, 3R approach (rewetting, revegetation and revitalization), and community based business.
 - Due to a large cost of peatland restoration but hardly beneficial to production, change in mindset and providing facilities and incentives for investors is required.
 - Commodity overview based on inventory: sago, rice, maize, horticultural crops, fruits, liberica, or a combination of farms with MPTS for bioenergy or fodder.
 - In forest area we could develop HTI sago as HHBK, carbon trading, ecosystem restoration, or eco-tourism.
 - Outside the land, we could develop primary industry by recycling waste sago for mushroom cultivation or bio-energy.

Discussion and Formation of Facility and Incentive Team in Peatland Restoration

Facilitator: Mr. C. Nugroho (BRG)

- Mr. Kuno provided an opportunity for the consortium team to undertake a study of potential commodities in 4 districts.
- Consortium had presented their result regarding to commodities that can be offered to investors technically.
- The results need input from the meeting participants especially in financial sectors to make the information more holistic.
- Meeting participants are welcome to ask about the presentation or other things related to the topic.

Mr. Anke (Marketing Communication Consultant)

- Marketing is currently moving not only meets the needs and desires of consumers but met the anxiety and desires of the target market.
- Anxiety and desire from Japan including the benefits, payback period, social security, and convenience (product concept oriented).
- Products in peatland business should be interesting and irresistible offer by involving emotional factors besides technical factors.
- Challenges for peatland business are product innovation, where product innovation should meet market innovation.
- Innovation presented by Mr. Kuno must be understood by the market.

Mr. Rudy (KADIN)

- While the incentives were designed there must be clear and scalable concept so that it would financially attractive and worth to do.

Mr. Erdiriyo (Coordinating Ministry for Economic Affairs)

- Work plan can be created with stakeholders as well as their programs, targets, indicators and outcomes presented as integrated matrix. For example: OJK could bring financial institution for financing or cheap credit.
- While waiting for funds from foreign investors, financing in Indonesia or incentives from Ministry of Finance, BI or KADIN can be used.

Mr. C. Nugroho (BRG)

- Indigenous commodities of peat land valued lower than other commodities grown on peat (non-indigenous).
- Peatland commodity did not have financing and facilitation as crops commodity in peatland such as oil palm and rubber.
- Therefore we try to increase the economic value of that commodity by promoting it to investors.

Ms. Sri Endang (BKPM)

- There were some limitations of investment activity in attracting foreign investors
- Not all commodities especially agriculture commodity allowed to develop by foreign investor.
- Foreign investment activities for paddy commodities can only be over 25 ha and foreign ownership restriction is limited to 49%.
- There must be a certainty of commodities to be offered and regulations governing foreign ownership restrictions on these commodities.
- Then it will be reviewed whether the limit of ownership can attract foreign investors.
- Japanese investors generally invested in manufacturing and very rarely in primary industry.
- If the scheme were objected to attract foreign investors it is impossible on a small scale.

Mr. Rachmad Firdaus (Coordinating Ministry for Economic Affairs)

- A priority of village typology should be made, since the typology of each village is generally different so that the treatment given will be different.
- Organizing a priority for superior products.
- Production and conservation programs from KPH which involving communities can be used as a model for national demonstration plots.
- Besides a work plan, roadmap of investment development is also important.
- Project adoption management office is required to help managing social forestry and fire prevention.

Mr. C. Nugroho (BRG)

- FMU/KPH is more oriented to forest management while peatland management is oriented to KHG.
- Efforts to promote investment in FMU/KPH can be emulated.

Ms. Ani Suryani (Coordinating Ministry for Economic Affairs)

- There should be a straightforward overview of the business line that can be given to attract investors.
- Identification of existing facilities and incentives in the government is necessary before creating a new incentive.
- Investors are always asking what can be given to them.

Mr. C. Nugroho (BRG)

- We would like to obtain information on available and identifiable fiscal and non-fiscal incentives, pledged facilities for investors to be combined with the consortium team's findings.

Ms. Ani Suryani (Coordinating Ministry for Economic Affairs)

- Is it possible to developed peatland area as special economic region? If it became a special economic region there's a lot of facility could be obtained.

Mr. C. Nugroho (BRG)

- Questions for Mr. Kuno:
 - What attracts Japanese investors?
 - What are the chances of rice investment?
 - Which commodities that has a good prospective based on consortium findings?

Mr. Kuno (JICA Mission)

- Japanese investors were still afraid to enter the primary sector because it takes a long time and risky, therefore it needs incentives and facilities.
- If there was a tax relief of PPH, it might be attractive for investors.

Mr. C. Nugroho (BRG)

- There were two types of Japanese investors: starter investor and investors who invest on the ongoing business.
- The starter investor did not require complete information, they only need land status and the legal status must clear.
- The other types of investor required clear information, cash flow, PEP, facilities and incentives.
- Some local commodities that have not been able to be promoted and completed investment proposals could be developed for starter investor types.

Formation of Incentive Team and Facility Team**Facilitator: Mr. C. Nugroho (BRG)**

- In the invitation letter there were a personnel agreement and institution agreement where the agreement was intended to enable the meeting participants to join the team.
- The facility and incentive team will give input to the consortium team.
- The input will be collected in printed format or soft copy and then it will be combined with the consortium team concept.
- The submission of ideas from the facility and incentive team will be submitted by the consultant team. The consultant team will do the discussion with the consortium team to formulate the investment proposal or concept note.
- Furthermore the results will be elaborated with facility and incentive teams.
- Facility and incentive team will receive consequences for their works.

Mr. Haris Gunawan (BRG)

- We expect facilitation breakthrough: simple, solutional, implementable, and community based.

List of Facility Team and Incentive Team's member

No.	Facility Team	Institution*	Incentive Team	Institution
1	Widiyanto	KADIN	Rudi Prasetya	KADIN
2	Sri Endang	BKPM	Gunawan Pribadi	Kemenko Perekonomian
3	Deny	Kemendag	Afif	Kemendag
4	Rachmad	Kemenko Perekonomian	Ani Suryati	Kemenko Perekonomian
5	Nugroho	Kemenkeu	Dendy	BKPM
6	Haryo	BKPM	Erdiriyo	Kemenko Perekonomian
7	Ruth Mitha	Kemenko Perekonomian	Istiana	OJK
8	Rizky	DJP	Ariawan	BKPM

*BKPM: Investment Coordinating Board, DJP: Directorate General of Taxes, KADIN: Indonesia Chamber of Commerce and Industry, Kemendag: Ministry of Trade, Kemenkeu: Ministry of Finance, Kemenko Perekonomian: Coordinating Ministry for Economic Affairs, OJK: Financial Services Authority.

Mr. C. Nugroho (BRG)

- The Facility team will focus on the facilities to be provided
- The Incentive team will focus on the incentives to be provided

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- Each team member provides narration related to facilities and incentives (max. 2 sheets) according to their team topic.

Mr. Haryo (BKPM)

- It is important to understand the concept of a peatland restoration business.
- Land certainty and status were required related to access of funding and then the necessary incentives will be designed by knowing the KBLI/ISIC status.
- Sago industry already has the facility but for sago planting there is no facilitation.

Mr. C. Nugroho (BRG)

- Proposed model from consortium team has not been specific and need input.
- BRG did not have capacity to grant business license but BRG could facilitate it
- The peatland restoration business will be conducted on private land area as of 400.000 ha.
- Business permit facilities might be granted by KLHK but only for forest exploitation located in forest areas, while in private lands we might be used communal approaches.
- Notes from the facility team and incentive team will be collected on July 7th, notes were sent to hastin@brg.go.id Cc: nugroho.sp@brg.go.id.
- Notes will be collected and then were submitted to the consultant team.

Mr. Nunung (IPB)

- Sophisticated technology is required.
- Challenge: How to establish work-intensive investments that can absorb both the downstream and the upstream.
- There was a biogenetic product that can be developed.
- Out of the box idea and friendly environment investment are required.

Mr. Gunawan (Coordinating Ministry for Economic Affairs)

- If the commodity could not be decide yet, we could commence cooperation between the incentive team and the consortium team.
- Tax allowance: target at large investment value
- Incentive team and consortium team could collaborate for more comprehensive consideration.

Closing Remarks

Mr. Haris Gunawan (BRG)

- Any investment should be able to support community economic growth.
- Note: please convey confirmation and good communication efforts with the head of the institution regarding readiness to follow up on this proposal.
- There is no compulsion but we will be very helped by the input from facility team and incentive team.
- The idea of this team if possible should be out of the box.

End of discussion.

1.2.8 July 7, 2017 <Watertable Monitoring Strengtening>

**Agenda Technical Meeting
Preparation of Management of Peat Water Surface Monitoring Tool Telemetry System
Oria Hotel, Jakarta
Friday 7 July 2017**

Minutes of Meeting

Agenda overview:

- a. **Welcoming speech by Head of Deputy of Research and Development Peat Restoration Agency/BRG**

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- Welcoming Speech
 - Explanation of Agenda Overview
- b. Presentation by Mr. Hiromitsu Kuno from JICA**
Overview explanation on the cooperation and takeover scheme of SEMASE tool from JICA to BRG.
- c. Panel Discussion**
The participants discussed on the management scheme of SESAME tools that have been installed and appointed the formal manager who will be responsible in maintaining the tools in each installation locations.
- d. Closing by Head of Deputy of Research and Development of BRG**
Closing and directions from Head of Deputy of Research and Development of BRG.

Opening and Welcoming Speech from Deputy of Research and Development Dr. Haris Gunawan

- Welcoming speech and thanking the participants.
- Overview explanation of activity background
- Direction for discussion and important notes.

Important points of the speech:

- We want to open discussion related to the needs of SESAME tools and how we can manage the tools given to us in order it can be functioned as its purposes. This tool is a grant from Japan Government through JICA Mission with BRG and was handed over in a very prestigious forum which was COP 22 in Marrakesh. Until today, there are 15 tools have been installed in four regencies namely Meranti Regency, OKI Regency, Musi Banyuasin Regency and Pulau Pisau Regency.
- This tool is a breakthrough and innovation derived from a long research related to the needs of information of the peat main variable which is water. It is important because one of the main factor influencing peat fire and haze is water availability.
- Following up on this first collaboration, further cooperation was undertaken while attending an international conference of peat communities in Scotland. We are the first country to apply this tool in peat areas while other countries are still manual.
- It should be direction for us, in order the existing tools can be used as exercise because we will add in quantity to more than 300 tools outside the company's concessions. Therefore we need to get support from Sir and Madam related to the maintenance of the tools. BRG will be only 5 years old so we need to discuss and hear the opinion of Sir and Madam how the takeover, the transfer, and the management can run well for the tool to being used properly.
- BRG as it is known has a mandate to restore 2 million hectares of peat land and extends to 2.49 million hectares. One of the indicators of its success can be achieved with this tool, and we always convey the progress to the President and copy to Ministry of Environment and Forestry, the Vice President, Ministry of Economics Coordinator, Ministry of State Apparatus Empowerment and others.
- We are also pursued by the presidential palace to immediately install this tool in the palace for its monitor screen.
- Let us support the use of this tool so that the country's highest policy maker can respond immediately to peat land fires.
- We are currently managing site level managers and are being trained to specialize in water for peat restoration. We need to get support from Sir and Madam if later there are selected colleagues to develop the knowledge about this.
- It is also planned that this tool will also be refined with satellites so that nothing can be hidden about the water in our peat lands. This is an attempt to provide "spy" in the field.
- We hope that installation of this tool in the field will not impact economically to the economic activities in peat area.
- I thank Sir and Madam who have attended this meeting and share their ideas, recommendations as well as experiences for our better peat management.
- The event was officially opened.

Presentation on Cooperation Overview from JICA

Speaker : Hiromitsu Kuno (JICA)

Title : Overview of Peatland Water Control Monitoring Outside of Concession Area (Component 1)

Important Points:

- Our cooperation was started last year on preparation for fire prevention and since last year also we supported BRG in peat land restoration.
- We would like to share experiences related to this Water Surface Control Tool outside concession area.
- Our missions are as follows:
 - a. Strengthening peat water surface monitoring.
 - b. Supporting new business models in order peatland can still be utilized for economic activities.
 - c. Supporting multi-stakeholders cooperation to invest in peat land.
- This tool has several parts namely sensor to measure the water surface of peat, rainfall rate, soil moisture, and etc and Data logger and Internal Antenna to send the data. Usually the data is sent in every one hour. If the signal in the location is not strong, external antenna can be put on to support the data transmission.
- For the 1st step of our mission, this tool has been installed since last December. We have pointed temporary manager and the spare parts have been entrusted to them. In the regency level we have installed 2 of these tools in OKI Regency and 2 tools in Musi Banyuasin.
- For the 2nd step of our mission in South Sumatera province, we have installed 2 tools in Conservation Area Padang Sugihan, 1 in APL (Other Utilization Area) Riding Village Sub-district Pangkalan Lampam, OKI Regency and 1 in Limited Production Forest Pedamaran Kayu Agung. We also have installed external antenna in all of them.
- In Riau province, we have installed this tool in Meranti Regency in Forest Village Kepulauan Meranti FMU (Forest Management Unit). The spare parts are put in TGRD and later when the official manager has been determined, it will be handed to them. We also have installed external antenna since the signal in the location is not strong.
- In Central Kalimantan province we have installed the tools in four locations in which 2 tools in Forest Village in cooperation with BRG and 2 in Forest Village in Pulau Pisau Regency. The spare parts temporary has been put in TRGD and will be handed over to the official manager later on. For the APER we are still confuse whether the management is given to Manggala Agni because we are still worry if it is given to the village.
- In outside concession area, peat water surface is not clear and Local government also allocated small number of fund for peat management.
- We are still confuse in terms of which parties are responsible for peat restoration and related to peat water surface tool who is better to manage it? If the peat is dry what action that should be taken ?
- In July 10-11 2017 there will be training on Water Surface Monitoring and on 27 July 2017 will be held a workshop on Business Model Development for Peatland Restoration. It is expected that on that date will also be held a signing the tools takeover from JICA to BRG and from BRG to the official manager.
- We have some recommendation related to the dry peat:
 - Maintaining and increasing the water surface.
 - Increasing the category with early warning system.
 - Developing technical SOP for the action in dry peat land.
- Based on our experiences, this SESAME tool does not require much cost for the maintenance. The cost that must be spent is only data credits (pulsa) for transmission around 4 million Rupiahs per year. Since the installation from July 2017 until July 2018, the cost has been paid by JICA. But if the data produced is abnormal or if the tool is broken, we must send a team to the location to check and repair it and some cost is required for that purposes.

Panel Discussion

Facilitator: Mr. Abdul Karim (BRG)

Participants:

1. Wahyu Indraningsih (Ministry of Environment and Forestry)
 - A. Sulaiman (BPTD)

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2. Rachmad Firdaus (Ministry of Economic Coordinator)
 3. Yophi Handoko (Research Center for Climate Change of Kalimantan)
 4. Agus Wanto (DAOPS Pulau Pisau)
 5. Merty Ilona (Environment Department of Central Kalimantan)
 6. Tri Minarni (TRGD Kalteng)
 7. Genman (Center for Natural Resource Conservation South Sumatera)
 8. Yuliarsyah
 9. G. Ratih Indriarti (Environment and Forestry Department of Riau Province)
 10. Sunarno (Directorate General of Forest and Land Fire Management)
 11. Ari Kusnadi (Directorate General of Water Resources)
 12. Wahiddan Nurachman (Ditjen SDA PUPR)
 13. Susilo Hartoko (FMU Area V Mesuji)
 14. Tri Prayogi (Mangala Agni DAOPS OKI)
 15. Salim Jundan (FMU Lalan South Sumatera Province)
 16. Himawan Sutanto (Forestry Department of South Sumatera Province)
 17. Laut Tarigan (TRG South Sumatera)
 18. Denni Marta (Research Center for Climate Change of Sumatera)
 19. Risda (TRGD Riau)
 20. Tabroni (Research and Development Center for Environment and Forestry, Palembang)
 21. Haris Gunawan (BRG)

Directions from Facilitator Bapak Abdul Karim:

The target from this discussion was to obtain the official manager who will manage and be responsible for the 14 tools that have been installed, but 4 tools can be put aside because they are still not handed over, so there are 10 tools that should be discussed in details. Before we discuss further, let us hear a presentation from Ibu Ning from Ministry of Environment and Forestry.

Presentation from Ibu Ning (Ministry of Environment and Forestry) about Peat Control Damages:

Important points:

- Water surface monitoring of peat is done in the location which has and not has permission. The question is how the management in the place where there is no concession permit will be?
- Protection and management of peat are related to the laws regulation, for example the forest functions and level of damages. We have to consider these variables in the policies.
- The threshold for water surface monitoring is 0.4 meter, so the baseline is very rare. This is one of examples the distribution of responsibilities of peat restoration related to water surface seen from the forest functions:
 - Minister: The responsibility is in conservation forest.
 - Provincial/Regency/City governments are depend on their authorities: Protection Forest, Production Forest, Other Utilization Area, and Community land.
 - Stakeholders/concession owner in their respective business area.
- Water surface monitoring becomes one of criteria for peat restoration success. When the restoration is done using water management method, the water building must be built in the first six months and the water soil table must reach 0.4 meter in the next three months.
- Water surface measurement procedures related to the point of compliance should be considered related to the company complains since they fear of it. It is because one of the parameters is water level, so it can be a tool to know if their practice is in accordance with the law. So the company is afraid that suddenly there are parties who enter and take samples in their area. Therefore a point of compliance is needed and if the base is concession so the compliance point is 15% of the concession area. If the tools will be installed in Other Utilization Area, we have to see the location status, say for example it is a palm oil garden owned by community with registered status, so I think we can still install the tools in the area. I also think we can cooperate with them. However the incentives and institutional mechanism should be clear when we invite them to manage the tools. This forum is the opportunity to find mutual solutions since every local government can be varies, depending on who owns the land.

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- In the concession area, the compliance point is determined by Directorate General of Pollution Control and Environmental Damages, but how if it is outside concession area? In this case, there is mechanism to build related to where the tools will be installed, the responsible party, and how to monitor the tools. It is important due to the tools existence and its advantages.
 - In the concession area where to put the 15% of compliance point? Because there are water management zone, different contour, and different plantation width in the peat ecosystem. According to the expert, the water in peat is convex so if in the center has been 0.4 meter so the monitoring can be done. Therefore, the locations of tools inside and outside the concession must be clear.
 - In the concession area, it is also important to note about the certainty of location coordinate because it will influence to the permission.
 - Implementation of ground water measurements can be varies in each area depending on the kinds of power. If community groups want to be involved as a manager they must be legal at least until the village government. This is what we need to think together.
 - The purpose of monitoring activities can be different, whether for research or to respond to data. If it is for research activities, we can establish the criteria. Therefore we need to look at the purpose of the tools before we decide the location.
 - Institutional matter is also important related to the management and human resources, the funding and takeover mechanism. There was a given tool, the tools have lost but it is still recorded to be exist. I think we also need to invite the institution who will be responsible and with an agreement signed by the two parties.
 - Related to training of the trainer, when it is done, how we could maintain those experts? For example, in Ministry of Agriculture we have pest expert. We need to think the form of institution for them as an appreciation in order they are willing to work with local government.
 - We must think of monitoring and reporting mechanisms so that all lines can gain access to the information, as the data will be responded by hierarchy authorities.
 - Regarding the funding in the local government, in Law 32 does not have clauses related to peatland monitoring, but if we look at the derivatives of Law 32 and local government, there is actually a way to propose funding slots for the management of this tool in the clause of pollution control and environmental damages. The management of peat lands is regulated in PP 71 which is also derived from Law 32 on Environmental Protection so that the Law can be used as a reference for funding.

Questions From Mr. Abdul Karim Related to SESAME Tool Cooperation Scheme:

- For maintenance fund, does JICA cover for this year only or until next year also?
- Data from that tool will go to Japanese server or Klot, is it possible that after the handover of the tool, the data is also integrated into our server?
- For licensed concession areas, they are responsible for the territory, but if the area is outside the concession, does the authority in that area also has an obligation like those in the concession area? If yes, it means that we must also help them to make the tool useful.

Update from Mr. Rahmad Firdaus (Forest Governance of Ministry of Economy Coordinator):

- We greatly appreciate this activity, as the peatland issue was also discussed at the cabinet meeting on January 11 2017 at the state palace, and the coordination meeting at the Office of the Ministry of Economy Coordinator last April.
- It was presented by Mr. Kuno, the water level is one of the important instruments in fire early warning. We have compiled a grand design of fire prevention with the World Bank and the Associations from Germany. The required funds amount to 39 Trillion for fire prevention, and there are financing schemes from the World Bank and International Partnership for this prevention.
- In the Grand Design there is also a technology development plan for forest fire prevention.
- Related to reporting mechanisms, emergency forest fire posts are copied to Ministry of Economy Coordinator and we always make monthly reports based on their daily reports including hotspots, large of burnt area and ISPU. But for ISPU is rarely reported by the region except for Riau.
- Related to this tool who is responsible institution, is it DAOPS or FMU? Riau Province only has 4 DAOPS and its ability to serve some districts/cities is quiet difficult. If it refers to

Ministry of Environment and Forestry's Regulation No 15 mentioned the responsible party for the area is the holder of business license, FMU, or community group, so where does this DAOPS belong to? It seems that we should review it again.

- The water level of 0.4 meters is measured from the canal or in the field?
- In the Ministry of Environment and Forestry's Regulation the success of peat restoration are management, monitoring, etc., is it possible to add some criteria namely plant species, plant age, rainy and dry season?

Respond from Mrs. Ning (Ministry of Environment and Forestry):

- In response to Mr. Karim, how is mechanism if the tool located outside the concession? We need to be observed the field conditions, for example, if it is inside the plantation there will be gradual permit, well for plantations outside the concession permit may indeed have no permission but it could be registered. That's what we need to map, what kind of permit is meant. Deliniation is very complex so we need to observe also the society in that area.
- In response to Mr. Firdaus, the vice president said 0.4m it is an un-negotiable. Measurements are done in the center or in the middle of the peat, the concession area is divided into blocks and then there are drainages of various sizes. Measurements are made at its center point because the water will flow into the canals next to it. I want to tell you a bit of my experience: Mr. Directorate General of Plantation does not want to have water limit of 0.4m and He plans to change the regulation. I once asked the peatland concession owners whether anyone has ever measured the water level but no one answered has ever did it. Then the Director General of the plantation once invited several parties who had assisted the concession and faced with the hydrologist, I asked if there was a dead palm oil with 0.4 m water level, they answered yes, but when I asked the location and the data, no one replied.
- Related to the reporting mechanism, the root of the fire problem in peat lands is draining. The derivation of Government Regulation number 71 has a plan for protection and management of peat ecosystems and the 0.4m water level should be clear during the dry season. If indeed the power of monitoring is in Manggala Agni so why we do not give the responsibility to them. I think we have to adjust to the strengths in the region, the important thing is a synergy between report and action in the field, because the data reported is not only to be read but also to be responded.

Respond from Mr. Kuno:

- Responding related to maintenance funding: JICA has paid its maintenance fee for 1 year since it was installed (July 2017 to July 2018), after which maintenance costs are paid by managers with the amount of approximately 4 million per year. As I said before, this tool relatively does not burden the manager for the maintenance cost as long as it is not stolen or broken. But if it is broken or stolen, we have to send people to check the tool so that it needs fund for transport officer.
- Data is stored not on Japan's server but on Midori's server. Midori already has a MoU with Research and Development Center for Technology (BPPT), so if you want to hold the handover of data and server access maybe we should discuss it with BPPT.

Respond from Mr. Abdul Karim:

- Responding to the Mr. Kuno related data: The data is our concern because once when we wanted to access the data, we could not do it due to technical problem inside the server. The tools handover should also with the server so that we can have access to the data at any time in order the monitoring can be implemented properly and the tool becomes not wasted.

Respond from Mr. Kuno:

- In respond to the data server: It can be discussed further with Midori.

Respond from Ibu Ning (Ministry of Environment and Forestry):

- In terms of tool management, the initial funding should be clear when we should fund for the maintenance, because it is related to budget planning in government that cannot be purposed at any time, there is a schedule. If the proposal is late and not become priority, it might not be budgeted.

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- I think we should see the purpose of this tool, even though we have a MoU with BPPT but BPPT has no duty to respond the data, so there must be an institution that can respond to the data. Therefore, access to the data should be provided to anyone with hierarchy authorities. If the data access is given to the Central Government how can the local government access the data, whereas the local government is the closest party to the location and has responsibilities in the region. If those who have the responsibility but do not have real time data, it will be difficult to perform a quick response.

Respond from Mr. Tabroni (Research and Development, Ministry of Environment and Forestry, Palembang):

- We get a part to socialize this tool to the community and the community is told to keep this tool. But we must also think about our access and benefits to the community. Because if they cannot access the data, then how will they respond? If we also do not have access to the data, it will be difficult to answer questions from the community.

Respond from Mr. Sunarno (Directorate of Forest and Land Fire Control, Ministry of Environment and Forestry):

- One thing to emphasize is the security of the tool. I remember there was a tsunami monitoring tool that was a grant from abroad lost and the people who stole it actually did not know its function so they only sold it per kg. Therefore, it is necessary to think about the method of securing the tool.
- In addition to training of the trainer for water level monitoring, security personnel should also be given attention.
- For those who will follow the training of water level monitoring should be the people who will indeed involve directly to the field, and those who just want to participate but will not be in direct contact with technical activities in the field may not join it.
- For 1 of this SESAME tool how many hectares can it represent? And also to guarantee the function of the tool in every how long the calibration should be done?
- This 0.4 meter limit is already an extreme number that cannot be tolerated anymore because of from our experience, less than 0.4 meter the land has been burned.

Respond from Mr. Abdul Karim:

- Are Mr. Kuno able to answer this technical question?
- For the tools security, temporarily we use iron fence.
- For the security personnel, we still need to discuss it further.
- For the training is also become our consent. We need to recruit local people where the tool is installed.

Respond from Mr. Kuno :

- I do not really know about technical matters of the tools, but according to information from Midori, the tool maintenance is done once a year so it seems calibration is done simultaneously with the maintenance. This tool monitors the water level so that calibration does not need to be too often, in contrast to the water quality monitor sensors which are very sensitive that must be often calibrated.
- I think, there should be a community assistance to change the mindset of society to ensure the security of this tool.

Respond from Mr. Deni (Climate Change Agency of Sumatera):

- Related to the tools security, we have installed water quality tool in the Musi River which in fact is in the middle of the city but the tool is kept missing. On the Musi River the water level is very rapidly changing so it greatly affects the instrument sensors of the tool.
- I think there should be training for the tools maintenance in order we don't need to invite expert from Japan.
- The existing data can be overlaid so that we can see the existing resources in the area, for example where the nearest water location during a fire so that the actions we take can be more effective and efficient.
- Delegating the management to the region is not something light because the region has a small budget. The local government will not be able to oversee the tool because the location is far

enough. Tools installed in the middle of the city, they sometimes do not want to come to check, moreover in the middle of the forest. So many obstacles exist, but hopefully we can design a joint solution. We greatly appreciate this tool's grant as it is important for the prevention of forest and land fire.

- In Ogan Ilir within a month there might be 3 fires, so it may be necessary to check whether the tools can help to control forest and land fires. It also should be clear who can access the data because this information is important for everyone. Hopefully this tool can be shared to everyone so that we can minimize the fires in peatlands.

Respond from Mr. Abdul Karim:

- Maybe later Mr. Kuno can explain about this online access related password. We are also not an administrator so we cannot adjust the server to our needs, if we are the administrator we can set the server to anyone who need the access in the region. This means that if the tools are handed over but the system is not, it will just be useless, because we cannot provide the data access to the region.

Respond from Mr. Kuno:

- We have two websites, for public and for professionals. If it is for common society they only need a username and password to access the data. If they (Midori) propose the system administrator to be trained for example BRG, local government and others then after that we give the ID and finally they can get into the database system. If you want it quickly, the manufacturer can provide a public website. If you want to process the data we have to build the system administration.

Respond from Mr. Tabroni (Research and Development, Ministry of Environment and Forestry, Palembang):

- If we take the data from this tool for monthly then the data storage will be over memory, so we want to take daily data to be able to predict the events in the next day so we can prepare. The data should be taken by people in the area every day.

Respond from Mrs. Merti Ilona (Environment Department of Central Kalimantan):

- We can choose the responsibilities such as who is responsible for the physical, budget, monitoring, evaluation, and access.
- The community is the closest party to the tool, and which institution is nearest to the tool and has budget capabilities. We must see also who has interests with this tool.
- From the top, who is the party that has interests related to the water level. According to us is Director General of Pollution Control and Environmental Damages. Well, the budgeting should go there, then in the region where the budget goes for example if in Central Kalimantan, it is in the Environment Department, then the Environment Department that manages the funds can be channeled anywhere. In the village forest, the funds can be disbursed to FMU so those are responsible at the site level about the security of the tool. There should be incentives for the community to maintain the tool. Our obstacle is in budget, maybe Central Minister can have power about budget to be distributed to regions.

Update from Mr. Abdul Karim:

- The matrix needs to be displayed and we need to discuss it with the ones here.

Recapitulation of Readiness as Responsible Manager of SESAME Tool

No	Code	Location	Proposed Field Manager	Readiness
S1	OKI-1 (South Sumatera)	Conservation Genetic Peat Forest of BPPLHK (Research and Development Center of	BPPLHK, South Sumatera (Mr. Tabroni)	Basically we are ready, but when it is handed over to us there must be clarity in advance related to budget funds to support the management of the tool.

		Environment and Forestry)		
S2	OKI-2 (South Sumatera)	Other Utilization Area of Simpangtiga Village, Sub-district Tulung Selapan	DAOPS Manggala Agni III OKI	Not Willing to be the manager, because: <ul style="list-style-type: none"> • The far monitoring location. • It is not appropriate to be handed over to Manggala Agni since we are not an institution. • It is better for the management to be given to authorize institution in that area. • We recommend for the management to be given to Environment Department of OKI.
S3	MUBA-1 (South Sumatera)	Production Forest of FMU Lalan Mangsang Mendis	FMU of South Sumatera (Mr. Salim J)	<ul style="list-style-type: none"> • We really appreciate JICA for the tools grant which will be very useful for us. • I am personally ready and welcome to be the manager. However, before it is given to us, there must be a clear description of the responsibilities, the consequences, and the compensations. • As long as there is support to the responsibilities given, we welcome and ready to be the field manager.
S4	MUBA-2 (South Sumatera)	Production Forest of FMU Lalan Mangsang Mendis		
S5	PS-1 (South Sumatera)	Conservation Forest of Padang Sugihan	(Center for Conservation and Natural Resources) BKSDA South Sumatera	<ul style="list-style-type: none"> • Principally, we are ready to be the manager, but we cannot allocate the fund for the management since not all UPT (Technical Unit) of Conservation of Natural Resources and Its Ecosystem own the tools. • We recommend that BRG to make an official letter to Director General of Conservation of Natural Resources and Its Ecosystem about this matter, so when we propose for funds, we will not be questioned. • We do not have budget to take further field actions from the data obtained.
S6	PS-2R (South Sumatera)	Conservation Forest of Padang Sugihan		
S7	AS-1R (South Sumatera)	Other Utilization Area of Riding Village, Sub-district Pangkalan Lampam OKI	DAOPS Manggala Agni III OKI	Not Willing to be field manager.
S8	PT-1 (South Sumatera)	Limited Production Forest of Pedamaran Kayu Agung, FMU Area V Mesuji	FMU, South Sumatera	Not willing to be the field manager because we do not have budget for the management. The budget of Provincial Government is allocated more to Asian games 2018.
R1	ST	Village Forest, FMU Area of Kepulauan Meranti	Forestry Department of Riau Province	Not willing to be field manager and recommended for the management to be given to Regency under the Department of Environment.

R2	LK	FMU Area of Pulau Meranti, Lukun Village Sub-district Tebing Tinggi Timur, Kepulauan Meranti	Forestry Department of Riau Province	<ul style="list-style-type: none"> We are ready to be the field manager and will coordinate further with FMU and Bappeda. We need the budget details for the management to be proposed in the next year budgeting.
C1	SJ	Community land (Demplot PLTB BRG D2), Other Utilization Area of Sebangau Jaya Village, Sub-district Kahayan Kuala, Pulau Pisau.	DAOPS Manggala Agni Palangkaraya	<p>Represented by Climate Change Agency of Kalimantan</p> <ul style="list-style-type: none"> We just know about this SESAME tool here. DAOPS is an operational agency and not an institution, above it there is Climate Change Agency of Kalimantan. It will be better that this offered is discussed with DAOPS' higher institution. Our working area is not Palangkaraya but Kapuas. DAOPS cannot decide to be or not to be the field manager since it is not an institution. Climate Change Agency of Kalimantan recommends that the management is given to the Regency and DAOPS will voluntarily help them.
C2	PM	Community land (Demplot PLTB BRG D2), Other Utilization Area of Paduran Mulya Village, Sub-district Kahayan Kuala, Pulau Pisau.	DAOPS Manggala Agni Palangkaraya	<ul style="list-style-type: none"> Our working area is not Palangkaraya but Kapuas. DAOPS cannot decide to be or not to be the field manager since it is not an institution. Climate Change Agency of Kalimantan recommends that the management is given to the Regency and DAOPS will voluntarily help them.
C3	PM	Forest Village, Forest Village Area of Buntoi, Sub-district Malik, Pulau Pisau	Forestry Department of Central Kalimantan	<ul style="list-style-type: none"> Related to the responsibilities, how is the description and how about the funds? Related to the takeover asset, is there Clearance mechanism with Ministry of Finance or not? We cannot state our readiness before those matters mentioned are clear.
C4	MT	Forest Village, Area of Mantaren I Village, Sub-district Malik, Pulau Pisau	Forestry Department of Central Kalimantan	

Respond from Mr. Abdul Karim:

- When the fund budgeting and takeover issues have been cleared, are everyone ready to manage this tool?

Participants:

- We are ready.

Closing from Deputy of Research and Development: Dr. Haris Gunawan.

Important points:

- I thank for all the recommendations, information, thoughts and ideas from Sir and Madam for the perfection of this program.
- There must be a modality and resources related to this water level.
- This is a MoU between BRG and JICA automatically this activity is still a BRG's activity until 2020, but support from JICA when signed only until 2017. Confirmation from Mr. Kuno, this tool maintenance fee has been paid up to one year ahead. In the beginning, I also mentioned that we can still propose budgeting if BRG still survive until 2020. Therefore, the problem of budget relatively has solution, and we hope the cooperation to coordinate the funding.

- Some of our notes, in the time these tools are publicly accessible with android systems. This tool helps with the goal of reducing the smoke haze disaster and the ultimate goal to keep our peat from extinction as it is now. So we want to build a sense of belonging. We will do TOT approach to make our cadres in the field either in government or in society.
- This tool is different from the one in the MDRS BMKG. Accuracy of Data sent is near real data in the field. We also continue to exercise for further development so that the impact coverage can be answered, we will also immediately use satellite image analysis to support it.
- We very appreciate of Mrs. Wahyu Indraningsih, related to the confirmation of the water level of 0.4 meters which is final. I also want to take advantage of this forum for hospitality and enhance our friendship.
- We thank for Mr. Kuno and JICA for the support given to us.

End of discussion and event.

1.2.9 July 12, 2017 <Investement Facilitation>

**Agenda Focus Group Discussion
Facilitation and Incentive Schemes for Investment in Peat Restoration
Morissey Hotel, Jakarta
Wednesday 12 July 2017**

Minutes of Meeting

Agenda overview:

- a. **Opening and direction from Deputy of Research and Development BRG**
 - Opening remarks
 - Directions
- b. **Presentation from Mr. Hiromitsu Kuno from JICA**
Overview explanation on investment schemes in peat restoration land.
- c. **Presentation of the Study Result by Consortium Teams**
Presentation on the result of consortium teams study in four priority Regencies.
- d. **Presentation by Incentive Team, Fasilitation Team, and Consultant Team**
Presentation on the main recommendation of Incentive Team, Fasilitation Team, and Consultant Team related ti the result of consortium teams study.
- e. **Panel Discussion**
The participants discussed about the schemes from consortium team study, and what need to complete before determining the business model and commodities that will be developed.
- f. **Closing from Deputy of Research and Development BRG**
Closing remarks and direction from Deputy of Research and Development BRG.

Opening Remarks from Deputy of Research and Development of BRG Dr. Haris Gunawan

- Opening remarks and thanking the participants
- Overview explanation of activity background
- Explanation of discussion objectives and important notes

Important points:

- Thanking the participants for the attendance.
- As we all know that there are several attempts to offer some of peatland potentials to support the restoration efforts, one of which is through economic activity in a green economy scheme.
- If it is possible, we are ultimately eager to make concrete action in relation to supporting peatland restoration activities. Hopefully in the final meeting later, the results of some of our discussions have been more visible and can attract investors to invest their money.
- We initiated from various informations at the beginning, and today we will try to formulate it. We expect that this year we can see the real result to be reported to the President. On July 27,

2017 we will bring together investors from Japan to Indonesia in the form of workshops. And the plan is next October we will go to Osaka Japan to promote this peat land investment.

- We also hope that the business model will directly touch the community. For example, as in Japan, the conglomerate-scale industry is not dominated by a single monopolistic activity but also supported by household-scale activities. I think it will be very interesting if it can be implemented into one of the business models in our peat.
- We want to develop a different business schemes. That's why we need an out of the box idea.
- We are facilitated by JICA to create attractive business models that can attract investors.
- Today we meet 3 teams: Consortium team, incentive team and facilitation team and one additional the consultant team. The consortium team consisted of 4 educational and research institutions in each province (University of Sriwijaya, Research and Development Center for Forestry, Palembang, University of Riau, and University of Palangkaraya) accompanied by related ministries and business world.
- Hopefully at the end of July will be a momentum for us to be able to speak our ideas for the sake of investment and investors in the workshop forums.
- Let's keep together so that the business we will run can affect to the humid, wet peatlands, non-exotic vegetation and livelihoods of a prosperous society.
- BRG expresses very much gratitude for the thoughts of all participants who will be followed up for our business model and for our peatland.
- We will always exercise to develop an appropriate business model because peat restoration will not be successful without economic activities for society.
- The event was officially opened.

Presentation from JICA

Speaker: Hiromitsu Kuno

Title : Proposed Scope of Private Business Investment for Peatland Restoration

Important points:

- Peatland has great challenges such as vulnerable to fire and fluctuate water table.
- The biophysical aspects in peatland is also a problem;
 - Low pH leads to low plant productivity.
 - Low number of population because most of residents surrounding leave to the city for job opportunities, so the number of worker to manage peatland is lacking.
- There are some problems from the community for cultivation on peatlands due to the period suitable for crops only in October-January, while January-April the peatlands are relatively flooded and in April-October the land is very dry.
- The lack of people to manage peatlands causes peat burning to be the primary choice.
- Green investment can be divided into green business and financial services. Green businesses can be divided into land-based businesses consisting of businesses in forest areas and outside forest areas.
- Business schemes within forest areas can be ecosystem restoration, Non-Timber Forest Products (NTFP) and social forestry.
- We need financial services to finance our business and to manage business cash flow. Hopefully, there are green financial services that can be applied into our business model.
- In formulating a business plan, the things need to consider is that, the business plan must be in order to support peat restoration and the improvement of the peat environment.
- Forest areas that have no management rights and still open access are business opportunities for peat restoration.
- The business plan we propose for the Southern Pulang Pisau in the culture zone includes the following:
 - Profit sharing schemes with farmers.
 - Land clearing by mechanization, without using fire.
 - Increase local rice production from 10 tons / ha to 13 tons / ha.
 - Planting rice can improve the water system.
 - Cultivation in peat can also be used to raise pH and eliminate pyrite.
- Business plan in West Kalimantan, Southern Kubu Raya includes:
 - Buying an inactive Forest Plantation for business in the field of NTFP Sago.

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- Many sago bins can be made for charcoal for power generators that can be sold.
 - Sago can be made into Starch and sold.

Presentation of Progress Review from Consortium Team

Facilitator: Prof. Rubiyanto

Important points from Facilitator presentation:

- Our three tasks as a consortium team include:
 1. Socialization of SESAME tools in priority Regencies.
 2. Creating a business model of investment which is peat friendly.
 3. Looking for alternative business models for peatland restoration.
- Managing peat has many complex problems.
- The background of the business model development plan is peat fires, food security, peatland revitalization, restoration of 2.4 million hectares of peatlands, returning dry drainage to wet and creating sustainable peatland efforts.
- The cost of for fire prevention is 221 T, so we need to change the preventive measures to keep people prosperous and un-burnt peat.
- One of the potential crops in peatland is Jelutung: peat friendly and flood resistant.
- Most of the peatlands are dried and planted with rubber trees but the results are not good because the rubber cannot withstand the submerged.
- Example of the suitability of palm oil, peatlands are actually not suitable for palm oil but it is kept open and the wetlands are drained with canals. Now we want to make the dry land to be wet again.
- Commodities that can be cultivated in peatlands such as rice, watermelon and corn, a year can be 3 times planted with revenue up to 3 millions/ha.
- For this restoration business should be selected water resistant commodities.
- The water level at the setting point in 4 priority Regencies is -40 m.
- Dried peatlands are now being attempted to be wet again, with a hydrological restoration approach, revegetation and community empowerment.
- 42% of peatland in Pulang Pisau Regency located in Sebangau area and 39% of its peat is used for agriculture, forestry and fishery, but it has not yet prospered the community so now we will focus on it.
- Around 61% of peatlands in OKI are used for agriculture, forestry and fishery activities, so we will focus in that sectors.

Progress Presentation from UNSRI Consortium Team for MUBA Regency:

Speaker: Mr. Mudiyantoro

Important points:

- SESAME tool that has been installed in South Sumatera last year was 4 and now we have 4 pieces of newly installed tools, so now there are 8 in total. There are 4 PHUs priority namely PHU Punsu Kecil River (Muba Banyuasin), PHU Sibumbang-Sibatok, PHU Sughian-Lumpur, and PHU Sugihan-Saleh.
- In the Muba area there are quite a lot areas burnt in 2015 ago.
- A half Muba area has become palm oil and Forest Plantation concessions, only PHU Meran Kepayang and Desa Kepayang left. Land in Muba is Kepayang Village forest. The peat in the village is still in a good condition and now we are trying to avoid it from fire.
- We have coordinated with local village officials to inventory the villages potential, then we conducted field visits.
- The village forest of Kepayang is legalized by the Minister of Forestry Decree of 2013.
- Potentials of Kepayang village forest:
 - Area of 5700 ha is managed by LDH (Lembaga Desa Hutan/Village Forest Agency). Around 4952 ha of peat depth is 0.5-6.5 m, 14% is categorized as very deep peat, 55% of deep peat category, 28% of medium peat, and 3 % is very shallow peat category.
- Kepayang Village Forest area with around 300 ha of mineral land is used for rubber plantation, but there are many rubber plants burnt in the 2015 fire.
- There are 81 identified tree species, some of which are commercial commodities such as meranti, kranji and petaling.

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- Carbon stocks in high-density forest areas reached 294.5 ton/ha while in community rubber gardens aged 6 months were 76.2 ton/ha.
 - Timber (*Baccaurea sumatrana*) is wood with highest IVI value and the highest wood volume reached 76.4 m³.
 - The canal blocking program of BRG 2017 to minimize forest fires in Kepayang Village was allocated 7 blocks. The location of canal blocking construction has been confirmed by South Sumatera TRGD and the preparation of construction will be done on 24-28 July 2017. The construction of canal blocking will be done in early August by self-managed community group with Deputy II.
 - The canal that divides the village forest will be blocked with the expectation that apart from 7 blocks from Deputy II there will be more canal blocks from other sources also as to improve the water table in this area.
 - KPHP Lalan has an area of 12.685 ha with several important tree species such as swamp Pulai, Mersawa, Merulan, Terentang, Red Pinang, Durian Burung, Jelutung Rawa, Nyatoh and Negris.
 - The potency of environmental services that can be developed are biodiversity protection, environmental rescue and protection and carbon sequestration as well as carbon stocks.
 - Other alternative utilizations of NTFPs are from forest plants, non-forest plants, and swamp fish cultivation.
 - Prioritized NTFPs for forest crops are kemenyan, leaf durian, asam payau, and large pandanus that are commonly found in village forests.
 - Prioritized NTFP from non-forest plantations are pineapple, rubber, cassava and banana.
 - In addition to the canal dividing KPHP lalan, there are still many small canals that will be blocked this year and used as models for swamp fisheries.
 - For areca nut plantations can be combined with pineapple in Agroforestry patterns.
 - In Muba there are not many choices because there are only 2 village forests.

Question from Mr. Utomo:

Potencies in Muba Regency are mostly flora and plants that now grow in dry conditions and later after the canal is blocked the area will be wet again. After wetting the canal, what plants can still grow? Are these plants identified before the fire which when the land is still wet or after the land is dried by canals?

Answers:

This plant grows long ago when the land was still wet and also can adapt to dry land. These species distribution is on dry land and peatland (wet). These selected plants can survive in these two different land conditions.

Presentation of Consortium Team for OKI Regency:

Important points:

- There are 5 PHUs in OKI Regency namely PHU Jeruju River - Mesuji River, PHU Lumpur River - Jeruju River, PHU Sibumbang River- Batok River, PHU Sugihan River - Lumpur River (the largest), and PHU Saleh River - Sugihan River (small parts in OKI Regency and mostly in Banyuasin Regency).
- Traditional community potency in peatland, one of them is fishery auction of lebak lebung. When the water in lebak is high, the fish goes and trapped into the lebak, then the auction is held and the winner can control and has the right of fish in the lebak. When the water is dry the fish stucked in lebak, harvested and the results are divided between the winner of the auction and the community.
- When the water in Lebak receded, the lebak used by the community as a rice field.
- Lebak rice potential: After the lebak dried, the ownership of the swamp returns to the owner before the auction. For the size of 60 m x 5 m with depth of 2 meters swamp, the potency is up to 50 kg of fish. As for the rice can be planted once a year. There is a government program to increase food peoduction by building irrigation there along the 300 meters. The irrigation is built in the place where business programs to increase the production of rice, corn, and soybeans existed.
- The irrigation has just been completed and has not been tested.

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- The potency of swamp plants: Brondong plants can be made into different handicrafts with purun so that it is potential for product diversification program.
 - The government needs to send an extension team to conduct social engineering in connection with the development of business models in OKI Regency peatlands.
 - Other potency is Swamp buffaloes with advantages: resource-based, plasma nutfah, local wisdom, the main livelihood of the people there, have multi-value added benefits, and open to innovation and investment.
 - Development of swamp buffalo: buffalo and feed nurseries. The problem that now exists is when the swamp is tide the buffalo can be grazed throughout the swamp but when entering the rice planting season then the buffalo can not be grazed (feed problems).
 - Utilization of swamp buffaloes: traditional gulo puan (wet crystal caramelised milk) foods, dadih (fermented buffalo milk), meat and samin oil.
 - Buffalo milk can be made into several processed products namely ice cream, milk candy, yogurt and pasteur milk. This is initiated because there is an excess of production that must be solved for the prosperity of society.
 - Most swamp buffalo business location is found in Pampangan sub-district.
 - The lebak lebung fishery has the advantages: it is local wisdom, resource-based, germplasm, supported by local regulations, fish products become an important industry for society, open for innovation and investment, and relevant to rewetting and revitalization of BRG.
 - In 1 sub-district there can be 60 swamp areas auctioned and the value in 2016 reaches 1.1 billion Rupiahs that goes into local government saves. Then 5% was taken for restocking and 2% for the sub-district, incentive to the people is in the form of utilization of the results. Land owners do profit sharing with auction winners and farmers get a share of 10-15%.
 - Cultivation of capture fisheries besides the waters of lebak lebung: sepat, gabus, and catfish.
 - The development of the lebak lebung fish cultivation can be very wide including many sub-districts.
 - The third proposed program is craft from purun: purun is one of the grasses in swamp area that can be used for various utilizations, one of them as craft raw materials such as bags, hats, key chain, and others. So far, the handicraft products are made based on order. OKI Regency Government has provided a promotion location. What is needed currently is promotion cooperation and technology input.
 - The other superior programs are optimization of wetland rice field which has wide potential and is the main livelihood of the community. Optimization is being attempted to be developed into 2 or 3 times planting period per year.
 - Lebak in South Sumatra has local varieties such as Pegagan rice, but currently we do not know whether the germplasm is still existed or not. The potency of such varieties are 3-5 tons/ha which makes the price expensive.
 - Other crops that can be developed are corn and soybeans.

Presentation from Consortium Team of Research and Development Center for Forestry, Palembang:

Speker: Mr. Edwin

Important points:

- Muba and OKI Regencies have different management and utilization histories. Peatlands have been regarded as backward areas and not cultivated.
- The last land use is dominated by Forestry Plantation Sinar Mas, there are also dominating and burning shrubs.
- Selecting a potential restoration location:
- PHU Sugihan River - Lumpur River has been largely used by Forestry Plantation concession but still has little gaps to manage for restoration.
- PHU Sibumbang River - Batok River is located close to Kayu Agung city. 3R potentials are in Limited Production Forest area of Pedamaran, which is still in shrubbery. 3R Potentials in the area is quite high, but for the third R (Revitalization) is somewhat less because it is in the middle of HGU but it has better access because it is close to the road.
- PHU Sugihan River - Saleh River has a fairly high Potential for 3R. This location has become the target area of several institutions.

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- Description of potential selected locations: PHU Sugihan River - Lumpur River has a thin peat, close to the transmigration area, PT BMH planting area, 600 ha for cultivation, partly intensive, and the community is well prepared for intensive agriculture.
 - The farmers are ready to manage the land, but the problem is the high capital.
 - The second potential area is Riding-Penyajab with a potential area of 1650 ha, peat depth <100 cm and 100-200 cm, the distance of the location with the village 15 minutes using the vehicles, the area of rice fields using sonor system.
 - In 2011 there was a permit to plant sugar cane in this area but rejected by the community because it was their rice field area.
 - In 2014 there was another permit for oil palm utilization. But they could not plant because the community refused it.
 - This area is a potential area because if it does not burn it will become dry shrub again which will be very vulnerable to fire.
 - The third potential location is Sepucuk - Pedamaran: PHU Sibumbang River - Batok River: the area reaches 10,000 ha, ex-burnt site, has excellent access which only 10 km from Kayu Agung City, the location near with demplot of Research and Development Center for Forestry, and has been used by the community for Pineapple on the roadside.
 - The burnt site is ready for planting but it is part of the peat dome (protected zone).
 - Potential restoration in OKI Sepucuk-Pedamaran: farmers already planted pineapples on the left and right of the road.
 - Exploration of business opportunity: learning from Tanjabbar Jambi area that has commodities such as Betel Nut and Tiberika Coffee, while from Lampung: pineapple.
 - In Tanjabbar the demand for betel nut fruit has increased greatly since the establishment of five factories. Farmers replaced rubber and palm oil with betel nut and pineapple. In the area has the same peat depth as in the OKI which is 2m.
 - In there we can cultivate betel nut and pineapple without making canals, and the prospects are still existed with the support of market investment.
 - The pineapple prospect is brighter, as Indonesia already able to export fresh pineapple to Italy.
 - Restoration business plan at Rengas Merah - Bukit Batu, PHU Sugihan River - Lumpur River: rice field, pineapple + betel nut, coffee + betel nut. The threat: concessionaires do not advocate perennial cultivation, BRG proponet prefers to R1 whereas society will put R3 frist.
 - For on-farm strategy at PHU Sugihan River - Lumpur River, with the same scheme, the challenge is high cost of transaction.
 - Business plan in Sepucuk - Pedamaran, PHU Sibumbang River - Batok River: 10.000 ha of land is very strategic for On Farm + Off Farm cultivation. The threat is that there are different interpretations related to protected zones and the unclear aspects of legality.

Presentation from Consortium Team of Kepulauan Meranti:

Speaker: Mr. Ahmad

Important points:

- About 90% of our target area is highly prone to fire.
- BRG targets 30,744 ha of peat restoration in 30 Villages in Meranti Regency.
- PHU Pulau Tebing Tinggi has about 82.5% deep peat so it is a dilemma for investment.
- Changes in land management status in Sub-district Tebing Tinggi Timur: PT NSP Concession 21,000 ha, and PT. LUM 11,000 ha.
- Changes in land status in Tebing Tinggi Timur sub-District to village forest grants. There should be clear guidelines for land management to be clear.
- Land-based investment: trade in ecosystem services such as tasik-based ecotourism and development of water treatment (eg water supply company) in Tanjung Village, Tebing Tinggi Barat sub-District. KPHP hopes that the location can be a fishing location but there should be restocking of fish seeds.
- Wood production: development of production forest for construction and carpentry woods in Lukun Village, Tebing Tinggi Timur sub-district with 500-800 ha (potential), sago growing is not optimal because of deep peat so it is diverted to construction timber. Land management is KPHP Tebing Tinggi - Lukun Village, human resources is exist but there is still no institutional and infrastructure.

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- The irony is that the former wooden barn area is now a deficit of wood. The community is confused of the utilization of the land.
 - Development of production forests for tree species for biomass. With the same characteristics as above, it can be harvested within 4 years. We imagine that there will be wood agroforestry with such a field for construction timber and another for fast-growing energy timber.
 - Land-based non-forestry investment: the potential of liberika coffee (organic coffee), a potential of 50 tons/month involving about 50 farmers. The locations of the program are in Teluk Buntal Village and Tanjung Gadai Village. In Tebing Tinggi Timur Sub-district was tried several times to cultivate the coffee but failed because the farmers were only given seeds without any assistance and extension. Actual land area in the village is 10 ha and potential land is 300-400 ha. The existing garden potential is only 20-60kg per month. There are already local varieties with a good quality.
 - Production of kelulut honey bee (meliponikultur) in the Village of Tanjung Sari, Tebing Tinggi Timur sub-districts. it is already sold and directly absorbed by the market in Malaysia at a price of 40 ringgit per liter. The problem is finding kelulut nest involves cutting down trees. A method or technology can be developed to break the nest artificially so without cutting down.
 - Sago-based investment: Locations in Sungai Tohor Village, Tebing Tinggi Timur sub-district, the production of sago flour is 70 tons/day in the form of wet sago, human resources are already half trained, institutions are already exist, no infrastructure. 1 kg of dried sago can be produced from 1.4 kg of wet sago.
 - Production of liquid sugar and granulated sugar: a demonstration plot has a capacity of 10 liters/day with sago as the raw materials, but there is a potential of conflict of interest, because there are already party who absorb the wet sago and they do not want to lose their raw materials.
 - Sago waste based investment: sirap production from uyung sago in Sungai Tohor Village and Lemang Village. The price of sirap on the market now is Rp 5,000 - 10,000 for ulin wood sirap. It is said that sirap from sago also has very good quality. Human resources and institutional are already exist with potential of 7-10 tons uyung/day from all village refineries. There is already a production capacity of 10,000 sirap/month with simple infrastructure and a market price of Rp 3,500-5,000.
 - Production of mushrooms in Tohor Village: potential resources of 20-30 tons of sago pulp from each village refinery. The manager is the Tohor river community. Human resources, institutions, and infrastructure do not exist yet.
 - Production of worms and fly larvae for livestock feed or fish. Actually for this program is heavy hearted because it involves the introduction of alien species.
 - 2 groups for criteria evaluation ie from BRG and from investors.

Presentation of Consortium Team of University of Palangkaraya:

Speaker: Mr. Ici

Important points:

- Pulang Pisau Regency is 92% covered by PHU.
- The burnt area in 2015 was around 160,000 ha but in 2016 was 109 ha.
- PHU Kahayan River - Sebangau River: mineral and peat soils with varying depths.
- The deepest peat is in the Tumbang Nusa area.
- Economic growth in 2015 was 7.8% with the most dominant sectors namely agriculture, forestry, and fisheries.
- Potentials offered for investment: paddy fields, especially irrigated rice and other land for chili, watermelon and long beans.
- Rubber plant in Pulang Pisau Regency with 24,293 ha and 70% of it is old rubber. We recommend rejuvenation for old rubber. Old rubber trees with potential 400 stems/ha that are not productive can be felled for furniture and others, so the land can be used to plant new rubber seedlings.
- Rubber productions in Pulang Pisau Regency are below the average rubber production in Central Kalimantan so it needs rejuvenation efforts.
- Optimizing the cultivation of laban: potential laban in Pulang Pisau Regency is 107,429 ha with potential of 1955 stems / ha. Laban can be used for charcoal. The price of the laban tree for charcoal now ranges from Rp 26,000 / stems.

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- Now there is no laban cultivation, just taking from nature. Economic analysis of laban cultivation for 20 years, with a discount factor of 16% / year will be feasible if the laban price per stem is Rp 55,000. However, if the laban price per stem is smaller than Rp 55,000, the cultivation business becomes unfeasible. The economic analysis does not include cost and income from thinning activities.
 - Optimization of gelam cultivation: the potential land for gelam cultivation is 60,126 ha. Gelam cultivation at a price of Rp 5,500 / stem is feasible, especially if it is made for charcoal.
 - Pelangeran wood cultivation which is already rare in nature. With a spacing of 2 m x 2 m, production in the 15th year can reach 0.2 m³ / stem. With the price of Rp 3.000.000 / m³ then the cultivation business is feasible to run.
 - Another economic potential is Alabio ducks growth.
 - Economic potential that can also be developed is capture fisheries in swamp areas. Now the fish in the area of Pulang Pisau regency are mostly sold in fresh form, so there is still a chance to develop fish derived products in the dry form.

Recommendation of Incentive Team, Facilitation Team, and Consultant Team

Facilitator: C. Nugroho S. Priyono

Direction from facilitator:

The four consortium teams have presented the results of their studies, but still in the biophysical aspect and not yet touch the incentives and financial aspects. The general picture of the consortium team has not yet been fully captured by the facilitation team and the incentive team, so the incentive and facilitation teams still need more detailed information to plan their incentives and facilitation recommendation. Now we will listen to the presentation of the consultation team who will try to provide some inputs and hopefully can be used by the facilitation team and incentive team to see the investment opportunities from the consortium team.

Presentation by Mr. Anke Dwi Saputra

Important points:

- One of the main elements in strategic selling is that we know how many target numbers we want to achieve. Until now I have not seen clearly, the main target revenue we want to achieve through the various planned business model.
- The target number should be clear to arise vibrations within the team to find ways to achieve those targets.
- The element of strategic selling is "how to make investors happy " in terms of providing what is needed and desired by investors.
- There should be an analysis of how the nature of investors we want to invite because it will affect their goals. The purpose of investors with regard to profit is high gain, low risk and stability. But there are also investors who want to invest because of value based/moral based, for example for humanity and environmental improvement.
- There should be clarity of what products are offered, in this case is the product champion because we can not offer many products at one time to the investor. It should be clear and what the main product focus and what kind of business model is offered to investors.
- Then there should be clarity about packet price and what kind of investment.
- Testimonials are also important elements for the promotion of a product.
- Recommendations:
 - Determine the product champion.
 - Prototype of existing and tangible and commercially viable products that sell in business.
 - There is documentation of its ultimate success in video form to attract investors.
 - What strategic issues will be sold to Japan.
- Investment Prospectus:
 - Testimonials from top Indonesian officials will make it better.
 - fact sheets.
 - Description of why investing in Indonesia.
 - Description of why invest in peatlands.
 - Description of the opportunities, support, and incentives that will be provided.
 - Description of the investment package offered.

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- Description of investment Steps.
 - Contact details that can be contacted.
 - Appendix.
 - Proposed concept of investor gath event in Osaka Japan:
 - If it is possible, a week or some time before the event, there is news in Japanese media about peatlands.
 - There is a presentation video at the beginning of the event.
 - Investors Invitation.
 - Commitment Letters.
 - Indonesia Culture Theme.

Respond from Facilitator:

I suggest to Mr. Kuno for the event on July 27, 2017, we can ask Mr. Anke and Mr. Nunung for input related to the format and concept of the event.

Presentation from Mr. Nunung Nuryartono (IPB)

Important points:

- Integrated area development can be emphasized in landbase and non-landbase management. Financial sector can go there and can be an investment capital for business model.
- The key to successful development of integrated areas: location, infrastructure, incentive, cost performance, and labor force.
- It is expected that there will be a realization of an eco-friendly regional economic program by creating linkages between backward and forward economies and creating efisiensi and competitiveness.
- The main target of the development of economic models in peatlands is to create jobs and incentives for economic prosperity for the people. Using local resources and environmentally friendly activities in peat.
- Economic activity in peatlands cannot be separated from regional and national economies.
- What we often forget in business development is institutional and institution set up, capacity and bureaucracy.
- What type of investment will be developed and what incentives and facilities are provided to investors.
- Fiscal and nonfiscal incentives related to what incentives are provided to investors and by what institutions.
- From the consortium team's explanation, the average business model offered is on-farm. However, do investors want to invest in the field? The risk is too high. Therefore, what should be considered is a business model for derivatives products such as from sago, chili, and the other plants, for example for purun plant how is the production capacity and the derivative products?
- A business model that can be developed is to use consumer demand pull approach that is driven business taken from consumers.

Respond from Facilitator:

I think from the presentation of the consultant team, it is now been clearer how to follow up the results of the consortium team. Next we listen to experience sharing from Mr. Utomo as a business practitioner.

Presentation by Mr. Utomo

Important points:

- There needs to be revitalization of peatlands after burning. Policies that need to be adjusted include:
- Regulations and mechanisms for peatland governance including the legal aspects.
- Accuracy of data on land includes biophysics, land status, and legal certainty.
- Compile detailed land-use priorities with respect to land character and detailed mapping.
- Digging and compiling information on socio-cultural conditions of the community to avoid conflicts.

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- Establish criteria for people who are entitled to use the land before establishing land for development by corporations.

Respond from Facilitator:

I proposed to Mr. Kuno to hold one more meeting for the facilitate the incentive team and the facilitation team explained in more detail the main points of their recommendation.

Panel Discussion

Facilitator: Dr. Budi Darmawan

Participants:

1. Utomo Icqo (Chamber of Commerce DRN)
2. Eko NM Saputro
3. Ngudiantoro (UNSRI)
4. Tabroni (Research and Development Center for Forestry, Palembang)
5. Rachmad Firdaus (Ministry of Economy Coordinator)
6. Ani Suryati (Kedep V Ministry of Economy Coordinator)
7. Ici P Kulu (Univ. Palangkaraya)
8. Anke (Cultivate)
9. Budi Wardhana (BRG)
10. Widiyatmo (Chamber of Commerce)
11. M. Yazid (UNSRI)
12. Edwin Martin (Research and Development Center for Forestry Palembang)
13. Yupin AD (Univ.Palangkaraya)
14. Rubiyanto (UNSRI)
15. Efendi Agus (Research and Development Center for Forestry Palembang)
16. Akihito Sakurai (JICA)
17. Gunawan Pribadi (Ministry of Economy Coordinator)
18. Haryo (BKPM)
19. Ariawan (BKPM, DPF)
20. Alexcius Winang (Ministry of Economy Coordinator)
21. Nirma Pratama (BKPM)
22. Bayu P (Ministry of Economy Coordinator)
23. Erdiriyo (M.Ekon)
24. C.Nugroho (BRG)

Direction from Facilitator:

What to look for next time? From the 4 consortium teams, there are still questions about how prepared and attractive the commodities are to investors? Where has the commodity developed? And what kind of business opportunities? If investors prefer off farm, how about on farm, can we make one package? What about the market? Agency or equipments required? How about the market infrastructure? How about the business actors, and whether in terms of production or financial institution have a different interest.

Equally important is the change of culture, if there is going to be intensification, there should be a change of culture and cultivation intensity. Then related to the aspects of sustainability, what if no one wants to buy again or the quality can not be maintained or the land can not produce more, whether the consortium team had arrived there? What is important for BRG is that we can support the good restoration either in the form of compensation, an alternative that encourages peatland utilization in order not to burn or not open new intact peat. Intensification can be a double-edged knife, may even trigger the expansion of land because people want to get the highest profits. What kind of value added should be put to keep it sustainable?

What emissions reductions are expected, and we expect there will be certified business model for the sake of income added. Another things is the inclusiveness, in the process, government does not include local people, inclusiveness also gurantee the sustainability. To ensure inclusiveness there must be an institution established. Attractiveness to financial market in order investors want to invest and the business model can be implemented.

Scalability can be extended in the scale of material transformation. Scalability also affects the

impact, whether large enough, whether if it is given directly to Off-site will immediately make people change their mindset. Scalability also requires different business models and will eventually result in different attractiveness for financial markets. What are the required regulatory incentives?

There should be research and development for potential products either on-site or off-site so that added value can be improved. There is also a need for development partners like JICA to support and increase investor interest.

Interruption from Mr. Utomo:

- For consortium teams: some commodities are nature-dependent commodities that can not guarantee industry sustainability.
- Related investment investors, Lebak Lebung is a local wisdom of society that must be maintained so that should not be proposed as investment object. This is because the local wisdom should be the right of the community that must be managed by the local community in accordance with its characteristics.
- There should be resilience between the business model concepts to be built with climate change so that businesses that run do not fall due to climate change.

Respond from Facilitator:

Now I give the chance for incentive team and facilitation team to deliver their thoughts:

Incentive Team:

- Peatlands are areas that have a very significant impact so it can be proposed to be a Special Economic Zone (SEZ) peat.
- There are special facilities and incentives if the peatlands become SEZ in accordance to Geovernment Act No. 96 of 2015 on SEZ Incentive Regulation.
- SEZ submissions can be started by ensuring the legal status of the land.
- 90% of investment fails due to land issues.
- For the management and business model plan on peatlands, there must be coordination with local governments because of the socio-cultural aspects of local communities and local regulations which better understood by local governments.
- From the four studies, the most porosed is agricultural sector so it can be synchronized with government programs for food security.

Respond from Facilitator:

We need to attach to certain government programs for incentives and facilities to be prepared better.

Facilitation Team (represented by BKPM):

- There is a lot of potential that can be offered, but before investors enter Indonesia, there must be adjusment to Standard Classification of Indonesian Business Field because there are rules and proportion in order later it is clear related to business model and incentives offered to investor.
- Investment to Indonesia at least Rp 10 Billion / USD 800,000.
- 'Facilities that have been issued in BKPM for example green line that cooperate with customs duty is acceleration for investment to enter Indonesia.
- 3 hours licensing service: investment license, RPTKA, INTA, APIT minimum investment of 10 Billion, NPUP for 1000 workers, License for land blocking.
- Facility to facilitate construction permit because in the regions Building Permit is difficult to obtained, through BKPM the Building Permit can all be directly dealt with construction permit.
- Tax allowance is being revised in its attachment is being finalized at Ministry of Economy Coordinator.

Respond from Facilitator:

We will focus for the next meeting on the financial aspect and the consortium teams will still be invited as observers.

Closing from Deputy for Research and Development (Dr. Haris Gunawan)

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- Thanks to the participants because our discussions are very productive and there are much enrichment we get.
 - Head of BKPM Mr. Lembong said that he will supervise this activity. He also said that investment in Indonesia is slow while there are many investment flows that want to enter Indonesia. This is a challenge for us.
 - We hope that all participants to remain strong and healthy for the next meetings.
 - Indonesia was able to have palm oil, so we must now be able to have restoration business.
 - Samsung can be very advanced because they have an intensive knowledge division of knowledge. If necessary we also learn from the success story in the peatlands outside the existing plant (palm) such as areca, pineapple, or coffee.
 - Related to branding, I think it will be very interesting for the economic development of products such as coffee restoration or pineapple restoration.
 - Downstream business also needs to be a note, because it seems that we in Indonesia do not very like downstream business and prefer to sell raw materials.
 - What kind of business model we offer, but local wisdom is also have to be preserved, but we may not forget if our society is so powerless that we need to support.

End of discussion and event.

1.2.10 July 25, 2017 <Investment Facilitation>

**Agenda Focus Group Discussion
Proposed Facilitation and Incentive Schemes for Investment in Peat Restoration
Oria Hotel, Jakarta
Tuesday, 25 July 2017**

Minutes of Meeting

Agenda overview:

- a. **Opening and direction from Deputy of Research and Development BRG**
 - Opening remarks
 - Directions
- b. **Presentation from Mr. Hiromitsu Kuno from JICA**
Overview explanation on Proposed Scope of Private Business Investment on Incentive/Facility for Peatland Restoration.
- c. **Presentation from Incentive and Facilitation Teams**
Presentation on the main recommendation from incentive, facilitation, and consultant teams.
- d. **Panel Discussion**
The participants discussed about the schemes from consortium team study, incentive and facilitation team and what need to complete before determining the business model and commodities that will be proposed in the meeting on July 27, 2017.
- e. **Closing from Deputy of Research and Development BRG**
Closing remarks and direction from Deputy of Research and Development BRG.

Opening Remarks from Deputy of Research and Development of BRG Dr. Haris Gunawan

- Opening remarks and thanking the participants
- Overview explanation of activity background
- Explanation of discussion objectives and important notes

Important points:

- Thanks to all participants for attending this meeting, the consortium team, the facilitation team, the incentive team, the related ministries and JICA.
- I would like to remind that this activity is a review package that will be updated and refined and will be completed when the target study is interesting and can be implemented.

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- Therefore, let us discuss deeper about our common mission to restore the peatland. This is our first exercise, so let us pack it in order this restoration scheme can be in accordance with our efforts in the context of development that stands for the people.
 - Indonesia, especially in peat, has a lot of natural resources and potential material from upstream to downstream that should be developed.
 - Our study is expected to be not only attractive to BRG or JICA but also can be implemented and bring prosperity to the people.
 - Today we will formulate the most appropriate facility and incentive schemes for business on peatlands. We will continue to test and guard the concept until it is fully implemented in the field.
 - I'm sure there must be many things we can explore and discuss about those expectations. Today we will hear the presentation from the incentive team and facilitation team regarding the most appropriate scheme to be implemented in the field.
 - In addition, the business or activity that we are going to make is not necessarily high but must be grounded, meaning that the results of these activities can be seen in a way that really benefits the community.
 - On July 27, 2017, we will meet again to prepare the best formulation by involving many parties, to agree on what kind of business scheme we will develop.
 - It is our hope that if in the previous meeting Mr. Deputy 1 delivered the basics target of peat restoration and how this business can contribute to the peatland restoration activities, of course the business we develop must be friendly and in accordance with the characteristics of swampy peat.
 - I thank JICA for facilitating this activity.
 - In Japan, when we start a business starting from big actors to small people are all happy. Because we are targeting Japanese investors in this restoration business, we hope that we can imitate the Japanese business and economic practices that involve the community in business activities, so that it does not spawn the new conglomeration and capitalism.
 - I think that the capitalism's hand is very difficult to defeat, but we must remain optimistic to be able to do it, especially for the business in peatland.
 - The Focused group discussion was opened.

Presentation by JICA

Speaker: Hiromitsu Kuno

Title : Proposed Scope of Private Business Investment on Incentive/Facility for Peatland Restoration

Important points:

- Action plan for promotion to Japan in October 2017.
- On July 27 we will conduct a workshop to facilitate our discussion with a larger forum on the concept of incentive and facilitation schemes for peat restoration.
- Starting from August to September 2017 BRG should start conducting an in-depth dialogue with Ministry of Economic Coordinator and Indonesia Investment Coordinating Board (BKPM).
- The consortium team must have completed their study and prepared the brochure to be promoted abroad.
- We must also immediately make a guideline draft for Green Business financing and begin the design of cooperation with financial institutions/financing.
- In mid-September we must already conduct the last FGD for October promotion in Osaka.
- On-farm business is a business that can touch the peatland restoration. However, for downstream businesses there must be a link between the business and peatland restoration activities, for example, the product is the result of peatland restoration or other, so it can be said that it is peatland restoration business.
- Financing may come from domestic institutions and foreign institutions.
- BRG targets are located in 7 provinces with 4 Priority Districts and we would like to touch the ex-fire area.
- Business on the restoration area can be On Farm Business with high priority, challenge, and problems as well as Off Farm Business.

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- Our recommendations are:
 - Improvement of local government regulation both provincial and district government, especially local regulation in 7 target provinces. This has been proposed to Pokja, one of which may be proposed for peatlands Special Economic Zone (SEZ).
 - We prioritize the business to touch the priority areas of fire and prone to fire.
 - On Farm Business is definitely related to vegetation, therefore the business that will be run must touch the rewetting aspect of peatland and water system.
 - We also have to consider about the scheme of facilities and incentives for financial institutions that support a peatland friendly business. This is a big challenge but we can think it over together.
 - Business schemes developed can be synergized with other government's programs such as food security or energy security.

Presentation from Facilitation and Incentive Teams

Presentation from Mrs. Ani Suryati/Facilitation team (Ministry of Economic Coordinator);

Important points:

- The Secretariat of SEZ is under the Ministry of Economy Coordinator, and its council is chaired by the President.
- After we discussed, we think maybe SEZ could be a scheme for peatland investment.
- SEZ appointment is authorized of the president.
- The implementation of SEZ in Indonesia refers to Act No. 39 of 2009 on Special Economic Zones.
- The basic concept of SEZ is not investment but on the preparation of regional areas in coordination with the central government. After the preparation of the area, then we start to create business activity within the area.
- The SEZ institutional framework is a national council chaired by the President.
- SEZ location criteria:
 - One of the advantages of SEZ is the support of the provincial and/or district/city government.
 - In accordance with provincial and district Spatial Plan. The thing that has been making SEZ falter is incompatibility with the Spatial Plan.
 - Located in a position close to the trade route. Well, for the peat it seems this criterion can be ruled out because peatlands have their own characteristics.
 - Has clear boundaries.
- Zones within SEZ: export processing (likely to be impossible for peatland), logistics, industry, technology (peatland may also come here), tourism (we can get to this category), energy, and other economies (it seems most likely we are getting here).
- Stages of SEZ implementation: Proposing, determining, developing, managing, and management evaluation.
- SEZ proponent may be a business entity, Regency/City government, Provincial Government, or Ministry/Institution. Looks like for the proposer, we can go to the Ministry/Institution ie BRG in cooperation with the Provincial Government or District Government.
- Proposed document: Proposed form, Power of attorney authority (BRG may join with provincial government in this case), Certificate of establishment of business entity (not necessary), SEZ development plan (eg in Morotai for fisheries and in Papua for mining), The detail map and width of proposed SEZ area (for the first stage is still not necessary), economic and financial feasibility studies, plans and financing sources, Environmental Impact Analysis, proposed SEZ operating period (can be submitted up to 80 years), location permit.
- Acceleration strategy: Preparation of SEZ formation on average takes 0-3 years. Strategic location and in accordance with the Spatial Plan can be processed more quickly.
- The SEZ formation evaluation stage if it is ready can be processed within 45 days.
- Scheme of SEZ formation: Can be from business entity with fund of the business entity and they are the manager. We propose that the proposer of this SEZ peatland is Local government and/or Ministry/Institution (BRG) because in that scheme we can build the area using State National Fund/Regional Fund and can use private government cooperation scheme if we lack of State fund. This cooperation scheme works as private party build the area since the

government does not have cash money and within 20 years the private party will be paid along with its profit benefits.

- Up to 2017 there are 11 SEZs formed from the target of 25 SEZs until 2019. These peatland SEZ can be proposed to the SEZ establishment category based on the new policy as per the president's commitment.
- The choice of investment should be observed so as not to overlap with government policy. We have experience in Morotai, there was investor from Taiwan who resigned to invest because it did not comply with the new policy.
- Facilities and incentives of SEZ: Licensing and non-licensing (one-stop integrated service); Taxation of customs and excise, traffic of goods, employment, immigration, land (Act number 2), DNI not applied.
- Reduction of Income Tax (PPH): Tax reduction/Tax Holiday for investment > Rp 1 Trillion reduction 20-100% for 10-25 years, for investment Rp 500 billion - Rp 1 Trillion reduction 20-100% for 5-15 years and Investment below Rp 500 billion tax deduction of 20-100% for 5-15 years. In addition, it will also receive Tax Allowance for outside the main activities.
- Employment: in SEZ a Wage Council was established and a Special Tripartite Working Unit, only 1 SP/SB forum in each company, ratification and renewal of RPTKA in SEZ, extension of IMTA in SEZ.
- Immigration: Visa on arrival for 30 days and extended for 5 times 30 days each.
- Land: Using the scheme of Law No. 22, the right to use can be extended for 80 years.
- There is a convenience of 3 hour investment permit.
- Our suggestions:
 - Prepare the basic requirements such as Spatial Plan and the land as they are the biggest obstacle.
 - Related to the financing in SEZ, there is no direct scheme of financial institutions to finance. However, maybe peatland can be an exception.
 - Peatlands are not possible for industry/factory so we can adjust the business with government programs such as food security. Adjusting with government programs such as new paddy field printing because peatlands have land and lots of water so the conditions are suitable. Besides it can be developed a farm that can also contribute to our economy, or an integrated soybean or corn in peatlands.
 - There are 7 provinces that are targeted for restoration with different physical conditions so that it must be adjusted the activities and business scheme when proposing the SEZ based on the characteristics of each region.

Presentation of Ibu Sri Endang Novitasari/Incentive Team from Head of Sub Directorate of Primary Sector Directorate of Deregulation of Capital Investment Dept. of Investment Climate, Investment Coordinating Board (BKPM):

Important points:

- Peatland ecosystem development policy. When the compilation of Government regulation number 57 year 2016 we were actively involved and strongly affected by the Law, especially related to the sustainability of investment activity. With this Law there are things that cause the sustainability of investment in Indonesia, especially in peatlands is disturbed. For example a change in the function of a cultivated zone to protected zone.
- One of the investment problems in Indonesia is legal uncertainty. This uncertainty will affect to the operating business and new business we invite.
- In the Law 57, it is stated that we may not open new land, especially if the land is in peat.
- Minister of Forestry's Regulation on limitation of activities on peatlands does not allow to open new land and there are restrictions related to activities on peatlands.
- BKPM is very supportive but we ask for legal certainty from the government so that the regulation does not overlap with the previous policy.
- From 7 provinces, there are 4 pilot project sites in priority districts.
- Several business fields whose indications are in the peat ecosystem, based on last year's investment both from local and foreign capital invested was heavily in food and plantation business. The possibility to capitalize on local and foreign capital is overwhelming.
- Most likely we are going to invite investors from Japan to get together to see if they can equally invest in peat restoration.

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- There are restrictions on foreign stocks ownership if it is not located in SEZ.
 - The SEZ scheme is an alternative to a negative list of investments: a policy of restricting certain fields that are declared closed to capital investment of either local or foreign investment.
 - There are areas that are only reserved for Small and Medium Enterprises (SMEs) such as rice under 25 ha, if more than 25 ha outside investment may come.
 - The field of business should be ascertained first and whether there are restrictions or not in the field. Do the foreign investors have no objection to the restrictions on foreign ownership?
 - The example we are trying to make for a scheme on peatland, such as freshwater fish is allowed to be 100% from foreign capital but the scheme must be partnership which means there must be a partnership with the community there in the form such as the provision of raw materials or others.
 - For rice and other crops cultivation, there is a maximum restriction of foreign capital in each business field. For example, the area below than 25 ha is reserved for SMEs (rice) and if the land area is more than 25 ha, foreign capital is 49% at maximum.
 - Small scale electricity generation (1-10 MW) foreign investment limitation maximum at 49%.
 - Business of Natural Tourism Objects outside the Conservation Area: foreign direct investment up to 67%.
 - Horticultural activities are very restrictive, maximum foreign capital only 30%.
 - There should be an explanation to the investor, how many percent they can invest and who will be their partner. We must also prepare who will cover the remaining capital because later they must form an Indonesian legal body to bind the foreign ownership.
 - Investment value for foreign investment: Local investment is not restricted. In SMEs Law no 20 Year 2008 foreign investment is categorized as medium business. Minimum value of foreign investment that goes to Indonesia is Rp 10 billion, under that number is devoted to domestic investment.
 - What about the land availability? Because there is a Law 71 year 2014 that does not allow the opening of new land. We also hope that the land for peat restoration activities must be clean and clear.
 - We are from BKPM can assist the promotion, but everything must be clear first, ranging from the type of business, the land, who is the partner and the restrictions of foreign ownership, and others.
 - One-stop integrated services to accelerate the investment in BKPM. If the selected scheme SEZ, there will be a delegation of all licensing authority from the center government to the administrator of the SEZ management, including the absence of negative investments except for those reserved for SMEs.
 - 3 hours service, with certain requirements, minimum investment criteria of 100 billion and/or employing at least 1000 workers.
 - The government issues tax amnesty, as long as there is a decree from the Directorate General of Tax, the companies are separated from the 100 billion and 1000 labor requirements for tax amnesty. The investors who will later invest in peat can be exempted over submission from BRG in order to invest.
 - Investment incentives:
 - Investment schemes based on investment and tax laws. There are several incentives and facilities offered such as tax holiday in the form of 20 years of exemption for certain projects, tax allowance for agriculture such as livestock, corn plantation, soybean plantation, tropical fruit and rice. Investor's consideration is what incentives will be obtained if they invest to Indonesia compared to other countries.

Panel Discussion

Facilitator: Mr. Nugroho

Participants:

1. Yuprin AD (UPR)
2. Robiyanto (UNSRI)
3. Ngudiantoro (UNSRI)
4. M. Yazid (UNSRI)
5. Ici P. Kulu (UPR)
6. Utama Kajo (Chamber of Commerce/DRN)

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7. Edwin Martin (Research and Development Center of Forestry, Palembang)
 8. Nur Arifatul U (Research and Development Center of Forestry Palembang)
 9. Adi Kunarso (Research and Development Center of Forestry Palembang)
 10. Sri Endang N (Indonesian Investment Coordinating Board)
 11. Dendy A (Indonesian Investment Coordinating Board)
 12. Nirma Pratama (Indonesian Investment Coordinating Board -Fasilitas)
 13. Ariawan OP (Indonesian Investment Coordinating Board -DPF)
 14. R. Mitha CN (Ministry of Economy Coordinating)
 15. Ani Suryati Ningsih (Ministry of Economy Coordinating)
 16. Ahmad (PSB-UR)
 17. Nurul Qomar (PSB-UR)
 18. Hastin
 19. Bayu P.G (Ministry of Economy Coordinating)
 20. Akihito Sakurai (JICA)
 21. Haris Gunawan (BRG)
 22. C. Nugroho SP (BRG)
 23. Nunung (IPB)
 24. Rachmad Firdaus (Ministry of Economy Coordinating)
 25. Shin-Ichi Aikawa (JICA)
 26. Rahmawati I. Wetadewi (BRG)
 27. Hiromitsu Kuno (JICA)

Directions from the Facilitator:

I want to review our process in the previous two meetings. Previously we agreed to give opportunity to the investment facility team and incentive team, to formulate the input. In the last meeting the consortium team has given exposure to its survey results but facilities and incentive teams have no chance to elaborate due to time constraints. The process is slow but it makes others aware of the mechanism and bureaucracy outside their field.

If we propose SEZ, there are facilities and convenience provided, there are some key questions, for example a business that will run is in the upstream/downstream and who is the partner? A lot of new important information delivered by Mrs. Ani and Mrs. Endang. We also agreed to bind the incentive and consortium teams with the help of a consultant team by Pak Nunung.

Important points from Dr. Nunung:

- SEZ is an alternative to be proposed and if it is agreed, BRG and the consortium team can begin to elaborate. The only question then arises is how much the scale that will be developed, so we know how much investment is needed, and we can know whether this should involve investment from local or foreign investment.
- What we have been talking about is a land based investment and which has not been touched and we need to discuss further is non-land based business. The development of this business need capital, well the question then whether for example this capital is owned entirely by domestic investors, but in the course of lack of capital, can we sell green bon to foreign parties, such as Japan.
- What we need to explore further for the model in the peatland restoration economy is non-land based business because of the need for capital there. Financial Services Authority (OJK) should also be informed because there are investment opportunities there.
- Wakatobi is destined for tourism and local governments have established a Tourism Authority Agency-similar to BRG (on peatland) where all tourism-related activities go into it including the related ministries.
- Hopefully if this concept works with its Green scheme it can be a role model and support the 2030 SDGs agenda. This activity may be able to become one of the indicators of SDGs and we can evaluate together.
- We agree on the peatland economic area, but what should be considered is how big the scale of activities, domestic and foreign investment needed, and if domestic capital requires additional investment whether it can sell green bon to foreign investors.

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- I also need to emphasize to the consortium team that when we want to do green economy it includes at least three aspects: social, economic, and environmental. Well, how these three things can be reflected in the proposed investment concept.
 - Ministry of Village also has (Village Owned Enterprises) BUMDES, our experience in Wakatobi there are 10 BUMDES who work together for tourism activities there. If one BUMDES alone has 800 million funds then 10 BUMDES is 8 Billion, well this is a big fund. So if we can cooperate with BUMDES in targeted areas, it can be significant capital strength of its own.

Respond from Facilitator:

- Business classification schemes should be adjusted to the consortium team's study by taking into account the scale, type of business which is based or non-land based, investment source whether domestic or abroad or in collaboration with BUMDES investments. It gives more choices for the investment strata, domestically, abroad, and now BUMDES. If BUMDES can be collaborated with an investment scheme I think it will be large enough the capital that can be collected to be used for the stagnant SEZ.
- Divide these domains and match them with conditions. it can be the conditions surveyed by the consortium team is improved first before investment or the field conditions in the existing level directly improved through investors investment.

Presentation of Consortium Team, Prof Robiyanto:

- We studied four priority districts. We must agree first if this business should support restoration, not anti-restoration/drying the peatland.
- Peat utilization should be integrated. We want the synergy of the parties, and this forum is an effort to bridge multi-stakeholder participation in role sharing and cost sharing.
- According to Ministry of Environment and Forestry, peatland has protection and cultivation function.
- The definition of PHU: there is a cultivation function in the river edges and a protective function in the middle of the peat dome, but it is opened. Well this is what must be searched a win win solution so that we can realize the green development.
- Target from deputy 1 is to restore 33 PHUs in 6 provinces. What we do now is about 4 PHU and only partially.
- BRG restoration approach: rewetting, re-vegetation, and revitalization livelihood.
- The problem minus 40 cm water table in the middle of peat (Gov's Regulation no 57 year 2016 and Minister of Forestry's regulation year 2017).
- In South Sumatera, restoration targets exist in two districts namely Muba and OKI. Restored land is a burnt area in 2015.
- 60% of MUBA economy is dominated by natural gas, agricultural sector is still small while the potential of the agricultural sector is large enough to be developed. The poverty rate in MUBA is 20%.
- What will be done by deputy II includes canals blocking, stakeholders KPA community, and village forest.
- OKI Regency: PHU Sugihan River - Salih River. Potential of fishery and farming is 61%. PHU Sibumbang River - Batok River main potentials: swamp buffalo, lebak lebung fishery, purun, food crops and horticulture, coffee liberika, areca and pineapple.
- For Lebak lebung fishery, UNESCO is interested to make it for tourism, so it can be a local wisdom tour. Fish products produced include smoked fish and salted fish. The national market already exists (Padang and Bandung) with demand exceeding the production capacity. Form of investment that can be done include product development, production process, and marketing cooperation (export).
- Development of Swamp Buffalo Industry can be used as Pasteur milk, yogurt, milk candy, ice cream, gulo puan, and curd. The forms of investment needed include product development, production, and marketing. The proposed business scale is small and medium.
- Another excellent program in OKI Regency is the development of purun handicrafts for various types of bags, hats, key chains, and others. The forms of investment that can be done include marketing cooperation. The development needs include production technology, coloring techniques, preservation techniques, and motives.

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- We can also follow Jambi, where a lot of palm oil is felled and replaced with betel nut plants. Provinces of NTB, NTT, and India need areca nut for dyes. The market is existed.
 - Leading peat-friendly commodities in Musi Banyuasin Regency: Kenaf, Pinang, Pineapple, Food Crops and Horticulture, Swamp Fisheries, and Environmental Services.
 - Field condition is dormant and will be made canal blocking.
 - Kenaf Commodities (*Hibiscus cannabinus*): adaptive (can be grown in dry land, wetlands, peat), easy to cultivate, two harvests a year (4-5 months with a capacity of 15-30 ton/ha), environmentally friendly, community-based. Kenaf can be used for pulp and paper, textile and carpet, dashboard, medium density fiber, bioplastic and biocomposite, oil spill, animal feed production.
 - The level of poverty in Meranti Regency is high. Approximately 90% of its area is highly prone to fire and 82.5% of its area is deep peatland.
 - If the community is still poor then the possibility of peatland to burn is very high.
 - Changes in the land status which was initially owned PT NSP and PT LUM, into village forests. There is a misunderstanding in the community as if the trees in the village forest may be felled.
 - Leading commodities of the Meranti Islands Peatlands: Coffee liberica, sago, liquid sugar, kenaf, environmental services/NTFPs, and timber.
 - Sago added value is still lacking and people want to have other added value from sago such as sago noodles, cereals and others. There are many sago refineries which produce much waste that usually is thrown away in the river.
 - The sago waste can be used as a medium for mushroom cultivation.
 - In the Tohor River village: a discussion with the community.
 - Profile and investment opportunities at PHU Kahayan River - Sebangau River, Pulang Pisau Regency Central Kalimantan: Central Kalimantan's food granary. Economic strength is in agriculture and fisheries.
 - PHU Selayar River - Sebangau River: one million hectares of peatland.
 - Integration commodities of Alabio duck, food crops and horticulture, balangeran and laban, kenaf and pineapple, betel nut, and swamp fisheries.
 - The way of harvest gelam is by burning the surrounding shrubs to avoid getting thorns. So as long as there is still gelam harvest, the area is still prone to fire. Gelam is used construction.
 - Rice field in Pulang Pisau Regency is still not optimal, planted once with a potential harvest of 2/3 tons. Then after harvesting the fields are abandoned into a scrub and opened again by burning.
 - We can follow Banyuasin Regency as example, there is rotation cropping during the rainy and dry seasons. For a year the commodities sold are different. There are commodities of rice, watermelon, corn, chicken, duck, and goat.
 - Rubber plants should be repaired so that people do not open the forests because rubber is the main economy.
 - Economic potential of laban wood is Rp 2 million/truck.
 - Mr. Mayor said that there is integrated economic development in Pulang Pisau Regency, if our business is combined with the program we can go to Regency Medium Period Development Plan (RPJMD).
 - Note: there must be an integrated peat restoration development. There should be a role sharing and cost sharing. The peat restoration management unit (UPRG) in the PHU should be agreed. It is necessary to draw up the Peatland Ecosystem Protection and Preservation Plan (RPPEG) at the District level in accordance with the RPJMD Districts, Provincial RPPEG and National RPPEG.
 - 20 years ago, there was forest, industry based and community based. We think the industry based now is no longer wood industry or palm oil but peat friendly industry.
 - We must adjust our program with Spatial Plan.

Presentation from the Financial Services Authority (OJK):

- Financial services institutions are engaged in risk management, the international standards refer to Basel.
- For this sustainable financial regulation, we are still in the capacity building stage to avoid any shock in its macro economy. So the regulation will be implemented gradually.

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- Since we at OJK are big book banks, books 3 and 4, we will be directly affected by this regulation in 2019. In 2020, we will begin to enter the capital market. We have also completed a study on green bon, whether the regulator may issue regulations on green bon. On the OJK website, there is a sustainable finance section, where the study results can be seen.
 - In 2018 hopefully if there is no obstacle, the green bon regulation will be published. This Green bon business process is very different from banking and non-bank financial industry. The capital market is disposure while banking is prudential.
 - Financial Services Institution and non-Financial Services Institution public companies, they submit their financial report to us every year but we do not have the right to ask it from them. We from OJK are only entitled to provide guidance so that the business can lead to sustainable finance.
 - There are two obligations that we will ask to emitem financial services institution and public companies. This regulation is new to the financial services institutions and the expert is very still less.
 - It is required to make a sustainable financial action plan. What action plan and PJSL fund is required.
 - The second is a sustainability report. The report is made as simple as possible because it will be submitted to the House of Parliament so that they understand the "language" of sustainable finance.
 - OJK already has 8 guidelines related to what kind of business and financing model that sustainable.
 - We are also guided by the Ministry of the Environment and Forestry and the Ministry of Industry, for example related to energy efficiency, peatland and others. What profit can I get from this business, so we have to provide an overview of the environmental and social values of it.
 - We once worked with GIZ related to financing pepper farmer in Bengkayang, we conducted training for financial services institutions. We tried to make a financial guideline for pepper farmers. Financial Institution especially banks, must be able to enter and create its supply-demand in the community.
 - We are assisted by JICA will make a financing guideline on this peatland.
 - For Green Bon, the previous commissioner had issued a policy of incorporating SMEs into the stock, later we need to discuss with BKPM, as making the regulation for SME into the stock is a big challenge.
 - For the implementation of this sustainable finance, we will discuss with the Ministry of Finance.
 - We also open for recommendation related to this Green Bon.

Respond from Mr. Nugroho:

- This sustainable financial-related information is very useful for us as an illustration for promoting business on this peatland matters.
- We enter the discussion session, at the end of this discussion we ask Mr. Nunung to give the final elaboration so we have an illustration of what we will bring to the upcoming 27th of July.

Respond from Mr. Utomo:

- My experience in the 70s on the east coast of Sumatra dominated by wetland, we did not succeed in developing cow farms because of cow lice. But buffalo might have a future.
- The coffee that has been discussed is coffee liberika, grow on the a bit wet land and not in the wetlands. The seeds are small and uneven, suitable for planting in eastern Sumatera and suitable for the Malaysian market but not in Sumatera, Japan, Europe or America. Liberika is good for the local economy but not prospective for national economy.
- Facilitation and incentives for investment:
 - No free taxes.
 - There should be a clear legal standing of the land.
 - Data availability is a State capital to assist the entrepreneur.

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- Ministry of Agriculture produces impara 3 seeds of rice in South Kalimantan. By cooperation with all research institution we can accelerate and support the restoration business.
 - I think that what investors want to hear tomorrow is government facilities and promises beside what we can do on peatlands.

Respond from Mr. Nugroho:

I give the opportunity to Mr. Dendy.

Respond from Mr. Dendy:

- Meranti District has become the largest sago producer in the world which also means the world's largest waste. The sago is 30% while the waste 70%. There are 96 big companies polluting the environment. If we manage this potential, we can be mushrooms and ducks exporter in the world. We are already able to make mushroom cultivation waste to be animal feed. We will be able to print for a very large business scale. The waste potential is very big. Sago waste can be made into mushroom growing media, duck feed, worms, organic fertilizer and fish feed. 20% of the waste can be used for mushroom media and 60% for duck feed. With this concept, it is expected that the farmers can be prosperous. With waste-based agribusiness, we do not need a highly educated workforce.

Respond from Mr. Nugroho:

- There is business integration, its relation to investment is rather difficult to categorize because there is business integration there, such as Pak Dendi who used the waste only.

Respond from Mr. Firdaus:

- From our initial meeting until today there are quite a lot progress, we will choose whether the business model is land based, commodity based or combined. It should be wrapped with the proper selection of places, such as the special economic zone of peat. I want to deliver two points:
 - With regard to the activity in 27th of July, perhaps the presentation can be more structurized and attractive, such as it can be started from the significance of the area analysis, then the other things.
 - The obstacles in SEZ development is the accordance with Spatial Plan both province and district. Because of its foundation are the Law of 2007 and Gov's regulation number 28 of 2008. What is feared by the local government is when the development of the area is different with the Spatial Plan. There is already a national strategic area of Gov's regulation no 28 of 2008. We should consider whether this SEZ area will intersect with government's strategic areas, our suggestion is we do inventory before proposing this SEZ region. Does BRG has the rights or able to propose national strategic area, because PHU is important to support the ecosystem sustainability.

Respond from Mr. Dendy:

- I would like to reaffirmed that SEZ might be a solution for peatland restoration, because from the positive side, the facilities and incentives related to this SEZ has been prepared by the government.

Respond from Mr. Nugroho:

- Additional note is Gov's regulation no 46 of 2013, the investment below 4.8 billion is only taxed 1%. This incentive can be very applicable to this business.

Respond from One of Participants:

- Related to SEZ, I think it can be offered at the event on 27 July. The question is the SEZ must have a manager. So that can be divided for the use of its territory. If there is no proposer, the management will be auctioned and difficult to control.
- The importance of offering a clear locus, maybe Mr. Dendy can re-address and sharpen the commodity that has been proposed by the consortium team whether it has categorized as the tax allowance and tax holiday commodities or not.

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- There are fixed areas that need middle to low cost. Actually we are in the government has a lot of financing schemes. This scheme may be offered to national entrepreneurs with a low classification.

Respond from Mr. Nugroho:

- Thanks to the information on the financing schemes.

Respond from Mr. Utomo:

- I hope that on the 27th July, we can already focus to 1 or 2 locations to be offered to investors. The commodities to be developed, knowledge based course that is on our list along with economic value and feasibility analysis. When the private party wants to invest, they must have something in mind related to what business they will do. After that we come into community empowerment through government funding scheme.

Respond from Mrs. Ani:

- I want to clarify and express that I agree with Mr. Utomo. We need to decide from all 4 format models we have, which one is the most suitable to use. I consulted with SEZ secretariat, there is one specificity about the environment and the cost for fire so please be careful. Then also look at which financing scheme is easiest for our business.

Respond from Prof. Robiyanto:

- The one who has juridical authority at the location of the study if the location is Other Utilization Zone (APL) is the Mayor/Regent. We do not have that authority. We cannot offer a location to investors because of the authority lies in the Regent. We only present the results of our study, its location and others. If the location is in FMU's area means that the authorized actor is FMU.

Respond from Mr. Utomo:

- I think it is better that we do not invite the investors in July 27. We have to finish our discussion first in our internal, and have further discussions with Regents, Ministry, FMU, and others. So we must make it clear related to the management and authority of the region. So the 27th of July event is not an investment forum but just coordination forum.

Respond from Prof. Robiyanto:

- Mr. Regent of Pulang Pisau is pleased to attend the 27th of July event. We agree to resolve internally. I agree that investors will not want if the authority is not clear. The location that we identify has been maximized according to the existing time table. But the authority remains in the Regents where the location will be developed.

Respond from Mr. Nugroho:

- The location is ready but has a different host/owner. We and Prof Robi will deliver the results of the study and overlaid with the rulers. So if investors want to invest in a certain area we will stay in coordination with the ruler.

Respond from One of Participants:

- In essence Mr. Utomo suggests that we should not invite investors. Therefore we have to discuss with the authorizes institutions so that later the ruler who will offer to investors. I agree the 27th July does not need to invite investors first.

Respond from Mr. Nugroho:

- We see and feel that what Mr. Utomo said is important, because we have a picture related to the desire of investors.

Respond from Dr. Nunung:

- I try to conclude but not simplify:

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- Consortium team is given a mandate to conduct studies, and there is an obligation for public hearings to convey their findings so that the date of July 27, 2017 it seems that not yet an investor forum, but a kind of public hearings.
 - It should be emphasized that activity on peatland is different from the usual investment, because there are certain problems such as environment and limited carriage capability. Therefore the approach is business as not as usual.
 - What approach we will use. When investors come, surely they will think what activities I am going to do. So we first mapped the activities, the location, and how it relates to the regulation and its process. These three things can be delivered later. Therefore, it is important that the approach is an appropriate area of incentives to be given to the government.
 - It could also be presented that the investment developed is zero waste product, such as sago and mushroom, I think it can provide its own incentives with environmentally friendly characteristics like this. We also need to say, which has not been much touched is the non-land based investment. I think this is interesting and can be delivered. Even we can deliver the potential of peatland tourism such as lebak lebung as fish production tourism.
 - The 27 July Forum later, my recommendation to complete Prof Robi, the presentation can be simplified and equated between regions, matrices already exist and can be equipped to facilitate the audience to understand.
 - Why is the BC ratio so low? Are you using BC or RC and how is the calculation. Because it is very low. Or we can use multi-commodity to make the BC ratio higher. Not forgetting also about the social environment aspect that can be equipped.
 - Characteristics and constraints can be presented at the beginning, what activities and locations and what facilities and incentives. The approach is not one by one but integrates various ministry actors. It is also interesting that this area is a poor area, how this is related to government programs to reduce poverty, whether or not the scheme which has been delivered can reduce poverty and increase income.

Respond from Mr. Utomo:

- At the end, we want to welfare the society.

Respond from Mr. Ngudiantoro:

- The problem in the peatlands of this study site is the community has limitations. The business schemes that we choose are already done by local community. The analysis conducted at the time of the survey was an analysis done by the community. Swamps can only be used 7-8 months for rice, the rest of the year they will go to peatland to take gelam, and the possibility of harvesting involves burning to clear the land.

Respond from Mr. Utomo:

- Investor may not enter to the community land, because if investors go there, it will disadvantage the community. I ask the Deputy to choose to invite investments into the damaged or non- community lands. I forbid for investors to enter community land and just go to damaged land for repairment.

Respond from Mr. Ngudiantoro:

- There are three segments of society related to Purun in OKI namely collectors, managers, craftsmen, but no one sells, here investors can enter.

Respond from Mr. Utomo:

- Well that's what we must keep Sir, as local wisdom, do not need investors there because it can be inputted technology assistance from the government. Do not let outside investment that can actually kill society's livelihood.

Closing from Deputy of Research and Development of BRG, Dr. Haris Gunawan:

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- BRG are very grateful and listen to the enrichment of the material and substance related to our shared plans to package the peat restoration as a business for the prosperity of the people. Do not let peat restoration only be healthy peat and good environment but the people remain poor.
 - That's why we have to metamorphose the business for better business.
 - What we want to develop is a layered green business. Because the haze really does affect us.
 - If Malaysia and Singapore they play in packaging and promotion. So we should be able to maximize it.
 - We collect the knowledge as much as possible regarding the development of this business model.
 - Example: Japan's peat water is made for spas, in Indonesia we have a lot of it. This is what we need to elaborate further. What knowledge enrichment and breakthroughs that can be generated.
 - On July 27th the format will be similar like this, but the participants are more than it, we also invite the local governments.
 - The final goal is a business meeting in Osaka, we expect Dr. Nunung and the team to package it and if it's necessary until the investment proposal.
 - Thank you for everyone's presence, hopefully we can find the right business and not too passing.

End of discussion and end of the event.

1.2.11 October 4, 2017 <Business Development>

Notes
Focus Group Discussion
Consortium Team for Business Development of Peat Restoration
Peatland Restoration Agency Office, Jakarta Pusat
Wednesday, 4 October 2017

Summary

FGD aims to discuss business models that can be developed on peat restoration areas or lands that can improve the financial and social welfare of the surrounding communities and can be a prospective business project to be offered at international forums and invite investors to invest in this sector.

The discussion was attended by 4 consortium teams from each district, representatives of the JICA survey mission, representatives from BRG and R&D of environmental and forestry sector. The consortium team has analyzed the potential commodities in each district. 4 major disctrict of this business development are Musi Banyuasin Regency, Ogan Komering Ilir Regency, Pulang Pisau Regency and Kepulauan Meranti. Observation and analysis resulted 21 potential commodities that will continue to be developed.

The discussion is expected to provide an output to a prospective business development model and can improve the welfare of the community by considering environmental aspects and succeeding the target of peat restoration. The FGD begins with a brief welcome and briefing discussion by representatives of R&D environmental and forestry sector. The discussion sessions began with the presentation of JICA and representatives of the consortium teams from each district. The matters presented are:

- Finalization of JICA's mission and project with BRG (Peatland Restoration Agency)
- Discuss leaflet and booklet preparation material on peat restoration business
- Prepare materials for delegates to be delivered at intetrnational meeting in Osaka

The next session was an open discussion. Generally discuss the realization and technical development of business models on peatlands. Selection of potential primary commodities to be sold on international markets as well as matters preparation for the next FGDs with local governments and BRG deputies.

Minutes of Meeting

Agenda overview:

- a. Speech and referrals
 - Speech
 - referrals
- b. Agenda 1
Draft finalization report and JICA survey mission and the presentation of each consortium representative
- c. Agenda 2
Discussion of booklet and leaflet matters
- d. Closing
Submission of summaries and important notes on meeting output.

Opening

Submission of referrals and outline discussion by Mr. Nugroho :

- Discuss finalization of JICA project and mission to be submitted by Mr. Hiromitsu Kuno and final report (draft)
- Discuss leaflet and booklet preparation matters on peat restoration business to be published with others in a short, easy and clear tool
- Prepare materials for delegates to be delivered at meeting in Osaka

Agenda 1

Referrals submitted by Mr. Hiromitsu Kuno :

- The final report presentation is made per district or representative of each consortium team area?
- The report focuses on the concept of general plans and commodities that are prioritized per KEK (Exclusive Economic Zone), as well as business concepts to be proposed
- Demonstration plots should be made in order to invite investors
- To do list: Site selection, priority commodities, investment per-KEK (EEZ), investment promotion, and business model formulation.

Presentation delivered by Mr. Ngudiantoro (Consortium-UNSRI)

- BRG-JICA (Phase II) Pre-feasibility in study for peatlands restoration investment
 - ✓ Priority restoration in Musi Banyuasin, SESAME tool used as monitoring tool
 - ✓ Draft revision result: Starting from fire incident at KHG in Musi Banyuasin, then selected potential location of peat restoration business, (3 areas allocation, HPL, HP, HL)
 - ✓ Secondary data is used and then the verification is executed in the field (dark color □ peat domes) data overlaid with fire data in 2015 seen in the concession area (peat restoration area)
 - ✓ Intersection was done with data of peat depth and fire, non-concession with the non-concessional forest that can be offered for the peat restoration business.

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- ✓ Overlay with existing boundary identification results selected potential locations
 - ✓ Further identification of potential commodities needs to be done to identify peat friendly commodities
 - ✓ Vegetation found; pinang, pineapple and other horticultural crops (including medicinal plants)
 - ✓ Potential of peat-friendly commodity business: In Merang Village 7,000 ha, Kepayang Village 5000 ha, Non-concession forest area 56,000 ha
 - ✓ Potential business; kenaf, beruk, gelam, pinang, pineapple, food crops, canal blocking-fishery
 - ✓ Business actors: community and corporations
 - ✓ Superiority of kenaf (*Hibiscus cannabinus*) :
 - suitable to be cultivated as conservation crop
 - able to grow in tropical and sub-tropical area
 - resistant on dry land and peatland
 - easy to cultivate
 - has short period of harvest time; can be harvested 2 times per year
 - the community has planted this species.
 - ✓ kenaf fiber → industry, raw material for automotive factory as material for cars interior
 - ✓ Demonstration plot of peat restoration (suggestion: share with BRG fund from APBN) insubstantial canal block will be damaged by people who lived in surrounding areas (fish cultivation) barrier can be maintained but must be economically profitable
 - ✓ We offer fish cultivation in the channel canal (offered also by the community)
 - ✓ The proposed business model; kenaf, areca nut, pineapple, agriculture food crops & horticulture, canal-blocking fisheries, beriang, gelam, environmental services related to carbon trading
 - ✓ The level of the kenaf business community to produce fiber; who offered to make a factory for the next stage of kenaf fiber marketing (the market)
 - ✓ HTI as a supplier of paper raw materials, kenaf has potential to replace acacia wood as paper raw material. This species can be a substitute commodity of HTI crops.
 - ✓ Kenaf is currently used as raw material for car interiors
 - ✓ Market driven or market demand shifting is difficult to control
 - ✓ The problem of kenaf production is in marketing
 - ✓ We expect that investors will come to take the yields of kenaf cultivation. So the production of kenaf could be sold.

Recommendations from Mr. Hiromitsu Kuno :

- Related to mapping of investment potential and business model. This project should describe business plan in detail
- Areas in the location are distributed to; HP Concessions, HP, HD, HP Non concessions, APL, HGU, Communities. In each field we look for investment potential and the right business model
- The best business model for deep peat is highly required
- Must be financially profitable to invite investors to invest
- Prepare a business model that has high profitability on the land with deep peat
- Only a few Japanese entrepreneurs are interested in investing in forest areas
- Most finance or joint venture investments are only in industrial estates. Beyond forest areas.
- Prepare a business model for all types of land both inside and outside of the forest area

-
- Explain the potential and profitability of the business model (to convince investors)
 - Business concepts should be as detailed as possible
 - Factory and its markets, the concept should be made clearly (discuss how to build kenaf industry in Muba / South Sumatra)
 - Business concepts should be delivered clearly even it is not including financial analysis
 - Market guarantees should be promising
 - 99% of Japanese companies will not take risk to invest in non-concessions
 - Set targets; location of industry, production description to determine investor target (make it easier to clarify investment requirement)
 - Also consider that Kenaf plant is not endemic plant fiber plantation commodities. It has potential to be an invasive species
 - Notice how the deliver what kind of species kenaf is. Is it classified as tree or not? If this plant is wooden tree and not classified as grass or herbs
 - Basically, all wooden tree could be the raw material for paper, which distinguishes only by the yield produced
 - Create map of potential areas at each location

Bpk. Adi Kunarso (BP2LHK – Palembang)

- Problems in landbase and non-landbase. Relatively easy to do finance analysis in landbase area. In non-landbase financial analysis is related to business competition in the market. So, it was difficult to perform.
- In the concept which has been offered by. It is not separated between landbase and non-landbase
- In the report submitted the results of financial analysis in the landbase appeared, while in non-landbase feasible or not feasible from the results of financial analysis did not appear

Presentasi delivered by Mr. Edwin (BP2LHK - Palembang)

Peatland restoration plan in Kab. Ogan Komering Ilir

- In general there are 2 parts in OKI. They are focusing more on non-landbase and community base
- OKI has the most extensive area of forest fires by 2015
- Community activities; depend on swamp areas and peatland □ cultivating swamp paddy/rice, lebung system fisherman (marsh or lebak system fishery), take purun and process it from making mat, buffalo-animal husbandry in swamp areas. People are very dependent on swamp areas.
- Products which is resulted from the activities above; has not been able to meet the economic needs of the community. This issue increase the community's dependency on swamp/peatland areas.
- Lebak-lebung rice only harvest once a year and depends on the tidal season
- The market of refined products has not been provided much
- Product from purun depends on order
- Purun is still seen as a less commercial product. However, it has been processed in various forms of products.
- Swamp-based paddy rice (lebak-lebung) land rights is based on the land auction system
- At high tide, even if a person has authority to the land rights when the flood happened then it become public resources or is controlled by the government and auctioned in lebak-legung auction system.
- Target: Improving people's prosperity by providing market
- This study prioritizes what products the community can generate from the major commodities (fisheries, swamp buffalo, purun and swamp paddy/rice) and helps people to sale their products to the market

-
- Fisheries has lots of potential from lebak-lebung system that can still be developed in order to gain added value
 - We offer better processing mechanism and marketing
 - Details of financial analysis already exists (in brochures / leaflets)
 - Milk production (swamp buffalo farming/) obtained not for industrialization, but if we want to help the community by varying the product then the products will increase
 - The business scale of the commodities above is only local and regional, so it is necessary to provide market for the products

Recommendation from Mr. Nugroho :

This business is a community-base business that has not been able to meet the needs of society, if investors would like to invest into this business could it change the position of this financial analysis status to be feasible to cultivate?

Which commodities are the most superior to be promoted?

Recommendation from Mr. Hiromitsu Kuno :

- The recommendations delivered by OKI consorsium remains unclear
- farms from swamp buffalo farms have no clear picture yet
- I emphasize the details that should be presented in the meeting in Osaka later
- If this business model can only be offered to local entrepreneurs, it is not suitable to be offered in Osaka
- Whether the entrepreneur already exists, the factory already exists or not. If it is from zero start then this concept still need to be developed and needs to be made more detailed concept
- there must be at least a financial plan to discuss
- If the availability of raw material depends on nature and can not be controlled. It means can not be cultivated.
- If you want to invite investors there should be number provided as an illustration
- Describe the production plan in details
- Content reported should also contain estimated figures and profits to invite investors
- The report submitted is not yet conclusive, the calculation of business plan is still unclear

Presentation delivered by Mr. Ahmad Rifqi (PSB – UR)

- Purun is the most suitable commodity to be proposed to international forum from OKI
- For OKI we carry land-based agroforestry. This system has been presented to OKI regent The existing situation of OKI peatlands :
 - Outside the HGU + active IUPHT area = swamp bush, remote, vulnerable to burn
 - The common perception (knowledge) that the cultivation of peasant farming in peatlands must be through drainage or canalization
 - Community activities in peat swamp still extraction (retrieval)
 - We would like to provide all kinds of portfolios from the common peat friendly and profitable
 - Investors are required to join on some parts; pinang, pineapple coffee processing and trading
- Most possible schemes for restoration areas will be offered
- Demonstration plots might use community-owned land with a combination or planting of other crops (using agroforestry systems)
- Industry can be built at OKI itself, with an integrated system. Investors is not required to stay at OKI

-
- Discussion of industry placement can be done later after there are investors interested in the potential of the OKI
 - The investment can change the condition of the area

Recommendation from Mr. Hiromitsu Kuno :

- Assumption needs to be made: Assume where is the location of industry, and what is the selling price of the commodity
- If you would like to propose the design of the demonstration plot, it is better that the point has been determined.
- This study would like to propose or promote what kind of investment?
- Potential should be clearly stated, otherwise it will not be able to be brought to the international forum like in Osaka
- The market must be created
- Purun is not suitable to be proposed to an international forum
- The commodity matrix must be performed in more detail
- Commodity recommendations suitable for local or international markets should be clearer
 - We have no information about the market, so we can not recommend it as an export commodity. We have not seen its market potential yet (in this case: purun)

Mr. Ngudiantoro : There are 21 leading commodities.

Mr. Nugroho : Try to focus more on some commodities that can be promoted to the international market. The questions conveyed by Mr Kuno are so technical question has not been included in our table or matrix. Investors invited to this business should support the development of people and increase society's welfare.

Presentation delivered by Mr. Ici Piter (UPR)

- The recommendations given are food crops. Central Kalimantan is one of the main food crops producing regions
- Paddy rice becomes the main commodity, gelam timber can be utilized (endemic species) in almost all areas of the peat can be overgrown
- The results of our records; which can be cultivated locally; gelam, laban □ charcoal (factory and machine not yet available) the yields are moved to South Kalimantan, Balangeran, rubber, corn and horticulture rice (paddy).

Conclusion :

Commodities with the potential will be offered to international markets: gelam (biomass), liberica coffee and areca nut and sago waste, sequestration carbon, or environmental services through carbon trading mechanism, bio-energy from timber.

Presentation delivered by Mr. Adhy Prayitno (PSB – UR)

- Map of restoration targets □ investment plans for peatland restoration
- Peatland depth classification; shallow and deep peat
- Classification of peatland locations by zone; NSP, Forest village and non-NSP
- Shallow peat in the area of PT. NSP, engaged in waste treatment
- deep peat will suitable for plantation business
- Demonstration of coffee liberica plots from certified community managed seed sources has been implemented
- Sago waste business model; driven to be developed at a large-scale refinery PT. NSP or medium and small community and local businessmen
- Solid and liquid wastes (bark, fiber, can be used as fungus and fodder tables)
- Sago waste (agriculture residue) can be made as wood pellets material
- The wood pellet market is wide

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- Sago has a midget characteristics similar to palm oil
 - Food, feed, fertilizer, furniture, fuel. Sago can be classified into Multi Purpose Tree Species.

Closing Agenda 1 by Mr. Nugroho

Major commodity per areas need to be exposed but the point started for this study is still from commodities. Avoiding the repetition of territorial mention for it still use commodities as a starting point.

Agenda 2:

Preparation for booklet and leaflet matters

Preparation will be coordinated by BRG, data required for booklet and leaflet matters please send to Mbak Hastin. Chairman of the consortium team from each region as a supplier of data and key person. Leaflets and booklets will be distributed for discussion in Osaka. Booklet in English. Contains the list of commodities to be proposed in interntional meeting.

Mr. Hiromitsu Kuno : The booklet I recommend must be containing a summary of 21 commodities then new major commodities and list of commodities per location.

End of discussion. 16.45 WIB

1.2.12 October 5, 2017 <Investment Facilitation>

Notes

Focus Group Discussion

Focused Discussion on the Deepening of Opportunities and Scenarios of Investment Facilitation Implementation and Business Model of Peat Restoration through the Development of Exclusive Economic Zones in Ogan Komering Ilir Regency, Musi Banyuasin, Kepulauan Meranti and Pulang Pisau

**Hotel Morrissey Room Lecture 1-2, Jl. KH Wahid Hasyim, Jakarta Pusat
Thursday, 5th October 2017**

Summary

FGD aims to discuss business models that can be developed on peat restoration areas or lands that can improve the financial and social welfare of communities and can be a promising business project to be offered at international forums and invite investors to invest in this sector.

The discussion was attended by a consortium team from each district, representatives of JICA survey mission, representatives from BRG and LHK Research Institute and representatives from local government. The consortium team has analyzed the potential commodities in each district. 4 districts that are the focus of this business development are Musi Banyuasin Regency, Ogan Komering Ilir Regency, Pulang Pisau Regency and Meranti Islands. The results of observation and analysis yield 21 potential commodities that will continue to be developed.

This discussion is expected to provide an output to a prospective business development model and can improve the welfare of the community by taking into account environmental aspects and succeeding the target of peat restoration. The FGD begins with a brief welcome and briefing discussion by representatives of LHB's R & D. The discussion sessions began with the exposure of JICA and representatives of the consortium teams from each district. The material presented are:

- The opening address and referrals of the Deputy Peat Restoration Agency
- Symbolic handover from JICA survey team to local government
- Presentation of consortium team representatives on potential commodities

-
- Recommendations and responses from local governments on the potential of local commodities
 - Prepare materials for delegates to be delivered at meetings in Osaka

The next session is discussion session. Question and answer sessions generally discuss the implementation and technical development of business models on peatlands. Selection of potential primary commodities to be proposed in international markets as well as material preparation to be presented to the symposium in Osaka.

Minutes of Meeting

Agenda overview:

- a. Opening speech and referrals
 - Opening speech
 - Referrals
- b. Agenda 1
Presentation from the consorsium team and recommendation from the local government
- c. Agenda 2
Recommendation and suggestions from the experts
- d. Closing
Conclusion and important notes

Opening delivered by : Mrs. Nuning Dwi Puspa

Agenda :

- Handover of monitoring tools (witnessed by TRGD, provincial and district representatives)
- Group picture taking
- Referrals from Deputy/Chief of BRG
- Presentation delivered by consorsiumt team about the peatlands restoration business model
- Open discussion

Opening address and referrals from Deputy of BRG (Peatlands Restoration Agency) : Dr. Haris Gunawan

- The title of this FGD is determined through the long reflection of the realization of the mission
- The deepening, implementation, investment, business model and development of exclusive economic zones outlines today's discussions. These 4 points are expected to be implemented.
- These ideas should be implemented on the field
- Paradigm shifting should be done where coffee becomes a potential commodity as a new lifestyle
- Coffee restoration of peat (liberika coffee) can be a brand new coffee in the market
- Potential of the commodities will be detailed presented by the consortium team
- Related to the investment, it is inseparable from the problems of foreign investors and local communities
- Invited investors should be friendly and have willingness to build local communities
- Business meetings will be held in the near future

**Presentation : Peatlands restoration business model delivered by Mr. C. Nugroho P and Mr. Ngudiantoro
(Consorsium team of BRG – Universities UNSRI, UN Palangkaraya, R&D and JICA)**

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- This step starts from a long process
 - Identification result of local potential commodities in peatlands, designing the implementation and perform classification of commodities that can be promoted to local, regional and international scales
 - Mismanagement in peatlands can lead to peatfires
 - BRG is ordered a mandate to restore of 2 million ha f peatlands in 5 years
 - Rewetting, revegetation, revitalitation is 3R motto of Peatlands Restoration Agency
 - Target of peat restoration activity 33 KHG (hydrological peat unit), 36 districts, 6 provinces.
 - Priority of peat restoration 2018; JICA has installed 4 tools at the early stages and 4 other tools will be installed later
 - From the commodities identified (OKI) :
 - buffalo swamp
 - Lebak lebung fisheries
 - Purun
 - Agriculture and horticulture crops
 - Beriangan
 - Gelam
 - Liberica coffee
 - Areca nut
 - Pineapple
 - Lebung paddy field optimalization
 - Pineapple and coffee liberica are the most important potential commodities
 - Identified commodities (Musi Banyuasin) :
 - Kenaf
 - Areca nut
 - Pineapple
 - Beriangan
 - Gelam
 - Result of identification (exist in village forest of Kepayang, Merang and Non concession area)
 - Identified commodities (Kepulauan Meranti) :
 - Liberica coffee
 - Sago waste (downstream of sago products, waste management of sago, potential for growth medium of mushroom, wood pellet)
 - Pulang Pisau commodities :
 - Gelam
 - Balangeran
 - Rubber
 - Itik
 - Agriculture and horticulture crops
 - Laban (firewood)

Notes :

- **An integrated peatland restoration development needs to be performed**
- **Role sharing dan cost sharing**
- **on every KHG needs to be agreed upon**
- **RPEG needs to be compiled**

Presentation delivered by Mr. Hiromitsu Kuno :

Draft final report: JICA survey mission for the collection of data on the prevention of forest fires and peatfires and peat restoration in Indonesia phase 2

-
- Summary of JICA survey mission activities of gravity; formulate the cooperation strategy of Indonesian government with Japan in relation to prevent peatfires and build a sustainable peatland management
 - Ideally; effort to maintain ground water level at peatlands area. Preliminary feasibility study to create a new business model
 - November 2016 Agreement in Marrakesh to support its next year's study (GWL monitoring, profit studies, creating business model concepts and supporting the coordination of stakeholders to foster an investment climate for peat restoration)
 - Basic design of ground water level data retrieval with telemetry system (SESAME Tool)
 - Build institutional corporation □ consortium
 - Component 2: 21 potential commodities; potential of local investment. Except 5 products, environmental and ecosystem services, carbon trading.
 - Component 3: FGD and coordination in Tokyo and Jakarta
 - Proposed scope of business investment related to incentives and facilities; revisions to the relevant ministerial regulation, synchronizing commodities of services / services that support peat restoration may encourage investment in peat restoration.
 - Local potential is emphasized in the communit-based business
 - Encourage BRG agreements with Banks to support investments in peat restoration to facilitate community financing support
 - Build a scheme of social forestry
 - Proposed provisional ideas: financial cooperation, KHG-based public-private partnership

Recommendations by Mr. Nunung N (Business Development and Investment IPB)

- Rapid progress from the consortium team
- 4 points emphasized by the deputy
- Deepening; the new policy to the 16 acceleration of investment and effort (being the starting point to leave) the president set up a task force in a well-synchronized area.
- Recommended business model; farmers' business follow-up (consolidation)
- Investor Business model; in one chart that can be submitted to the government and the investors
- These following points should be included in business model;
 - Value proposition (development of economic activity has specificity must considering to environmental aspect)
 - Elements and blocks in the business model of peat restoration development
 - Value creation that can be raised
 - institutional (corporate) approach is an optimistic that local governments support
- Creative economy ; fashion, foods dan crafts
- We have to develop a sustainable business model
- The context of digitalization in product development, the concept in the business of digitalization model is important and should be considered now
- I will create more detailed business model template so the business-flow will be clear
- Determination of customer, client, market
- Capacity will be developed in local scope
- What kind of corporation should be made?

Presentation delivered by Prof. Mizuno (Kyoto University)

(Peat Restoration and Development of Sago Industrial Center in Kepulauan Meranti)

- Rewetting and reforestation village

-
- Collaboration with local communities, strengthening community ownership rights, collaboration with BUMDes,
 - Ijon System; farmers are in debt to earn money and pay for it with sago produce at harvest time
 - Sago yield is sold to Chinese traders. So farmers get too attached in Ijon system
 - This system is found in Sulat Panjang area
 - Peat restoration; encourage people to plant sago
 - Transactions need to be made among the traders to stop the Ijon system

Presentation delivered by Mr. Irwan (Head of Kepulauan Meranti)

- Recommendation for Sago trading system :
- Indonesian Bureau of Logistics must be included in sago trading in Kepulauan Meranti, Ijon chain which occurs because all sago flour is sent to Cirebon and has not been paid so high sago price can not be bought and this is a fundamental problem that happened in sago trade system
- Sago can be harvested twice in three years, harvesting rotations that take a long time become the reason why people are not interested to plant sago
- The key solution : Indonesian Bureau of Logistics must be willing to accommodate the productions of community sago flour to be distributed to the market
- Other potential commodities: Mangroves (mangroves / swamps that become bufferzone sago to withstand erosion or coastal abrasion)
- The economic value of Avicenna is high
- Other commodities from Kepulauan Meranti that potential to be proposed to international market :
 - Sago flour
 - Avicenna firewoods (Export to Malaysia and Turki)
 - Coconut (Exported to Malaysia)
 - Swallow : many swiftlet nest in traditional sago refineries that can be sold
 - The area of forest fires planted with chili
 - Sago waste: Bark (uyung) used as the basic material of road construction on peat so the construction is stronger and durable
- Complaints from HTI companies in Kepulauan Meranti : with the enactment of Ministry of Forestry and Environment Regulation no. 16 year 2017 related to the harvesting system where it is not allowed to be planted on already harvested fields.

Presentation delivered by Beni Hernedi (Vice Head of Musi Banyuasin)

- The position of BRG is too far from the location of peat fires
- Determining business models have to consider and in accordance with the consideration of various aspects
- Major commodities proposed by Kab. Musi Banyuasin :
 - Swap paddy
 - Palm oil
 - Rubber
- Regions should not be used as various types trials of seedlings
- There must be a follow-up of the concrete steps taken as a solution to the problem
- Many paddy fields are converted to palm oil plantations because they are considered more profitable
- Business models should be tailored to the interests of the community
- Zoning of peatlands should be based on definitive peat data
- Communities perceive HTI (Sinarmas) have easy access to enter the peat so that corridor roads made by companies are used by communities to access peatlands and cultivate (illegal planting)

-
- BRG should establish district-level institutions
 - The legality of the managed lands, especially those carried out by the settled community, must be enforced
 - Business model should be considered to improve the welfare of the community

Highlight :

1. **Institutional approach should be including of mechanism, institution and PIC**
2. **Community governance legality**
3. **District-level institutions**

Presentation delivered by Mr. Tatang Sambas (DLH-OKI)

- should be able to answer the issues in particular areas of OKI; poverty and forest fires and the empowerment of peatlands
- There are land tenurial issues that are mostly owned by plantation companies and individuals
- Utilization of derivative products is still not maximized
- Regulations in peatlands need to be reviewed and amendment should be performed

OPEN DISCUSSION moderated by Mr. C. Nugroho P

Mrs Ani Suryati Ningsih (Indonesian Ministry of Economy) :

- In terms of investment and business, exclusive economic zones (EEZs) require the development of regional models based on local wisdom or local resources
- EEZ is not only in resource but also related to industry from upstream to downstream
- Industry development needs to be done to accommodate the results of UKMs and educate the community to become entrepreneurs
- Business scheme that SME-IKM-Industry needs to be built

Mr. Rachmad Firdaus (Indonesian Ministry of Economy) :

- Important thing to be considered: This program must be strong in business and need to strengthen the grand design and positioning of the importance of this activity
- Need a legal protection reference that has not been raised yet
- Among business models: a systematic scheme of backwards and forwards linkage is necessary
- Based on LHK Regulation No. 81 years 2016
 - It is necessary to specify whether activities are carried out on forest land or in peatlands
 - This regulation also regulates partnership of forest area utilization for food security
- The relationship of economic equity is very important to be considered
- From Indonesian Ministry of Environment and Forestry Regulation No. 81 years 2016 can be copied clusters forest area management for sugar
- There is a loss calculation in article 8E paragraph 1
- Land swap → No. 40 2017
- Ministry of environment and forestry regulation helps government facilitation to build the region
- Development of peat restoration must be inclusive. Includes aspects; ecological, social, environmental needs to increase
- Release of peatland status into manageable land needs to be sharpened to address the issue
- Subsidies for peat restoration programs reach 10 trillion
- 10 trillion for UMKM financing
- Consider the importance of digital-based infrastructure

-
- Business model must be equipped with clear cost structure

Mr. Dedy (Musi Banyuasin)

- Tertiary facilities; investment and incentives
- Projects should be packed in an informative memo
- Investment value related to business scheme and financing source
- Determine the PIC of the offered project (whether it will be submitted to the local government, central government or ministry)
- Exclusive Economic Zone: need to be done by performing parallel process. The procedure should start from now.
- Presidential Regulation no. 91 by 2017
- The momentum of ease of entrepreneurs in Indonesia. Changing cultural culture begins with the process of issuing permits

Mr. Najib Asmani (TRG Prov. Sumsel)

- Zone of peat restoration
- Commodity of income; fast, medium, low
- Companion team: 15 people from BRG
- Institution, technology, capital, obtaker
- South Sumatra peatland map is being prepared
- Corporate farming

Mr. Ngudiantoro (PSB – UNSRI Konsorsium)

- Concepts or business models that are built depart from the problem
- Initial feasibility study:
 - Investing in potential commodities
 - Ensure the location or status of the area
- build or use at the business level

Mr. Edwin Martin (BPLHK – Palembang)

- key words of this problem:
 - Forest fires
 - Peat friendly commodities
 - Local people
- The implementation aspect must be an exit strategy of this work

Closing remarks delivered by Dr. Haris Gunawan (Deputy of BRG)

- Post-meeting follow ups : implementation
 1. Agree to decide priority of EEZ Peat in Riau, Sumsel and Central Kalimantan
 2. JICA (Japan) as a partner who will accompany and support until this mission is completed
 3. Performing priority mapping
 4. EEZ at KHG
 5. Priority 4 districts in presidential regulations □ EEZbased EEZ pilot
 6. Create a business model / chart / matrix model
 7. The central government always puts the people first
 8. BRG will start working on site

Discussion ends at 12.55 Jakarta Time.

1.2.13 October 6, 2017 <Financing for Business>

Notes

Focus Group Discussions
FINANCING GUIDELINES FOR PEATLANDS RESTORATION
BUSINESS

9th Floor Radius Prawiro Tower, Building A Bank Indonesia
Friday, 6 October 2017

DRAFT FINANCING GUIDELINES FOR PEATLAND RESTORATION BUSINESS →
RECOMMENDATION OF FINANCIAL BUSINESS PEAT RESTORATION

Meeting participants :

OJK staff
BRG
JICA
Balitbang LHK - Palembang

The opening remarks was delivered by Mr. Edi S ABS DPNP (Financial Services Authority)

- Consortium does support the OJK policy to encourage the financial services sector to put attention to social aspects, improve the environment friendly sector
- The financial services sector makes principles, creates work plans, prepares public reports (sustainability reports)
- Effectively will be enacted 2 years into the future
- Work together to issue and publish the guidance regarding to the sectors that can be financed by financial institutions
- Guidelines that already published by OJK; palm oil, clean energy, renewable energy, green building, etc.
- Target : OJK and JICA work together to create business guidance for peat restoration (by using business-friendly language and not technical)
- Explain in advance the details about peat restoration business
- Percentage of return from the restoration of peat restoration must be clear and profitable
- Risks confronted by OJK, in green sector business is higher. Green sector business is new in financial support
- Provide the existing regulations related to peatlands, OJK does not have to search. Facilitate the financial services sector to provide finance support for the peatlands business sector
- The results of this program will be published and uploaded on the OJK website for an open access

Presentation delivered by Mrs. Nur Arifatul (R&D Environment and Forestry Palembang)

- Why peatlands restoration matters forest fire is the threat for sustainable development
- BRG offers 3 restoration schemes. They are: rewetting, revegetation (peudikultur / cultivation on peatlands), revitalization of community livelihoods.
- The program of a million hectares of rice in peatlands found its failure
- Peatlands can be found in some sub-tropical countries
- Current cultivation practices in peatlands; On the 70s peat including HPH concession areas, post-HPH peat land degradation era due to logging and recurrent forest and land fires, conversion to HTI, oil palm plantation, infrastructure development
- Peatlands degradation is irreversible. It takes long period of time to be restored.

REASONS WHY BUSINESS OPPORTUNITIES IN PEAT LANDS IS PROMISING

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- Investment in the palm oil plantation with fire or losses incurred is not equal. Palm oil plantation brings more harm than good and benefit
 - Cultivation can be done in shallow peat by not changing the peat ecosystem drastically
 - Peat friendly commodities; in tanjabar district prov jambi.
 - Type; areca nut, liberica coffee, pineapple. Cultivated with mixed patterns
 - NB: which should be encouraged the use of areca nut agroindustry
 - Peat restoration business; community and industry
 - Areca nut is now only processed of till drying stage. Liberica coffee is only processed normally
 - Peatlands restoration business can be performed in landbase area and non-landbase area
 - Peatlands restoration business : new business sector, require big amount of investment, big risk and need investment support from other business actors
 - The role of investors and financial services institutions is very important
 - NB : it is required a team who work by only focusing in this sector
 - Government; assisted by BUMDES program, BLU
- **KUR (Kredit Usaha Rakyat)**
 - NB: educated community still able to pay high interest rate
 - Scheme 1; individual lending
 - Scheme 2; credit distribution through farmer groups or gapoktan
 - Scheme 3; involvement of local government (assistance and securities)
 - Sharia financing has a good prospect, to finance the community's business landbase
 - Revolving fund
 - Scheme of financing through PT Sarana Multi Infrastruktur (SMI) one of example financial support system that can be used

Recommendations from Mr. Edi S (OJK)

1. Map of peat demography in Indonesia is required and its ownership/tenurial status (to determine the strategy to be taken) so that investors can observe visually to the business determine how to approach to plantation / community-base plantation. A minimum potential landscape should be provided
2. The settlement is not only charged to funding. It is involving non-finance aspects to optimize their potential more efficient financial institutions to finance business groups
3. This business has not been developed, so the expectations of commercial or financial instutional still low because the percentage of return becomes very important for financial institutions another side to be considered; consideration of the current bank investment
4. This business should use mix funds grant, soft long and commercially
5. For initial stages mix funds is required to reduce risk, and used for guarantee
6. Approach should be performed should be performed with fellow gent from upstream-downstream rather than snapshot just to help farmers. This project is expected to have a large multiplier effect by OJK as a financial institution
7. Further funding schemes should be made; publishing green board in long term
8. If the project would like to be proposed as anational program, its potential should be maximized
9. The mechanism of conservation activities trade; the possibility of private sector to join or involved is still low. Most possible cooperation can be performed with local government

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10. How much is the percentage of entire area that is ready to be planted/cultivated
 11. Risk management should be considered
 12. Business plan should be made as clear as possible
 13. This business plan is too general and it is limited to the introduction only
 14. Scheme of peat-friendly commodity derivative products add notes; (put concern on some major commodities)
 15. Give special color to commodities that can be distributed first and already exist in Indonesia
 16. Locate the area where coffee is planted and cultivated on a definitive map
 17. Try to be more informative
 18. Highlights the potential export commodities
 19. This information needs to be enriched
 20. Encourage / motivate investors to invest
 21. Make a comparison of investment costs for planting coffee and pineapple trees in peat and non-peatlands
 22. Create serial derivative products more definitive and detail
 23. The next version; financial guidance for commodities on peatlands
 24. The final project should involve the local government. OJK will support
 25. Problem of UKM; integrity, management, market access and quality product
 26. Assistance PIC will be given to NGO? Local Government? Community groups?
 27. OJK wants to support financing for this project/business plan
 28. Vol 2; financing coffee cultivation on peatlands
 29. Vol 3; financing of areca nut cultivation on peatlands
 30. Schemes 1 2 and 3 can be positioned behind
 31. the current stage status of this business model is still in initial stage, it is not possible to use commercial loan, mix fund to support is the solution.

Additional Recommendations by Mrs. Istiana Kasubag DPNP (Financial Services Authority)

1. on which part the calculation allows for financial services institutions to participate in this peat restoration business?
2. Business processes should be clear
3. In which part OJK can support finance, eg; costs for the seeds etc.
4. How's the possibility percentage for farmer to return the fund support?
5. Prioritize the commodity which has higher production and yield

Discussion end at 11:25 Jakarta Time

1.3. Seminars

1.3.1 April 11, 2017 <Tokyo>

**From Readiness to Actions:
Private Investment Seminar for Peatland Restoration in Indonesia
The University of Tokyo, Tokyo
Tuesday, 11 April 2017**

Session-1

Opening speech

Mr. Takahiro Morita (Deputy Director General, Forestry and Nature Conservation Group, Global Environment Department, JICA)

The recent trend of JICA's assistance and support has been to work with private companies and

academic institutions in order to promote sustainable development and climate change reduction and green economy promotion to improve the livelihood of the local residents. To promote green economy, private investment, which is the topic of today's seminar, is essential. We would like to invite the Japanese companies to contribute to the local economy of Indonesia with cutting-edge technology and promotion of new types of business.

Private investment needs are quite diverse within the peatland restoration. However, there are many information that is required for private investment. For example, what are the environment or requirements for the investment, who can be the partners in Indonesia, etc. In today's seminar, we would like to provide such important information in answer to your questions.

Keynote speech 1: National policies in Indonesia

Dr. Nur Masripatin, Director General of Climate Change, Ministry of Environment and Forestry (MoEF), Indonesia

At this opportunity, allow me to share with you about policy aspect in relation with land use sector in Indonesia, focusing on the nationally determined contribution of Indonesia and national policy approaches for peatland management. Indonesia has ratified the Paris Agreement through law Number 16 - 2016 and we also have submitted our first NDC in November 2016.

In our NDC, the forests sector play the significant role. In fact, the highest contribution of our NDC target will come from the forestry or land use sector. So, of the 29% of our NDC target, 70.2% of that will come from land-use, the land-use change sector, four areas of policy intervention and action reducing the deforestation rate of forest cover loss.

The second regulation is wood production in natural forests. The third will be increasing production in commercial plantation of forests through the increase of each productivity. The last is the one that is very much related to our discussion this morning: that is accepting the NDC's target for peatland restoration and land rehabilitation. The target that we set in our NDC for peatland is peat restoration achieving 90% of survival rate, and the area of peat restoration will reach two million by 2030.

We have substantially reviewed and also revised the government regulation on peatland so we have new regulations on the peatland, and a number of ministerial regulations have been put into effect as elaboration of the new revised government regulations on the peatland.

We encourage that all related activities to climate change be registered in our national registry system. With that, we could maintain the principle of transparency and clarity, and also understanding of our action, also, support received by us and support provided by our partner.

Keynote speech 2: Peatland restoration and green investment in Indonesia

Mr. Nazir Foead, Head, Peatland Restoration Agency (BRG), Indonesia

Today, I will expose an example of a business case, looking particularly on planting, plantations in peatland of crops, called sago.

Sago grows natively in peatland. They can stand wet conditions in peatland. Sago is like a palm. It needs 8–10 years to harvest. The sago palm has a myriad of possible applications, for food, polymers, pharmaceuticals, textile industries, and so on. The most common use of sago, the starch of course, is for food, both for domestic and international market. It's used as sago flour, sugar, noodles, jelly and many other forms.

Sago can grow in a wet area, so we need the peatland to be wet. All the drained peatland that have caused fires need to be rewetted, and if they are wet, the carbon emission can be reduced in the plantations of sago. So, the economies can benefit both from the sago production as well as from the carbon reduction.

I like to stress again that this is not about greenhouse gas emission, this is not about peatland restoration, but it can be also be beneficial for the economy in a sustainable manner, and sago had been tested by traditional communities' farmers, so it's not new agriculture. It has been used by the farmers in Indonesia, in Sumatra, in Kalimantan, as well as in Papua. What we need is to help, bringing up to a more efficient scale of industrial, economic scale perhaps, and access to the market.

Panel Presentation: Potential of private investment for peatland restoration in Indonesia

< Moderator > **Dr. Ken-ichi Abe, Professor, Research Institute for Humanity and Nature (RIHN)**

1. Economy and Green Investment in Indonesia

Dr. Kosuke Mizuno, Professor, Kyoto University

I'd like to talk about the overall Indonesian economy and the position of Japan's private investment in the environment sector in Indonesia.

The policy that's been released by the Indonesian government is to protect the environment. Let's look at the macroeconomic environment, which supports the government's drastic policy on conservation of the environment. And I would also like to share with you, the current situation in Indonesia.

Indonesia's growth rate is about 5% after the financial crisis in 2009. Although other countries suffered negative growth, Indonesia continued to perform well at around 4%, and Japan's investment to Indonesia grew. Personal consumption in Indonesia is strong, and this is a big difference from countries such as Brazil or Russia. This is the reason behind pro-environment policies in Indonesia.

The investment in the environment sector is also important for the Indonesian economy. Personal spending/consumption is also very strong. Export is improving, and the growth is very much driven by domestic demand. Indonesia made foreign direct investment law in 1967, and Japan's investment grew just after that.

We need to think about our private investment in Indonesia. The basic idea is rewetting and paludiculture. Paludiculture is turning dried peatland into wet peatland to promote the sustainable use of wetland by agriculture, forestry, and fishery. So, there is the business of agriculture, forestry, and fishery on peatland, and also, as was mentioned yesterday and today, sago cultivation is also one way of promoting paludiculture.

Here, what's important is to foster relationship with the local people. Taking advantage of the customs and knowledge of the local people is important. The business will only work if we can avoid conflicts with the local people. So, we need to really look long-term when doing business in Indonesia. We need to try and grow the strength, and the strong and attractive aspects, of Indonesia going forward.

2. Responsible Peatland Management that Providing Economic Opportunities in South Sumatra

Mr. Alex Noerdin, Governor of South Sumatra Province

The video is about the fire in South Sumatra in 2015. This is a real story. Indonesia had a very big fire in South Sumatra.

[Video presentation]

The steps to restore peatland in South Sumatra: one is priority to control land of forest fire, strengthening partnership of landscape management among public/private or landscape management, public-private people partnership, green growth development.

South Sumatra green growth is the first initiative in Indonesia managing sustainable landscapes, a breakthrough in bringing together the activities carried out by many modern stakeholders from various sectors collaborated with international donors directly, and by public-private people partnership. South Sumatra green growth plan will start to increase agriculture and forestry production, while protecting and restoring forest and peat, and ensure a contribution towards achieving the SDGs and NDCs national and regional models.

3. Financial scheme for private involvement in Peatland Restoration

Ms. Mari Yoshitaka, Chief Consultant, Mitsubishi UFJ Morgan Stanley Securities Co., Ltd.

Today in this symposium for peatland restoration, and how the private sector can contribute, I would like to talk about three financial schemes that can be useful.

The first scheme is the Green Climate Fund, which is created by the United Nations. The second is Green Bond, which is gaining a lot of attention in the market these days. The third is Adaptation Business Opportunity.

First, let me start with GCF, the Green Climate Fund. This was first established in UNFCCC COP 16, which was held in Cancun, Mexico. In order to create paradigm shifts in the response to climate change, a new fund, the Green Climate Fund, was created and this fund will be used for both mitigation and adaptation. Currently, there are 43 governments that have committed to GCF, and it is about USD\$10 billion.

For GCF, there are national designated authorities, or focal points, for each developing country, and it works through the accredited entities (AEs) to channel its resources. The GCF always has to work through the accredited entities. At the same time, there needs to be always approval from the National Designated Authority (NDA) in the developing countries. In this case, the NDA will be Ministry of Finance.

Next, I would like to talk about the green bond market. Green bond is a debt instrument, which means that you borrow the money and you have to repay the money. And the interest is what the investors are looking at.

If you are looking at, for example, if the investor buys the National Bond, they look at the interest rate, but this green bond focuses exclusively on green investments. And this is initially the funding for the World Bank to invest in green projects in developing nations.

You may think that the World Bank is using just the commitments from each nation, but actually, if you buy the World Bank bond through the regional bank, then you will be actually providing money to the World Bank. So, there are many types of investments, direct and indirect. So, who buys green bonds? Of course, these are life insurance companies, trust banks, and also private investors and retail investors.

And I believe that mitigation is very important, but so is adaptation, and I believe that for the private companies, adaptation could be a business opportunity. Up to now, I have been working very closely with private companies in promoting such investments, but this is very difficult, because the companies can only bear a certain amount of risk, and that is why awareness raising is essential.

You have to raise the motivation of the investors, and, as much as possible, the risk should be taken by the public sector to collaborate and mitigate the risk on the private side. I would like to do my best to sell this adaptation scheme to Japanese companies and investors, but what is most important is the close relationship and good matching of Indonesian partners with Japanese partners. No matter how hard the public sector works, there needs to be a close relationship between the Japanese and the Indonesian partners.

An NGO could be one stakeholder as well, and they could help in establishing such relationship between the partners on both sides. So, I would like to request to the Japanese government and the Indonesian government for such a strong matching scheme. Even if you are called for investment, private companies cannot go into areas with a high level of risk, and neither can financial institutions, so I hope that there could be a good pairing on both sides.

Panel Discussion: Opportunities and challenges of private Investment for peatland restoration in Indonesia

< Moderator > Dr. Ken-ichi Abe, Professor, Research Institute for Humanity and Nature (RIHN)

Q1) To have a more active investment, what are the schemes that allow such risk control?

A way to lower risk is something that is being demanded from the private sector. Different from energy, there is higher risk for agriculture — for example, a change in the weather. So, if there is a clarification of who and how much risk will be borne by a certain actor, this will make it easier for the private sector to come in.

And what is the guarantee scheme? For the financial institution to loan out money, it is a big problem if the private companies go bankrupt. But for the World Bank, there is no risk of bankruptcy. So, this makes it easier for the private companies to be involved in the initial investment.

Q2) Many Japanese people don't know about the peatland. So how should provinces such as South Sumatra attract investment from Japan? For people living in South Sumatra and Japanese businesses, is there a big opportunity for collaboration between the two?

More than 700,000 hectares of peatland forests we're damaged by the fires. About 300,000 hectares of them had already been supported by the GIZs from Germany, from the Netherlands,

from England, and from Norway. So, what happened with the 400,000 hectares, the rest? So, this is the opportunity when we would like to ask for help from Japan.

Q3) Why there is a lack of Japanese participation through GCF, or can you talk about future prospects as well?

In Japan, the environment is not ready yet, and the process is not completed: we're learning by doing, the fund just started, and everybody is in trial and error. And in this trial and error, we want to work together with the AE from Indonesia.

Q4) Is there any requests or demands to the Japanese companies and Japanese private investments?

At the World Economy Forum in Davos, we launched a financial scheme that can be used to support agriculture, assisting agriculture restoration and protection activities into one project. What is interesting is that this financial package is blending the grant and a loan or credits, maybe like the GCF.

Now, we would like to encourage Indonesian business entities to apply to that fund. I very much also welcome a join with the Japanese companies, or even Japanese investment. I would like to welcome and invite you to have a more detailed discussion with us. And even in a month, or two or three months, to go to visit Indonesia to look on the real situation. You can visit provinces like South Sumatra and meet the technical unit of the governor or the local businessmen, and discuss the possibility of investment in restorations and conservations.

Q5) Do you have some emerging ideas to support the green investment programs, particularly the small-scale enterprises coming from abroad or even locally? Or, if you already have a legally supporting paradigm, if you have please share with us.

Yes, we give support not only the very rich companies, but also the small-scale, not only the large-scale companies. The government of South Sumatra can give support and to facilitate whatever you need, even small companies, to invest or to support our province.

Q6) A sustainable supply chain is important when a company is trying to move from one industry to another; is there an opportunity for sago? I don't know how well you can balance sago and palm. How best to strike a balance between two different types of crops?

Sago is a native species in peatland. Well, I think palm oil is a species from West Africa, and they grow on dry soil. They can grow in peatland but not in perfect condition, while sago natively grows in peatland in Indonesia. So, it's a native species. The ecological impact, I believe, is zero, yes. Of course the best is to also adopt agroforestry mixed crops, which is not all sago, and traditionally the farmers in Riau, they all already mixed the crops.

I'd like to share also, there's one palm oil company in Indonesia and Riau which have done a pretty good job. They plant the palm oil in peatland and they put a lot of investment in managing the water. What interested me is that they are not only selling palm oil, they are also selling the water from the peatland as drinking water and mineral water. So, you can see the two commodities, selling water and also selling the palm oil. That shows that it is possible, and maybe also other crops — also to encourage them to not only put palm oil, but also to experiment on other crops.

Closing Remarks

Dr. Kosuke MIZUNO, Professor, Kyoto University

Indonesia aims to recover two million hectares of peatland. This is a very urgent global challenge that we need to face. Not just the Indonesian people, but also other people, since it's a global problem. We have to do our part; researchers have to do their part, as well as JICA, the private sector, businesses, and NGOs. We all have our strengths, so we need to make contributions through our strengths in order to restore two million hectares of peatland. And actually, this is a big opportunity.

There is immense opportunity going forward. And that's also the same for us in the academic field — we can write a lot of academic papers, and it is a big business opportunity for the private sector and also for the local people, because local people can improve their livelihoods. And also, friendship as well: through this, we can further deepen the friendship between the two countries. So, there are so many opportunities ahead of us.

**Workshop on Restoration Business Model of Peatland Areas in
Enhancing the Development of Green Economy
27 July 2017, Sari Pan Pacific Hotel**

Session-1

Opening speech, by Representative of JICA Indonesia

This is a good opportunity for us to learn and share the knowledge for inspiring future developments of business in Indonesia, especially in 4 districts: Meranti, Pulang Pisau, Ogan Komering Ilir (OKI) and Musi Banyuasin (Muba).

Indonesia's peatlands have become a source of greenhouse gas emissions through decomposition and fire. But now we need to change terminology so that peatlands become the carbon stock area, instead of the source of greenhouse gas emissions. The question is how do we change this situation? So far, we knew how to build channels blocking to maintain the water level in peatland area. We also knew that sago is a good commodity for peatland restoration. Unfortunately, we don't have both industrial and marketing system in place to support a large production of sago starch. So we need to take a further steps in exploring and finding the best way to create the systems. This is not only a challenge in Indonesia, but also a in worldwide.

JICA has been starting to collaborate with the Indonesian counterpart, including BRG, KLHK and BPPT for restoration and monitoring of peatlands. For example: The development of monitoring system by combining field data with satellite data; Design establishment of conservation and peat restoration, in Kalimantan and Sumatra; and Trial of peatlands business development with the government.

As time progresses, it is indicated that economic life in our business will be transformed. Indonesia needs to take part in the future, including demonstrate the business model of restoration on peatlands. Today, we will hear the experiences and lesson learnt of the 4 districts and will identify challenges and issues, so as to generate informative ideas for the next step.

Opening speech: Head of Peat Restoration Agency (BRG), Nasir Fuad

In Indonesia, the area of peatlands that must be restored is very large. From the 15 million hectares, over a half of the total area have been open. Some are well managed, some are poorly managed, and some are not managed.

To manage the peat restoration requires considerable effort and resources. If we only relies on the government resources, the help of government partners, whether aid from friendly countries or philanthropic foundations, are not enough. Entrepreneurs, including investors, have an important role in jointly restoring which also leads to cultivation on peatlands.

There have been some good examples done by some entrepreneurs related to cultivation on peatlands and the results are quite satisfactory. BRG wants to raise more forestry, forestry agriculture and other agriculture activities to attract business actors and interested parties for investment.

The Government of Indonesia, in particular the KLHK Minister, has already had a national policy for Greenhouse Gas (GHG) reduction. Cultivation activities in peatlands besides providing opportunities from commodities also have a big role for GHG decline. Currently, more incidents have been occurred due to extreme temperatures and fires. In the United States alone, 1.8 million hectares of forest has burned in 2017. This week, a tourist center in France was burned and caused 10 thousand people to be evacuated. It means, basically our activities can not escape from extreme weather changes and fires.

Above all, to cope with extreme weather is that we need a positive energy and extra effort, from government, companies, business actors, investors, communities, NGOs, and academics. BRG has worked with several universities in Indonesia and the world including Kyoto University Japan to conduct research on climate change. Hopefully this workshop opens up a lot of new ideas, thoughts,

and options for cultivating entrepreneurs in the future. Wishing all the results of the discussion brings a better future and positive thinking.

Session-2

Panel Discussion: Business Model for Peatlands Restoration

Moderator: Mr. Budi Wardhana

1. Pre-Feasibility Study for Peatland Restoration Investment in Four Most Prioritized Areas in Indonesia, Prof. Robiyanto, Koordinator Tim Konsorsium Universitas

In restoring the peat ecosystem we must have an understanding that the process includes four stages: revitalization, restoration, rehabilitation, and law enforcement. All stakeholders (academic institutions, government, industries and society must work together to achieve the goal.

The impacts of unsustainable peatland processing - forest and peat fires, including: economic losses of Rp. 221 Trillions, around 504,000 people in six provinces are exposed to acute respiratory infections, 5 million school students are excluded, greenhouse gas emissions up to 15.95 million tonnes of CO₂ emissions / day, and loss of habitat range of 2, 6 million hectares.

Success factors in the implementation of peat ecosystem recovery are influenced by: (1) synergy of the parties, (2) cooperation between KLHK, university, facilitator, local government and local community, (3) Cooperation scheme: MoU between KLHK dg University, fasilitator rekrutment from Local by university, fasilitator training by KLHK, RKM preparation by community with fasilitator, canal plumbing.

Below are profiles of 4 priority districts that are pilot areas for implementation of the peatland restoration business model:

OKI District:

Its main commodities are swamp buffalo, swamp fisheries, food crops and horticulture, liberica coffee, areca nut, and pineapple. The prospective product form for swamp buffalo commodities are fresh milk, yogurt, ice cream and milk candy. While processed products for capture fisheries and aquaculture are salted fish and smoked fish. On the other hand, areca nut demand has been increasing rapidly since the establishment of 5 ready-to-export processing plants, including young areca nuts for candy raw materials in China and Korea. Tanjabbar farmers, Jambi even replace rubber and oil palm plantations in peat with areca nut and pineapple. This is due to the stability of market prices and cheaper production costs. There are 4 different locations in OKI Regency with partnership and restoration schemes with partnership, i.e., Rengas Merah and surrounding areas, Riding, Penyajab, Pedamaran HPT, and APL Pedamaran-Pampangan.

Musi Banyuasin (MUBA) District:

The types of superior commodities in this regency are kenaf, areca nut, pineapple, food crops and horticulture, swamp fisheries and environmental services. Processed products from kenaf include: pulp and paper, textiles and carpets, dashboards, bioplastics and biocomposites, vegeta oil, and others. The main obstacle to kenaf cultivation is the limitedness of large companies.

Melawai Islands District:

Main commodities of Meranti Island district are coffee of liberica, sago, liquid sugar, kenaf, etc. The business investment ideas for liberal coffee are as follows:

- Investors help farmers to build new gardens with superior liberica coffee seedlings (LIM-1 and LIM-2) -great assistance related to farmers' services in restoration efforts
- Investors ask farmers to breed trees for damaged peat restoration
- Investors ask farmers to plant seeds produced on restored peatlands
- Investors are entitled to buy all the best coffee produced by the farmers and label the "peat restoration coffee"

Pulang Pisau District:

Leading commodities in Pulang Pisau regency are Integration of Alabio duck, food crops and horticulture, kenaf and pineapple, areca nut and swamp fishery. The process of peat restoration business model in Pulang Pisau is through the alignment of matrix of action plan of peat restoration

economic area with green development and vision, mission, strategy and development priority of Pulang Pisau regency. An example of the topic is the optimization of land use without burning - zero waste.

Specific notes on pre-feasibility for investment in peatland restoration are as follows:

- It needs an integrated peat restoration development
- It needs clear roles sharing and costs sharing
- Requires agreement regarding the management unit of peat restoration (UPRG) in KHG
- Requires preparation of RPPEG at district level in accordance with RPJMD Kabupaten, Provincial RPPEG and National RPPEG

2. Peatland Processing for Agricultural Land, Tim PT. Sinar Pangan Indonesia

The program has been running in Central Kalimantan and South Kalimantan.

The objectives of this peatland processing program are:

- Utilizing less productive peatlands, and
- Reducing the risk of land fires

Conditions:

- There is still a lot of unripened paddy field
- high risk of peatland fires
- limited ability of personnel and financial to work with the expected extent

Solutions:

- establish a system of farmer cooperation with counterparts
- management with industrialization system,
- financial provision to support the provision of infrastructure and work equipment

One of the programs that have been done is paddy field printing in Mulyasari, with the following steps:

- Opening new land for paddy fields. This needs to be done to clear the land from the remaining vegetation material
- Printing of agricultural land (paddy) follows the existing ownership of farmers
- Revamping of canals and roads to facilitate logistical pathways
- The need for assistance to work on the land, both the availability of equipment for industrialization and funding.

Broadly speaking, the steps of the peatland handling process, including:

- a. Checking the condition of the land based on the map of the restoration plan
- b. Identify the land ownership data included in the restoration plan
- c. Identify the pattern of paddy fields in the area
- d. Making blocking based on the condition of the land on the suitability of vegetation that can be planted refers to the availability of water
- e. Leveling data to plan the use of water gates and less possible use of water pumps in case of drought
- f. Logistic road, channel / canal and sluice roads for new land clearing
- g. Selection of vegetation that can be planted according to the condition of the land

3. Draft for Development of Special Economic Zone on Peatland Investment (KOENIG), Ani Suryati Ningsih, Kementerian Koordinator Bidang Perekonomian, Tim Insentif dan Fasilitas BRG

The basic concept of a special economic region/zone is the provision of facilities to the preparation of areas whose locations have access to global markets (access to ports and / or airports). The area is given a certain incentive to increase competitiveness with the surrounding countries. With increasing competitiveness, it is expected to attract investors to invest in the region.

The implementation of Special Economic Zone in Indonesia has been regulated in Law Number 39 Year 2009, as a mandate of Law no. 25 of 2007 on investment, with the following objectives:

- a. Increased investment through the preparation of areas that have geo-economic and geo-strategic advantages
- b. Optimization of industrial activities, exports, imports, and other economic activities that have high economic value
- c. The acceleration of regional development through the development of new economic growth centers for the balance of inter-regional development

-
- d. The realization of a breakthrough model of regional development for economic growth, including industry, tourism, and trade so as to create jobs

The criteria for location of Special Economic Zone are:

- Support provision from provincial and / or district / local government
- The existence of conformity with the Spatial Plan (RTRW) and does not have the potential to disturb the protected area
- Located in a position close to international trade routes / close to international shipping lines in Indonesia or located in areas with the potential to have excellent resources
- Has a clear boundary

Zones within special economic zones, including: export processing, logistics, industry, technology development, tourism, energy and other economies.

Acceleration strategies for proposal process of SEZ establishment:

- Strategic location, in accordance with RTRW, and land has been mastered minimum land requirement for stage 1 of SEZ development
- Ensuring SEZ development vision
- Strived party originating from the Business Entity, both state-owned (BUMN) / BUMD / private
- Readiness of infrastructure support
- Have prospective anchor investors
- Prepare the requirements and submit the proposal in accordance with the procedures set forth in the legislation

Scheme of business entity establishment in SEZ development and management:

- If the proposer is a business entity, the development of the area includes land acquisition and physical construction borne by funding sources from business entities.
- If the proposer is a government (pemda / pemrov / ministry), the proposer builds the area through the source of APBN / APBD funds, then appoints the business entity as the manager through the tender, or appoints the BUMN / BUMD as the manager with equity.
- If the proposer is a government (pemda / pemrov / ministry), the proposer builds the area through a private government cooperation fund (PPP), then establishes the business entity winning the PPP tender as a manager

The SEZ development policy in Indonesia is directed to have an optimal contribution to the achievement of at least four components of national development priorities, namely:

- a. Building Indonesia from the suburbs by strengthening the regions and villages within the framework of the unitary State
- b. Improve the quality of human life of Indonesia
- c. Improve people's productivity and competitiveness in international markets
- d. Achieve economic independence by moving the strategic sectors of the domestic economy

Session-3: Group Discussion

Group 1

Theme: Community – Based Business Model in the Special Economic Zone of Peatland Restoration Investment

Facilitator: Hanni Adiati (KLHK) and Kuno Hiromitsu (JICA Mission)

Ideas and experiences sharing:

1. Joko Sulistyanto (KPHP Pulang Pisau)

The people of Pulang Pisau want something definite in the management of peat. The current trend in Pulpis is that the community is very enthusiastic to plant sengon (market need). The emphasis is (a) Is there a market certainty? (b) Is there legal certainty ?.

2. Prof. Robi

Experience socializing and working with the community: fostering the community of swampy farmers.

The academic community should always be in the field (technical assistance, social, economic). Do not come only when there is a project and then disappear when the project is completed, but must be sustainable in various forms of the program. So that people will respect and hear us, and get updates related to the latest data. Each stakeholder (ABCG) should work together, but the matrix must be clear, objective and appropriate on the ground, who does what!

3. Pak Fera

Prof. Robi speaks truly, that the facilitator must exist in each region. BRG should have a Peat Cares Village program. Of the hundreds of thousands of hectares in West Kalimantan, approximately 119 hectares of hectares are responsible for restoration in West Kalimantan, in unlicensed cultivation areas. Ownership of land is owned by only a handful of people who historically are the first to penetrate / open forests, farmers just borrow only.

Feedback to pack Fera:

KLHK approach is a forest area, if the forest area is owned by indigenous peoples, it is recognized as a customary forest status (listed in the Ministry of Home Affairs). The problem is if it is not recorded by MoHA, so it needs to be identified whether the area belongs to customary forest or not. If not customary forest can enter the social forest.

There are three questions we must answer together: Where, what business, and who does what?

The type of business chosen that has been grown in the community, if possible do not develop something that does not exist.

Who does what, these are identified whether on-farm or off-farm, land based or non land based. The characters of society living in the vicinity of peatlands are have no land, no skills, no access to venture capital, and no entrepreneurial nature. That's why we need entrepreneurs in off-farm for processing and marketing.

4. Pak Tanaka, NGO in Jepang

Providing input on appropriate technology aspects, with criteria: environmentally friendly, affordable costs, and in accordance with the characteristics and needs of local communities. For example: wastewater treatment. The NGO has developed TTG for biomass processing, especially for charcoal gasification.

5. Pak Deddy

He is developing waste-based agribusiness. Sago produces waste, and waste can be used media and organic fertilizers, in addition to Meranti also in South Kalimantan.

6. Pak

The emerging questions are:

- (a) Where the feasible location for a peatland restoration business system is established, with the following criteria: not entering the concession area;
- (b) When we can do it;
- (c) Who does what.

7. Pak Pasaribu, IPB

There is a brief overview of research on how profiles of advanced farmers. The results showed that the plant will be sustainable if there is diversification with periodic harvest that is not long, for example: planting chili, etc.

Diversification of agriculture is one of the approaches to the model of peat land restoration business.

8. Pak Yuprin

We can not order the people/communities to revegetate while the results are long. Supposedly, these lands are diversified with other products, such as fish, ducks, etc.

From economic calculations, the process of diversification is more advantageous when compared to one by one.

9. Pak Robi

The concept that we make must be multi commodity and multi effort

Conclusion:

The investment scheme for the peat land restoration business model should be affirmative and there are alignments, grass periods, low interest rates and buyers, not business as usual.

Group 2

Theme: Company – Based Business Model

The objectives of the discussion are:

- Looking for a suitable business model on peatlands,
- The type of commodity that can be sold and planted where
- What type of financial services will be used, and
- Who is the initiator

Adi Prayitno dari Pusat Studi Bencana – Anggota Konsorsium Universitas:

More friendly land base that has grown in Riau is plantation forest with sago commodity. This commodity has been planted PT National Sagu Prima, on an area of 11 thousand hectares in Pulau Tebing Tinggi located in the area of a peat dome with a peat depth of more than 3 meters. Of the 11,000 hectares of sago grown, 5000 hectares have been produced.

Deficiency:

- Intensification of agriculture is very massive
- Although sago is hydrology friendly, but prone to fire
- Productivity is lower than shallow peatlands

Challenge:

- It is worth considering the added value of sago plants, how to make SMEs that can create derivatives from sago plants, such as food products, sago cakes, etc.

Profesor Yazid:

Propose to discuss the problems on the ground before talking about who will invest. Because, many situations are intensified in the field, among them are:

- Burning area
- Degraded peat
- Land use issues
- Social culture (conflict with the community, the change of village boundaries from adat village to village)

Yanti, PT Sinar Pangan Indonesia

- PT SPI established in 2014, a rice crop commodity planted on an area of 1200 hectares
- In Central Kalimantan there are a lot of unplanted lands, especially in transmigration areas where there are already large rice fields (2010 and 2012) and unexplored rice fields are abandoned with bushes. In fact, there is an effort from the local people to plant, but the losses faced when the first planting is not contained. On average, each farmer has 15 hectares of paddy fields.
- PT SPI runs a Partnership System with farmers conducted as follows: profit sharing system where the land is managed for 5 years and leased Rp 500rb / hectare / year. The second year after harvest, farmers are given ½ blek or cans of 20kg per borong (1 ha, 28 - 35 borong)
- PT SPI targets rice productivity to reach 4 tons / ha
- Using superior varieties, resistant to immersion (inpari varieties 30 - harvest 6.4 tons/ha)
- Requires Rp.12 million / hectare for paddy field printing
- Profit: when planting rice at least 500 hectares area.
- Problem: Labor issues, hope the government can provide workable land. Manpower is needed. Bringing from Java, farm laborers who do not have land. From the foundation of the displaced, they are nurtured. They are given the land and salary. Self-help transmigration is come from the company.

-
- Input from KLHK Sumsel: input of agrira reform should be given to people who want to manage the land, not for people who want to control the land.

Challenges:

- Infrastructure condition, mainly land is damaged. When the rainy season is impassable, eventually use the waterway
- Labor difficulties
- Difficulties when unloading land (some excavators are drowning in peatland)
- Labor issues, during this time to bring from Java: farm laborers who do not have land and from foundations of displaced people. They are nurtured, given the land, and salary.

Advantages:

- Support from local government
- The market is guaranteed because of cooperation with Bulog
- Land already exists
- The community is ready to cooperate,
- Profit oriented of the company can be count

Prof Adi Prayitno

- Presenting the scheme of an Integrated Sago Industry Agro Business
- Sago plant: 30 percent is sago starch and 70 percent is waste. If this waste is processed as an added value, it will be a big addition to farmers, and sago crops on peatlands become a promising business. Sago waste can be used for animal feed, fuel, furniture, and fertilizer. It would be good if sago refinery owners are not fixated on the production of sago flour.
- Need investment from upstream to downstream
- Need to build the model and this trial needs to be facilitated by the local government.

Ibu Ani Kemenkeu:

- PT SPI has prepared an integrated area
- PT SPI already has plans for the development of livestock, corn, and coffee. Currently, manure is imported from the outside. After the farm runs the need for manure can be fulfilled itself.
- The concept of PT SPI is clear and still carries the scheme of 'green investment'.
- PT SPI pattern can be modeled.
- In one special economic region there may be more than one commodity model.

UPT KLHK Sumsel:

There is a glimmer of hope from the model developed by PT Sinar pangan Indonesia. The most interesting of PT SPI is the partnership system used where he uses BUMDES and uses agricultural extension. PT SPI scheme can be used as the initial model used together.

Input for Pineapple and areca nut Commodities:

Pineapple:

- In the Ogan Komerang Ilir (OKI) District, the community has already planted pineapple on peat soil but no investors yet.
- Pineapple grown on peatlands favored by the local market: sour, sweet, and fresh
- In Lampung: pineapple plantation and trading already exists.

Areca nut:

- In Tanjung Jabung Barat: areca nut demand has increased rapidly since last 5 years for export.
- Why is areca nut: 3R, not business only, but also for restoration

Prof Gatot Supangkat from UMY:

- Sustainability of farming industry should be considered.
- Sustainability paradigm: ecologically viable, economically feasible, socially culturally feasible - the most important is the certainty of the status of the land.
- Establish a company whose shares are 80 percent owned by farmers.

-
- In order to have a better income for both farmers and private company sectors, the partnership in the farm system should be upstream to downstream as a whole, not partially. This is because the highest value for farmers is in downstream.
 - Hope the recommendations of this workshop are not technical.

Summaries:

- Discusses the company's business model, but the result is a community-based company.
- Model: one large area model eg rice: 1200 hectares
- Initiation of program: sago (Merati), rice (Kalsel), pineapple and areca nut (South Sumatra)
- Challenges: local challenges - more on providing support, tax allowance etc.
- There are different conditions and properties of peat. Thus, one commodity is not enough to be offered to the investor.
- This is not business as usual, it should still pay attention to the preservation of the ecosystem.
- Infrastructure is always a potential problem for potential investors, so the government needs to intervene
- Capital should not expect capital from abroad.
- Need to create a mature investment scheme
- Seeking investment from the business world, but with the pattern of partnership with the community. Community empowerment, not conglomeration.
- One Homework: follow-up plan.

Additional input from Budi Wardhana:

Actually what is needed is a regional approach, because our peat is a landscape. In a single business model of landscape, the economic area approach is very important. In the landscape, it is clearly visible which areas that may be developed, has been developed and will be developed. For example, infrastructure access (plant construction sites, roads, offices etc) and energy resources must be clear. The unity of the direction of economic development makes the government easy to provide infrastructure (road infrastructure, market, and financial). We need to determine what infrastructure is suitable for the region.

This approach is similar to the approach that used for peatland management. Peat management approach is through KHG in which there are different types or groups of industry sectors. Each consortium has already provided a study on what commodities can be developed in the each respective area. Not all of this commodity enters the stage of industrialization. Probably it is still based on activities undertaken by community groups. Stages to separate which is more suitable to remain managed by the community and which has reached the stage that can be developed industrially, where the benefits by developing SEZ peat can be taken advantage of as much as possible can be developed, and arrange it into KEK.

Speaking of commodities, development considerations for commodities are up to the extent to which we know their development and utilization. Examples of sago cultivation in the Meranti Islands, the stage has not reached the final process, has not even formed the process of white temps as a food industry. The question is we want to move on an economic scale like what. Large economies of scale will need big investment and has big risk. Financial markets should also be considered. Although some incentives and facilitation for investment has been given but the risk still persists as it is a new product. It should also be prepared in our matrix of developing the economic area.

The expected input from this meeting is that each commodity or area that has been studied by the consortium has reached which stage to enter into the company's business form, where has its scope been? Where has its integration with other commodities been? It needs to be made in matrix form.

One thing that remains untouched is the non-marketable commodities in general. It is carbon. If we see, not all areas whose commodities can be processed into commodities consumed by the community, may be a region whose nature is based on the unity of the ecosystem is a protected function area. Restoration, rehabilitation and revegetation activities may be assessed on the basis of the carbon benefits resulting from the restoration work. This is what has not been discussed until now, but it is also important.

Session 4: Pleno Session

Results Discussion Group I: Community-Based Business in Special Economic Zone for Peat Restoration Investment

The conclusions of the discussion are as follows:

1. Regarding the business concept, the area of peat restoration in community level that attracted investors are as follows:

- Availability of support from banks and public service agencies such as financial institutions in KLHK or other agencies, as well as a support from private sectors and other financial institutions .
- There should be special government support ie low interest schemes. Low interest rates because the cash flow of business in peat restoration is very heavy
- There should be a period where it does not have to pay bank interest. Taking the example of the Public Service Board in KLHK there is a system of about 5-6 years interest free during the area is planted, after the new production plants pay interest.
- This business must have market guarantees. The community forest plantation program linked to the company that wants to buy is very exciting to the community. So the market guarantee from the government becomes a must.
- Businesses built should vary, diversify income. So there are revenues can be taken yearly, monthly, and maybe daily.

2. The steps:

- a. There are existing Social Forestry Working Groups in each provincy, including in peatlands and in the mineral areas. This institution can be utilized by BRG to synergize. Strengthening the business community through this working group, the data is also quite complete.
- b. Second Concept: BRG cooperates with banks, formulates investment projects at commodity level that are not burdensome to the public. BRG can also work with foreign donors where funds are held in national banks such as BRI for channeling so that the interest remains low at the community level.
- c. Preparation of investment: the location should be safe, has been rewetted and not burning.
- d. Maintenance of community groups that will do business, there must be technical assistance, social and marketing
- e. The identification of commodities must be careful that the commodities being sold can revitalize people's lives in the restored peatlands.

Result of group discussion II: Proposed Model

1. There are four existing models that are: rice, sago, pineapple and areca nut.
2. There are two business models that can be done, namely the Zone/Regional Business Model and the Commodity Business Model.

A. Regional Business Model:

- The model of this area is almost the same as that owned by BRG using KHG model.

Advantages of Regional Business Model:

- There are existing KHGs from BRG. BRG has about 33 KHG ready for the map and just put the business analysis on it.
- The government provides various facilities and incentives for activities in the region.
- Foreign ownership facilities in business activities located above this special economic area are longer.
- In one area can be many companies and can be many commodities. Further steps if we choose that option then needed as follows:
 - Required site selection based on proposed KHG.
 - It takes the administrative process in proposing the area to the government in consultation with the regional councils

-
- Complete business model certainty covers commodity type, business cycle, marketing, manpower etc and coincided with the administrative process.

Weakness of regional business model:

- The filing process is long
- Need spatial,
- Need the reappraised parties

B. Commodity Model

Currently that has been running is a commodity of rice, sago, pineapple, and areca nut

Advantages of Commodity models:

- environmentally friendly,
- ecosystem friendly peat,
- It is a product that can be developed by society at large,
- It can directly engage with private sector.

Weaknesses of Commodity models:

- There is a business analysis or economies of scale that can be done with investors
- (so in fact it is quite a lot, but business analysis or calculation of the ekomi scale does not exist yet)
- Need market analysis
- Need a socio-cultural analysis that supports the business base in order for this sustainability to be maintained.
- For rice commodities: need ready land, labor, road infrastructure.

3. Conclusion from Group 1 dan 2 are:

- Integrated farming,
- Need a partnership pattern

These two things should be knitted together.

Closing remarks

By Haris Gunawan, Deputy of Research and Development, BRG RI

Some things in today's workshop formulation need to be followed up before packaged more ready to be brought in the business growth economic forum to be held in Osaka, Japan.

The Government of Indonesia until 2019 has an investment target to be the most important drive in economic development. So this is very much in line with the Government of Indonesia's plan. Therefore the formulation leads to the establishment of Special Economic Zone of Investment and Green Economy Development. In order for us to become king in our own country and land.

Investment development should be appropriate to the economic scale of its activities, both small and medium enterprise development. The questions are, now we come to what stage and want to finish up to what stage? This is what has not been declared in this workshop.

There should be a target when it can be realized.

Event closed. #

2 Translation of Governmental Regulations Concerned on Peatland Restoration

2.1. PP No. 71/ 2014

PRESIDENT OF
THE REPUBLIC OF INDONESIA

INDONESIAN GOVERNMENT REGULATION
NUMBER 71 OF 2014
CONCERNING
PROTECTION AND MANAGEMENT OF PEATLAND ECOSYSTEMS

BY THE GRACE OF GOD ALMIGHTY

PRESIDENT OF THE REPUBLIC OF INDONESIA,

Considering : that in order to implement the provisions of Article 11, Article 12, Article 21 paragraph (3) point (f) and (5), Article 56, Article 57 paragraph (5), Article 75, and Article 83 of Act Number 32 of 2009 on Environmental Protection and Management, it is necessary to establish Government Regulation on the Protection and Management of Peatland Ecosystems;

In view of : 1. Article 5 paragraph (2) of the 1945 Constitution of the Republic of Indonesia;
2. Act Number 32 of 2009 on the Environmental Protection and Management (State Gazette of the Republic of Indonesia of 2009 Number 140, Supplement to State Gazette of the Republic of Indonesia Number 5059);

DECIDED

To stipulate : THE GOVERNMENT REGULATION CONCERNING PROTECTION AND MANAGEMENT OF PEATLAND ECOSYSTEMS

CHAPTER 1
GENERAL PROVISIONS

Article 1

In this Government Regulation:

1. Protection and Management of Peatland Ecosystems is a systematic and integrated effort made to preserve the functions of Peatland Ecosystems and prevent damage to them through planning, utilization, control, maintenance, monitoring, and law enforcement.
2. Peat is an organic material formed naturally from the remains of plants decomposed imperfectly and accumulating in the swamp.
3. Peatland Ecosystem is the order of Peat elements constituting a single complete entity, influencing each other in the form of balance, stability, and productivity.
4. Peatland Hydrological Entity is a Peatland Ecosystem located between two (2) rivers, between the river and the sea, and/or in the swamp.
5. Minister is the minister in charge of governmental affairs in the field of environmental protection and management.

Article 2

- (1) This environmental protection and management shall include that provided for the ecosystems of:
 - a. land for biomass production;
 - b. coral reef;
 - c. mangrove;
 - d. seagrass bed;
 - e. Peatland;
 - f. karst; and/or
 - g. others classified as such according to the advancement of science and knowledge.
- (2) This government regulation shall only regulate Peatland Ecosystem Protection and Management.
- (3) Provisions on the protection and management of ecosystems as referred to in paragraph (1) points (a), (b), (c), (d), (f), and (g) shall be regulated in a separate government regulation.

Article 3

Peatland Ecosystem Protection and Management as referred to in Article 2 paragraph (2) shall include:

- a. planning;
- b. utilization;
- c. control;
- d. maintenance;
- e. monitoring; and
- f. administrative sanction.

CHAPTER II

PLANNING

First Section

General

Article 4

The Planning of Peatland Ecosystem Protection and Management shall be made through such stages as:

- a. Peatland Ecosystem inventory;
- b. Peatland Ecosystem function determination; and
- c. Peatland Ecosystem Protection and Management plan drafting and stipulation.

Second Section

Peatland Ecosystem Inventory

Article 5

- (1) The Peatland Ecosystem inventory as referred to in Article 4 point (a) shall be performed by means of:
 - a. satellite image; and/or
 - b. aerial photograph.
- (2) The implementation of inventory as referred to in paragraph (1) shall be performed in consideration of the map indicating national Peatland Ecosystem distribution contained in the Appendix, which forms an integral part of this Government Regulation.

- (3) The Peatland Ecosystem inventory as referred to in paragraph (1) shall be performed by the Minister.

Article 6

- (1) The satellite image and/or aerial photograph as referred to in Article 5 paragraph (1) shall be interpreted through the following stages:
- a. delineating the satellite image and/or aerial photograph, which have been radiometrically and geometrically corrected to determine the position and borders of the Peatland Hydrologic Entity; and
 - b. placing the result of satellite image and/or aerial photograph delineation into the tentative map of Peatland Ecosystem Hydrological Entity at a minimum scale of 1:250,000.
- (2) The result of satellite image and/or aerial photograph interpretation as referred to in paragraph (1) shall be verified by field survey activity.
- (3) The field survey as referred to in paragraph (2) shall be made for verifying:
- a. the presence of Peatland Hydrological Entity; and
 - b. the Peatland Ecosystem characteristics.
- (4) The result of verification as referred to in paragraph (3) shall be evaluated to obtain a final map of Peatland Hydrologic Entity.
- (5) The final map of Peatland Hydrological Entity as referred to in paragraph (4) shall be presented at a minimum scale of 1:250,000.

Article 7

- (1) The final map of Peatland Hydrological Entity should at least contain data and information on:
- a. location, presence, and area of Peatland Hydrological Entity;
 - b. physical, chemical, and biological characteristics, hydrotopography, and sediment type underneath the Peat which include:
 1. point location or coordinate;
 2. land elevation;
 3. groundwater, inundation, or flooding;
 4. land cover, land use, and their conditions;
 5. existence of protected flora and fauna;
 6. natural and artificial drainage conditions;

7. water quality;
 8. overflow type;
 9. Peat thickness;
 10. Peat material weight proportion;
 11. Extent or damage level of Peat;
 12. substratum characteristics beneath the Peat layer; and
 13. land characteristics and pyrite layer depth.
- (2) The final map of Peatland Hydrological Entity as referred to in paragraph (1) shall be used as a reference to determine the function of Peatland Ecosystems.

Article 8

Further provisions on the implementation procedure of Peatland Ecosystem inventory shall be governed by a Ministerial Regulation.

Third Section

Peatland Ecosystem Function Determination

Article 9

- (1) The Peatland Ecosystem function determination as referred to in Article 4 point (b) shall be made by the Minister upon coordination with:
- a. the minister in charge of government affairs in the field of forestry and the one in charge of government affairs in the field of water resource and spatial zoning, in case the Peatland Ecosystems to be determined are located within a forest area; and
 - b. the minister in charge of government affairs in the field of water resource and spatial zoning, in case the Peatland Ecosystems to be determined are located outside a forest area.
- (2) The Peatland Ecosystem function as referred to in paragraph (1) shall include:
- a. Peatland Ecosystem protective function; and
 - b. Peatland Ecosystem cultivating function.
- (3) The Minister shall be required to determine the Peatland Ecosystem protective function area of at least thirty percent (30%) of the total Peatland Hydrological Entity area, located at the Peat dome peak and surrounding area.

- (4) In case, more than thirty percent (30%) of total Peat Hydrological Entity area as referred to in paragraph (3) there remains:
- a. Peat at three meters (3m) or more in thickness;
 - b. specific and/or endemic germ plasm;
 - c. protected species in accordance with the regulations of law; and/or
 - d. Peatland Ecosystems located within the protection area as determined in a regional spatial zoning plan, protected forest area, and conservation forest area,
- the Minister shall determine them to be Peatland Ecosystem protective function areas.
- (5) The Peatland Hydrological Entity area as referred to in paragraphs (3) and (4) shall be based on the final map of Peatland Hydrological Entity as referred to in Article 7.
- (6) In case the Peatland Ecosystems do not meet the provisions as referred to in paragraphs (3) and (4), the Minister shall determine them to be Peatland Ecosystem cultivating function areas.

Article 10

- (1) The Peatland Ecosystem function areas determined by the Minister to be Peatland Ecosystem protective and cultivating function areas as referred to in Article 9 shall be presented in the form of a Peatland Ecosystem function map.
- (2) The Peatland Ecosystem function map as referred to in paragraph (1) shall consist of:
- a. a national Peatland Ecosystem function map presented at a minimum scale of 1:250,000;
 - b. a provincial Peatland Ecosystem function map presented at a minimum scale of 1:100,000;
 - c. a regency¹/municipal Peatland Ecosystem function map presented at a minimum scale of 1:50,000.

Article 11

- (1) Any Peatland Ecosystems with cultivating function² can be changed into Peatland Ecosystems with protective function.³

¹ Translator's note: Indonesia's administrative divisions include provinces, regencies and municipalities. A regency, under the authority of a regent, is equivalent to a district.

² Translator's note: i.e., Peatland that has a production function, i.e. that can be exploited for business or other activity. Contrasting with peatland with a protection function, i.e. the function of which is to protect a natural resource.

³ Translator's note: i.e., protected Peatland, peatland that needs to be part of a protected area.

- (2) Such change of Peatland Ecosystem function as referred to in paragraph (1):
- a. shall be performed by the Minister; or
 - b. shall be based on the governor or regent/mayor's proposal according to their authority.
- (3) Such change of Peatland Ecosystem function as referred to in paragraph (1) can be made in the event:
- a. the Peatland Ecosystems meet the provisions as referred to in Article 9 paragraph (4) points (c) and (d);
 - b. an ecological urgency prevent environmental damage or make recovery efforts to and/or around the Peatland Ecosystems occur; and/or
 - c. an ecological urgency to make Peatland Ecosystem reservation efforts in a province or regency/municipality occurs.
- (4) The Peatland Ecosystem function change as referred to in paragraphs (1) and (2) shall be determined by the Minister upon coordination with:
- a. the minister in charge of government affairs in the field of forestry and the one in charge of government affairs in the field of water resource and spatial zoning, in case the Peatland Ecosystem function change to be determined is located within a forest area;
 - b. the minister in charge of government affairs in the field of water resource and spatial zoning, in case the Peatland Ecosystem function change to be determined is located outside a forest area; and
 - c. the governor and/or regent/mayor according to their authority.
- (5) In performing the coordination as referred to in paragraph (4), the Minister may establish a study team for Peatland Ecosystem function change.
- (6) Further provisions on the procedure to establish a study team for Peatland Ecosystem function change and the procedure to propose a Peatland Ecosystem function change by the governor or regent/mayor shall be governed by a Ministerial Regulation.

Article 12

Any Peatland Ecosystems determined to be protective or cultivating function areas shall be used as materials in the drafting and review of the regional spatial zoning plan together with the detailed plan.

Article 13

Further provisions on the procedure to determine Peatland Ecosystem function shall be governed by a Ministerial Regulation upon coordination with relevant minister(s).

Fourth Section

Peatland Ecosystem Protection and Management Plan Drafting and Stipulation

Article 14

- (1) The Peatland Ecosystem Protection and Management plan drafting as referred to in Article 4 point (c) shall include:
 - a. a national Peatland Ecosystem Protection and Management plan;
 - b. a provincial Peatland Ecosystem Protection and Management plan; and
 - c. a regency/municipal Peatland Ecosystem Protection and Management plan.
- (2) The national Peatland Ecosystem Protection and Management plan as referred to in paragraph (1) point (a) shall be drafted for cross-province Peatland Ecosystem Protection and Management.
- (3) The provincial Peatland Ecosystem Protection and Management plan as referred to in paragraph (1) point (b) shall be drafted for Protection and Management of Peatland Ecosystems located within provinces.
- (4) The regency/municipal Peatland Ecosystem Protection and Management plan as referred to in paragraph (1) point (c) shall be drafted for Protection and Management of Peatland Ecosystems located within regencies/municipalities.

Article 15

- (1) The national Peatland Ecosystem Protection and Management plan as referred to in Article 14 paragraph (1) point (a) shall be drafted based on the national Peatland Ecosystem function map as referred to in Article 10 paragraph (2) point (a).
- (2) The provincial Peatland Ecosystem Protection and Management plan as referred to in Article 14 paragraph (1) point (b) shall be drafted based on:
 - a. the national Peatland Ecosystem Protection and Management plan as referred to in paragraph (1); and
 - b. the provincial Peatland Ecosystem function map as referred to in Article 10 paragraph (2) point (b).
- (3) The regency/municipal Peatland Ecosystem Protection and Management plan as referred to in Article 14 paragraph (1) point (c) shall be drafted based on:

- a. the national Peatland Ecosystem Protection and Management plan as referred to in paragraph (1);
- b. the provincial Peatland Ecosystem Protection and Management plan as referred to in paragraph (2); and
- c. the regency/municipal Peatland Ecosystem function map as referred to in Article 10 paragraph (2) point (c).

Article 16

- (1) The national Peatland Ecosystem Protection and Management plan as referred to in Article 15 paragraph (1) shall be drafted and stipulated by the Minister upon coordination with:
 - a. the minister in charge of government affairs in the field of forestry; and
 - b. the minister in charge of government affairs in the field of water resources and spatial zoning.
- (2) The provincial Peatland Ecosystem Protection and Management plan as referred to in Article 15 paragraph (2) shall be drafted and stipulated by the governor.
- (3) The regency/municipal Peatland Ecosystem Protection and Management plan as referred to in Article 15 paragraph (3) shall be drafted and stipulated by the regent/mayor.
- (4) The stipulation of Peatland Ecosystem Protection and Management plan by a governor or regent/mayor as referred to in paragraphs (2) and (3) should obtain prior technical recommendation from the Minister.

Article 17

- (1) The Peatland Ecosystem Protection and Management plan should at least contain a plan for:
 - a. Peatland Ecosystem utilization and/or reservation;
 - b. Peatland Ecosystem quality and/or function maintenance and protection;
 - c. control, monitoring, and empowerment and conservation of Peatland Ecosystems;
 - and
 - d. adaptation to and mitigation of climate change.
- (2) The Peatland Ecosystem Protection and Management plan as referred to in paragraph (1) should consider:
 - a. character diversity and ecological function;
 - b. population distribution;

- c. potential natural resources distribution;
 - d. local wisdom;
 - e. public aspiration;
 - f. climate change; and
 - g. regional spatial zoning plan.
- (3) The Peatland Ecosystem Protection and Management plan forms a part of the environmental protection and management plan.

Article 18

- (1) In case Peatland Ecosystems with cultivating function are changed into Peatland Ecosystems with protective function as referred to in Article 11, the Peatland Ecosystem Protection and Management plan which has been stipulated as referred to in Article 16 should be changed.
- (2) The change in Peatland Ecosystem Protection and Management plan made by a governor or regent/mayor should obtain technical recommendation from the Minister.

Article 19

Further provisions on the procedure to draft, stipulate, and change a Peatland Ecosystem Protection and Management plan shall be governed by a Ministerial Regulation upon coordination with relevant minister(s).

CHAPTER III UTILIZATION

Article 20

- (1) The Peatland Ecosystem utilization shall be performed based on the national, provincial, and regency/municipal Peatland Ecosystem Protection and Management plans as referred to in Article 16.
- (2) The Peatland Ecosystem utilization as referred to in paragraph (1) can be applied to Peatland Ecosystems with both protective function and cultivating function.
- (3) The Peatland Ecosystem utilization as referred to in paragraph (2) shall be required to be performed by maintaining the Peat hydrologic function.

Article 21

- (1) Peatland Ecosystems with protective function as referred to in Article 20 paragraph (2) may be utilized in a limited fashion for activities in such fields as:
 - a. research;
 - b. science and knowledge;
 - c. education; and/or
 - d. environmental service.
- (2) Peatland Ecosystems with cultivating function may be utilized for all activities as per the Peatland Ecosystem Protection and Management plan.

CHAPTER IV

CONTROL

First Section

General

Article 22

- (1) The Peatland Ecosystem damage control shall be performed based on the national, provincial, and regency/municipal Peatland Ecosystem Protection and Management plans as referred to in Article 16.
- (2) The Peatland Ecosystem damage control shall consist of:
 - a. Peatland Ecosystem damage prevention;
 - b. Peatland Ecosystem damage response; and
 - c. Peatland Ecosystem damage recovery.

Second Section

Peatland Ecosystem Damage Prevention;

Article 23

- (1) Peatland Ecosystem damage may occur to:
 - a. Peatland Ecosystems with protective function; and
 - b. Peatland Ecosystems with cultivating function.
- (2) Peatland Ecosystems with protective function shall be declared damaged if the damage standard criteria are exceeded as follows:
 - a. an artificial drainage exists in the predetermined Peatland Ecosystems with protective function;

- b. pyrite and/or quartz sediments beneath the Peat layer are exposed; and/or
 - c. land cover area and/or volume in the predetermined Peatland Ecosystems with protective function are reduced.
- (3) Peatland Ecosystems with cultivating function shall be declared damaged if meeting the damage standard criteria as follows:
- a. the ground water level in the Peatland is greater than zero point four meter (0.4m) beneath the Peat surface; and/or
 - b. pyrite and/or quartz sediments beneath the Peat layer are exposed.

Article 24

- (1) The provisions on damage standard criteria of Peatland Ecosystems as referred to in Article 23 paragraph (3) shall be exempted from Peatland Ecosystems of less than one meter (1m) in thickness in the Peatland Ecosystems with cultivating function.
- (2) The damage standard criteria of Peatland Ecosystems of less than one meter (1m) in thickness in Peatland Ecosystems with cultivating function as referred to in paragraph (1) shall be stipulated in the environmental permit.

Article 25

- (1) The person in charge of businesses and/or activities utilizing Peatland Ecosystems with cultivating function, which is required to have an environmental impact assessment or an environmental management effort and environmental monitoring effort, shall be required to obtain an environmental permit from the Minister, governor, and/or regent/mayor as per their authorities.
- (2) The requirements and procedure to request an environmental permit as referred to in paragraph (1) shall be in accordance with the provisions of law.

Article 26

Anyone is prohibited from:

- a. opening land in Peatland Ecosystems with protective function;
- b. creating a drainage canal causing drought to the Peatland;
- c. burning any Peatland; and/or
- d. performing other activities which cause the damage standard criteria of Peatland Ecosystems to be exceeded as referred to in Article 23 paragraphs (2) and (3).

Third Section
Peatland Ecosystem Damage Response

Article 27

- (1) The person in charge of businesses and/or activities utilizing Peatland Ecosystem in such a way which causes damage(s) to the Peatland Ecosystems within or outside his/her business and/or activity areas shall be required to make a response as per his/her obligations under the environmental permit.
- (2) The Peatland Ecosystem damage response as referred to in paragraph (1) shall be required to be performed by the person in charge of businesses and/or activities that cause damages resulting from:
 - a. Peatland fire;
 - b. pyrite and/or quartz sediments being exposed;
 - c. drainage construction causing drought to the Peat; and/or
 - d. land opening in Peatland Ecosystems.
- (3) The Peatland Ecosystem damage response as referred to in paragraph (2) shall be performed by:
 - a. firefighting;
 - b. isolating the area in which the pyrite and/or quartz sediments are exposed;
 - c. constructing a dam overflow (tabat) or a water controlling construction; and/or
 - d. other methods causing no negative impacts on the Peatland Ecosystems.

Article 28

In case the person in charge of businesses and/or activities does not perform any damage response as referred to in Article 27 within at the latest twenty-four (24) hours from the time a damage incident is made known to him/her, the Minister, governor, or regent/mayor as per their authorities shall assign a third party to perform the damage response of Peatland Ecosystems at the expense of such person in charge of businesses and/or activities.

Article 29

- (1) In case the person in charge of businesses and/or activities does not perform any response, the costs charged to the person in charge of businesses and/or activities as referred to in Article 28 shall be calculated as an environmental loss.

- (2) The amount of environmental loss as referred to in paragraph (1) shall be determined based on agreement between Minister, governor, or regent/mayor and such person in charge of businesses and/or activities.

Fourth Section

Recovery

Article 30

- (1) The person in charge of businesses and/or activities utilizing the Peatland Ecosystem in such a way which causes damage(s) to the Peatland Ecosystems within or outside his/her business and/or activity areas shall be required to make a recovery as per his/her obligations under the environmental permit.
- (2) The recovery within and outside the business and/or activity areas as referred to in paragraph (1) must be performed by the person in charge of businesses and/or activities against the damage as referred to in Article 27 paragraph (2).
- (3) The recovery shall be performed by:
- a. rehabilitation;
 - b. restoration; and/or
 - c. other methods consistent with the advancement of science, knowledge, and technology.
- (4) Further provisions on the function recovery criteria of Peatland Ecosystems shall be governed by a Ministerial Regulation.

Article 31

In case the person in charge of businesses and/or activities does not make any Peatland Ecosystem function recovery as referred to in Article 30 within at the latest thirty (30) days from the date a damage incident is made known to him/her, the Minister, governor, or regent/mayor as per their authorities shall assign a third party to perform the Peatland Ecosystem function recovery at the expense of such person in charge of businesses and/or activities.

Article 32

- (1) In case the person in charge of businesses and/or activities does not perform any recovery, the costs charged to the person in charge of businesses and/or activities as referred to in Article 31 shall be calculated as an environmental loss.
- (2) The amount of environmental loss as referred to in paragraph (1) shall be determined based on agreement between Minister, governor, and/or regent/mayor and such person in charge of businesses and/or activities.

CHAPTER V
MAINTENANCE

Article 33

The Peatland Ecosystem maintenance as referred to in Article 17 paragraph (1) point (b) shall be performed by:

- a. reserving the Peatland Ecosystems; and/or
- b. conserving the Peatland Ecosystem function as a climate change impact controller.

Article 34

- (1) The Peatland Ecosystem reservation as referred to in Article 33 point (a) shall be established by the Minister, governor, or regent/mayor.
- (2) The Peatland Ecosystem reservation as referred to in paragraph (1) shall be established through the determination of Peatland Ecosystem which cannot be managed within a certain period of time.
- (3) The Peatland Ecosystem which cannot be managed within a certain period of time as referred to in paragraph (2) shall include:
 - a. Peatland Ecosystems with protective function the area of which is less than thirty percent (30%) of the total Peatland Hydrological Entity area in provinces or regencies/municipalities;
 - b. Peatland Ecosystems with cultivating function fifty percent (50%) of the area of which is exploited by business or activity for which a permit has been issued, and for which the exploitation exceeds the damage standard criteria as referred to in Article 23;
 - c. Peatland Ecosystems assigned for utilization moratorium under the regulations of law; and/or

- d. Peatland Ecosystems with cultivating function whose function has been changed to Peatland Ecosystems with protective function by the Minister as referred to in Article 11 paragraph (3) point (c).
- (4) The stipulation of Peatland Ecosystems which cannot be managed within a certain period of time as referred to in paragraph (2) shall be included in the national, provincial, and regency/municipal Peatland Ecosystem Protection and Management plans.

Article 35

- (1) The conservation of Peatland Ecosystem function as a climate change impact controller as referred to in Article 33 point (b) shall be performed by:
 - a. climate change mitigation effort; and
 - b. climate change adaptation effort.
- (2) The climate change mitigation and adaptation efforts as referred to in paragraph (1) shall be performed in accordance with regulations of law.

CHAPTER VI MONITORING

Article 36

- (1) The Minister, governor, or regent/mayor as per their authorities shall be required to monitor the compliance of the person in charge of businesses and/or activities of Peatland Ecosystem utilization with:
 - a. provisions on utilization, control, and maintenance of Peatland Ecosystems; and
 - b. requirements and obligations contained in the environmental permit.
- (2) The Minister, governor, or regent/mayor may delegate their authority in performing such monitoring to officials or technical institutions responsible for environmental protection and management.
- (3) In performing this monitoring, the Minister, governor, or regent/mayor shall assign an environmental monitoring official who is a functional official.

Article 37

- (1) The environmental monitoring official as referred to in Article 36 paragraph (3) shall be authorized to:
 - a. perform monitoring;
 - b. ask for information;

- c. make a copy of documents and/or make a note needed;
 - d. enter certain places;
 - e. take pictures;
 - f. make audio/visual recordings;
 - g. take samples;
 - h. examine equipment;
 - i. examine plants and/or means of transportation; and/or
 - j. stop certain violations.
- (2) In performing his/her duty, an environmental monitoring official may coordinate with state investigation officials.
- (3) The person in charge of businesses and/or activities shall be prohibited from hindering the performance of the environmental monitoring official's duties.

Article 38

- (1) The environmental monitoring official shall be a civil servant who meets the minimum rank requirement of junior superintendent of level/group IIIa.
- (2) In addition to the rank requirement referred to in paragraph (1), he/she should be a civil servant who passes environmental monitoring education and training.

Article 39

The provisions on the environmental monitoring official shall be governed with or based on the regulation of the minister in charge of government affairs in the field of state apparatus empowerment and bureaucracy reform.

CHAPTER VII ADMINISTRATIVE SANCTION

Article 40

- (1) The Minister, governor, or regent/mayor as per their authorities shall apply administrative sanctions.
- (2) The administrative sanctions as referred to in paragraph (1) shall consist of:
- a. written reprimand;
 - b. government coercion;
 - c. environmental permit freezing; or
 - d. environmental permit revocation.

- (3) The government coercion as referred to in paragraph (2) point (b) shall include:
- a. temporary activity cessation;
 - b. activity facility relocation;
 - c. drainage canal closure;
 - d. dismantlement;
 - e. seizure of goods or tools potentially causing any violation;
 - f. temporary cessation of all activities; and/or
 - g. other actions aiming at stopping violation and recovering environmental functions.

Article 41

Anyone violating the provisions of Article 26 shall be subject to government coercion as referred to in Article 40 paragraph (3).

Article 42

- (1) In case the violation of provisions of Article 26 is made by the person in charge of businesses and/or activities, the Minister, governor, or regent/mayor as per their authorities shall give an administrative sanction in the form of government coercion as referred to in Article 40 paragraph (3).
- (2) In case the person in charge of businesses and/or activities does not respond to the government coercion as referred to in paragraph (1), the Minister, governor, or regent/mayor as per their authorities shall pass an administrative sanction in the form of environmental permit freezing.
- (3) In case the person in charge of businesses and/or activities does not comply with the provisions in environmental permit freezing as referred to in paragraph (2), the Minister, governor, or regent/mayor as per their authorities shall pass an administrative sanction in the form of environmental permit revocation.
- (4) Further provisions on criteria and term of fulfillment of provisions on government coercion, environmental permit freezing, and environmental permit revocation shall be governed by a Ministerial Regulation.

Article 43

- (1) The person in charge of businesses and/or activities utilizing a Peatland Ecosystem in such a way which violates the provisions of Articles 27 and 28 shall be subject to an

administrative sanction in the form of government coercion as referred to in Article 40 paragraph (3).

- (2) In case the person in charge of businesses and/or activities utilizing a Peatland Ecosystem does not respond to the government coercion as referred to in paragraph (1), the Minister, governor, or regent/mayor shall pass an administrative sanction in the form of environmental permit freezing.
- (3) In case the person in charge of businesses and/or activities does not comply with the provisions in environmental permit freezing as referred to in paragraph (2), the Minister, governor, or regent/mayor as per their authorities shall pass an administrative sanction in the form of environmental permit revocation.
- (4) Further provisions on criteria and term of fulfillment of provisions on government coercion, environmental permit freezing, and environmental permit revocation shall be governed by a Ministerial Regulation.

Article 44

- (1) The person in charge of businesses and/or activities utilizing a Peatland Ecosystem in such a way which violates the provisions of Articles 30 and 31 shall be subject to an administrative sanction in the form of government coercion as referred to in Article 40 paragraph (3).
- (2) In case the person in charge of businesses and/or activities utilizing a Peatland Ecosystem does not respond to the government coercion as referred to in paragraph (1), the Minister, governor, or regent/mayor shall pass an administrative sanction in the form of environmental permit freezing.
- (3) In case the person in charge of businesses and/or activities utilizing a Peatland Ecosystem does not comply with the provisions in environmental permit freezing as referred to in paragraph (2), the Minister, governor, or regent/mayor shall pass an administrative sanction in the form of environmental permit revocation.
- (4) Further provisions on criteria and term of fulfillment of provisions on government coercion, environmental permit freezing, and environmental permit revocation shall be governed by a Ministerial Regulation.

CHAPTER VIII TRANSITIONAL PROVISIONS

Article 45

By the time this Government Regulation begins to be in full effect and force:

- a. the business and/or activity permit to utilize Peatland Ecosystems in Peatland Ecosystems with protective function, which has been issued prior to the effective date of, and the operation of, this Government Regulation, shall be declared to remain in effect until the expiry of such permit.
- b. the activity of utilizing Peatland Ecosystems with protective function, which has obtained a business and/or activity permit and has not performed any activities in the site, then, the business and/or activity permit shall remain in effect with the obligation to maintain the Peatland hydrologic functions.
- c. In case the holder of a business and/or activity permit has not performed his/her obligation to maintain the Peatland hydrologic functions as referred to in point (b) for two (2) years, the business and/or activity permit shall be revoked by the permit issuer.

CHAPTER IX
CONCLUDING PROVISIONS

Article 46

- (1) The Minister shall stipulate the Peatland Hydrological Entity map not later than two (2) years, calculated from the date on which this Government Regulation is stipulated.
- (2) The Minister shall stipulate the Peatland Ecosystems with protective and cultivating functions not later than two (2) years, calculated from the date on which the final map of Peatland Hydrological Entity is stipulated.

Article 47

This Government Regulation shall be in full effect and force as of the date it is promulgated.

For public cognizance, this Government Regulation shall be promulgated with its inclusion in the State Gazette of the Republic of Indonesia.

Stipulated in Jakarta
on 12 September 2014

PRESIDENT OF THE REPUBLIC OF
INDONESIA,

signed,

DR. H. SUSILO BAMBANG YUDHOYONO

Promulgated in Jakarta

on 15 September 2014

MINISTER OF LAW AND HUMAN RIGHTS OF
THE REPUBLIC OF INDONESIA,

signed.

AMIR SYAMSUDIN

STATE GAZETTE OF THE REPUBLIC OF INDONESIA YEAR 2014 NUMBER 209

Issued as a certified copy

MINISTRY OF STATE SECRETARIAT OF
THE REPUBLIC OF INDONESIA

Deputy for Laws

in Economic Field,

Lydia Silvanna Djaman

ELUCIDATION
OF
INDONESIAN GOVERNMENT REGULATION
NUMBER 71 OF 2014
CONCERNING

PROTECTION AND MANAGEMENT OF PEATLAND ECOSYSTEMS

I. GENERAL

A peatland has unique characteristics. In addition to serving as a component of wetlands and a component of land space, it also serves as a component of environment, located in the sovereign territory of Unitary State of the Republic of Indonesia. With such characteristics, a peatland serves varied functions in the national history of Indonesia, for example, as natural resources in the form of germ plasm and timber commodity, as a place for fish to live, and as a warehouse where carbon is stored, thus playing the role of climate balancer.

In order to prevent the peat function from changing, every country shares the same interest in maintaining and increasing this natural resource and climate balancer to provide the maximum benefit for people's welfare, both for current and future generations, for both national and global society. In order for the peatland to have sustainable benefits at the desired quality, Peatland Ecosystem Protection and Management programs have been essential.

The Peatland Ecosystem Protection and Management plan governs planning, utilization, control, maintenance, and administrative sanctions. The planning includes Peatland Ecosystem inventory, Peatland Ecosystem determination, and Peatland Ecosystem Protection and Management plan drafting and stipulation. The Peatland utilization is determined based on the Peatland Ecosystem Protection and Management plan. The damage control of Peatland Ecosystems is made by establishing damage standard criteria for Peatland Ecosystems and implementing environmental permit instruments for businesses and/or activities utilizing Peatland Ecosystems, which are required to have an environmental impact assessment as well as environmental management efforts and environmental monitoring efforts. The Peatland Ecosystem Protection and Management plan includes Peatland maintenance, administrative sanction implementation, and monitoring of the compliance of the person in charge of businesses and/or activities with this Government Regulation and the environmental permit.

II. ARTICLE BY ARTICLE

Article 1

Self-explanatory.

Article 2

Self-explanatory.

Article 3

Self-explanatory.

Article 4

Self-explanatory.

Article 5

Self-explanatory.

Article 6

Paragraph (1)

Point a

In delineating the satellite image which has been geometrically corrected, land system, soil, river network, and digital elevation maps are also used.

Point b

Self-explanatory.

Paragraph (2)

Self-explanatory.

Paragraph (3)

Self-explanatory.

Paragraph (4)

Self-explanatory.

Paragraph (5)

Self-explanatory.

Article 7

Self-explanatory.

Article 8

Self-explanatory.

Article 9

Paragraph (1)

Self-explanatory.

Paragraph (2)

Self-explanatory.

Paragraph (3)

Self-explanatory.

Paragraph (4)

Point a

Self-explanatory.

Point b

The term "endemic germ plasm" means a genetic resource found only in a certain region, site, habitat type, or certain islands, and it cannot be found naturally anywhere else.

Point c

Self-explanatory.

Point d

Self-explanatory.

Paragraph (5)

Self-explanatory.

Paragraph (6)

Self-explanatory.

Article 10

Self-explanatory.

Article 11

Self-explanatory.

Article 12

Self-explanatory.

Article 13

Self-explanatory.

Article 14

Self-explanatory.

Article 15

Self-explanatory.

Article 16

Self-explanatory.

Article 17

Self-explanatory.

Article 18

Self-explanatory.

Article 19

Self-explanatory.

Article 20

Self-explanatory.

Article 21

Paragraph (1)

Point a

Self-explanatory.

Point b

Self-explanatory.

Point c

The education in this provision excludes the provision of infrastructures for education.

Point d

The term "environmental service" means limited tourism and carbon trade.

The term "limited tourism" means any activity of visiting, observing, enjoying Peat uniqueness and plant and animal diversity existing within the Peatland Ecosystems.

Paragraph (2)

Self-explanatory.

Article 22

Self-explanatory.

Article 23

Paragraph (1)

Self-explanatory.

Paragraph (2)

Point a

Self-explanatory.

Point b

The term "pyrite sediment is exposed" means the pyrite sediment occurs or is discovered in the oxidation zone or it is no longer submerged in water.

The term "quartz sediment is exposed" means quartz is exposed to the surface or the quartz is no longer covered by the Peat layer.

Point c

Self-explanatory.

Paragraph (3)

Self-explanatory.

Article 24

Self-explanatory.

Article 25

Self-explanatory.

Article 26

Point a

Self-explanatory.

Point b

The term "drainage" means the canal directly flowing water out of the Peat Hydrologic Entity, such as when it flows water directly from the Peat Hydrological Entity to the river or sea.

Point c

Self-explanatory.

Point d

Self-explanatory.

Article 27

Self-explanatory.

Article 28

Self-explanatory.

Article 29

Self-explanatory.

Article 30

Paragraph (1)

Self-explanatory.

Paragraph (2)

Self-explanatory.

Paragraph (3)

Point a

The term "rehabilitation" means the recovery effort to restore the function and improve the Peatland Ecosystems can be performed, among other things, through revegetation.

Point b

The term "restoration" is a recovery effort to make the Peatland Ecosystems or parts thereof function once again like they did.

Point c

Self-explanatory.

Paragraph (4)

Self-explanatory.

Article 31

Self-explanatory.

Article 32

Self-explanatory.

Article 33

Self-explanatory.

Article 34

Self-explanatory.

Article 35

Self-explanatory.

Article 36

Self-explanatory.

Article 37

Self-explanatory.

Article 38

Self-explanatory.

Article 39

Self-explanatory.

Article 40

Self-explanatory.

Article 41

Self-explanatory.

Article 42

Self-explanatory.

Article 43

Self-explanatory.

Article 44

Self-explanatory.

Article 45

Self-explanatory.

Article 46

Self-explanatory.

Article 47

Self-explanatory.

SUPPLEMENT TO STATE GAZETTE OF THE REPUBLIC OF INDONESIA NUMBER
5580

PRESIDENT OF THE REPUBLIC OF INDONESIA

**REGULATION OF THE REPUBLIC OF INDONESIA
NO. 57 YEAR 2016**

**ON
AMENDMENT OF GOVERNMENT REGULATION NO. 71 YEAR 2014
ON PEAT ECOSYSTEM PROTECTION AND MANAGEMENT**

BY THE GRACE OF GOD ALMIGHTY

PRESIDENT OF THE REPUBLIC OF INDONESIA

- Considering:
- a. WHEREAS, peat ecosystem is vulnerable and the land had been damaged by forest and land fires in 2015, thus intensive efforts are necessary to protect and manage them;
 - b. WHEREAS, Government Regulation No. 71/2014 on Protection and Management of Peat Ecosystem needs to be enhanced to respond public legal development and needs;
 - c. WHEREAS, based on the consideration under point a and b hereof, it is necessary to stipulate Government Regulation No. 71/2014 on Protection and Management of Peat Ecosystem.
- In view of:
1. §5.2 of the Constitution of the Republic of Indonesia Year 1945;
 2. Law 32 of 2009 on Environmental Protection and Management (State Gazette of the Republic of Indonesia Year 2009 No. 140, Supplement of State Gazette of the Republic of Indonesia No. 5059);
 3. Government Regulation No. 71/2014 on Protection and Management of Peat Ecosystem (State Gazette of the Republic of Indonesia Year 2014 No. 209, Supplement of State Gazette of the Republic of Indonesia No. 5580).

DECIDES TO:

**Stipulate : GOVERNMENT REGULATION ON AMENDMENT OF
GOVERNMENT REGULATION NO. 71 YEAR 2014 ON PEAT
ECOSYSTEM PROTECTION AND MANAGEMENT.**

Article I

Several provisions under Government Regulation No. 71/2014 on Protection and Management of Peat Ecosystem (State Gazette of the Republic of Indonesia Year 2014 No. 209, Supplement of State Gazette of the Republic of Indonesia No. 5580) shall be amended into the following.

-
1. Provision of §1 point 2 thereof shall be amended into the following:

§1

The following definitions shall apply hereto.

1. Peat Ecosystem Protection and Management means systematic, integrated efforts carried out to preserve peat ecosystem functions and prevent against Peat Ecosystem damage, including planning, use, control, maintenance, supervision and law enforcement.
 2. Peat means organic materials naturally formed out of plant remainder not completely decomposed, of 50 cm thick or more and accumulated in swamps.
 3. Peat Ecosystem means an order of peat elements constituting one comprehensive, integrated unit and affecting one another in forming its balance, stability and productivity.
 4. Peat Hydrologic Unit means Peat Ecosystem situated between two (2) rivers, between river and sea, and/or in the swamp.
 5. Minister means the minister who administers governmental affairs in the field of environmental protection and management.
2. Provision of §9.3 thereof shall be amended into the following.

§9

- (1) Determination of Peat Ecosystem function under §4.b hereof shall be carried out by Minister upon coordination with:
 - a. minister administering governmental affairs on forestry and minister administering governmental affairs on water resources and spatial planning in case the peat ecosystem to be gazetted is located within forest area; and
 - b. minister administering governmental affairs on water resources and spatial planning in case the peat ecosystem to be gazetted is located outside forest area.
- (2) Peat Ecosystem function under paragraph (1) of this article hereof shall include:
 - a. Peat Ecosystem protection function; and
 - b. Peat Ecosystem cultivation function.

-
- (3) Minister shall set Peat Ecosystem protection function to cover at least thirty per cent (30%) of the total area of Peat Hydrologic Unit whose location starts from one (1) or more peat domes.
 - (4) In case the following areas are still found outside the coverage of 30% under paragraph (3) of this article hereof:
 - a. peat of three (3) metres thick or more;
 - b. specific and/or endemic germplasm;
 - c. species protected under applicable laws and regulation; and/or
 - d. Peat Ecosystem situated in protected area as gazetted in provincial/district/municipal spatial planning, protected forest area and conservation forest area,

Minister shall decide that the area delivers Peat Ecosystem protection function.

- (5) Area of Peat Hydrologic Unit under paragraph (3) and (4) of this article hereof shall be based on final map of Peat Hydrologic Unit provided under §7 hereof.
 - (6) Where Peat Ecosystem does not meet requirement under paragraph (3) and (4) of this article hereof, Minister shall gazette its Peat Ecosystem cultivation function.
3. Provision of §10.2 point b thereof shall be amended and point c be removed, thus §10 thereof shall read as follow.

§10

- (1) Peat Ecosystem function set by Minister as protection and cultivation functions as provided under §9 hereof shall be represented by Peat Ecosystem function map.
- (2) The Peat Ecosystem function map under paragraph (1) of this article hereof shall comprise:
 - a. national Peat Ecosystem function map presented with scale of at least 1:250,000;
 - b. provincial and district/municipal Peat Ecosystem function map presented with scale of at least 1:50,000;
 - c. *removed.*

-
4. Provision of §11.4 thereof shall be amended, while §11.5 and §11.6 thereof removed, thus §11 thereof shall read as follow.

§11

- (1) Peat Ecosystem with cultivation function may be converted into Peat Ecosystem with protection function.
 - (2) Conversion of the Peat Ecosystem under paragraph (1) of this article hereof shall be:
 - a. carried out by Minister; or
 - b. be based on governor or district head/mayor proposal, as the case may be, to Minister.
 - (3) The Peat Ecosystem function conversion under paragraph (1) of this article hereof shall be made based on the following reasons:
 - a. Peat Ecosystem meets the requirement provided under §9.4 point c and d;
 - b. due to ecologic urgency to take preventive or restorative measure in and/or around Peat Ecosystem; and/or
 - c. due to ecologic urgency to make effort to reserve Peat Ecosystem at provincial or district/municipality level.
 - (4) The Peat Ecosystem function conversion under paragraph (1) of this article hereof shall be authorised by Minister upon coordination with minister administering governmental affairs on water resources, minister administering governmental affairs on spatial planning, other relevant ministers, as well as governor and/or district head/mayor as the case may be.
 - (5) *Removed*
 - (6) *Removed.*
5. Provision of §14.3 thereof shall be amended, thus §14 thereof shall read as follow.

§14

- (1) The planning for Peat Ecosystem Protection and Management under §4 point c hereof shall include:
 - a. national plan of Peat Ecosystem Protection and Management;
 - b. provincial plan of Peat Ecosystem Protection and Management; and

-
- c. district/municipal plan of Peat Ecosystem Protection and Management.
- (2) The national plan of Peat Ecosystem Protection and Management under paragraph (1) point a of this article hereof shall be made for interprovincial Peat Ecosystem Protection and Management.
 - (3) The provincial plan of Peat Ecosystem Protection and Management under paragraph (1) point b of this article hereof shall be made for interdistrict/city Peat Ecosystem Protection and Management;
 - (4) The district/municipal plan of Peat Ecosystem Protection and Management under paragraph (1) point c of this article hereof shall be made for Peat Ecosystem Protection and Management in one single district/municipal territory.
6. Provision of §16.1, §16.2, §16.3 and §16.4 thereof shall be amended, thus §16 thereof shall read as follow.

§16

- (1) The national plan of Peat Ecosystem Protection and Management under §15.1 hereof shall be made and authorised by Minister upon coordination with:
 - a. minister administering governmental affairs on spatial planning;
 - b. minister administering governmental affairs on water resources;
 - c. minister administering governmental affairs on national planning and development; and
 - d. other relevant ministers
 - (2) The provincial plan of Peat Ecosystem Protection and Management under §15.2 hereof shall be made and authorised the relevant governor;
 - (3) The district/municipal plan of Peat Ecosystem Protection and Management under §15.3 hereof shall be made and authorised by district the relevant head/mayor.
 - (4) The authorisation of Peat Ecosystem Protection and Management under paragraph (2) and (3) of this article hereof shall be carried out upon prior technical consultation and approved by Minister.
7. Provision of §17.2 thereof shall be amended, thus §17 thereof shall read as follow.

§17

-
- (1) Peat Ecosystem Protection and Management plan shall contain at least the following:
 - a. Peat Ecosystem use and/or allocation;
 - b. Peat Ecosystem quality and/or function maintenance and protection;
 - c. Peat Ecosystem control, monitoring, and use and preservation; and
 - d. adaptation to and mitigation of climate change.

 - (2) The Peat Ecosystem Protection and Management Plan under paragraph (1) of this article hereof shall take into account:
 - a. diversity of physical and biophysical characteristics of the ecological functions;
 - b. distribution of natural resources potentials;
 - c. climate change;
 - d. population distribution;
 - e. local wisdom;
 - f. community aspiration;
 - g. provincial and/or district/municipal spatial plan; and
 - h. restorative efforts from Peat Ecosystem damage.

 - (3) Peat Ecosystem Protection and Management Plan shall be part of environmental protection and management plan.
8. Provision of §18.2 thereof shall be amended, thus §18 shall read as follow.

§18

- (1) In case where Peat Ecosystem with cultivation function is converted into Peat Ecosystem with protection function as provided under §11 hereof, the authorised Peat Ecosystem Protection and Management Plan under §16 hereof shall be adjusted.

 - (2) Adjustment of Peat Ecosystem Protection and Management Plan shall be conducted by governor or district head/mayor after technical consultation and Minister's approval.
9. One (1) article shall be inserted between §22 and §23, namely §22A that shall read as follow.

§22A

-
- (1) Peat Ecosystem damage prevention under §22.2 hereof shall be implemented using the following methods:
 - a. preparation of technical regulation;
 - b. development of early detection system;
 - c. strengthening of governmental institutional capacity and community endurance;
 - d. improvement of community legal awareness; and/or
 - e. securing fire-prone and previously burnt areas.

 - (2) The preparation of technical regulation as provided under point a of paragraph (1) of this article hereof shall cover:
 - a. authorisation of Peat Hydrologic Unit map as provided under §7 hereof;
 - b. authorisation of protection and cultivation functions, particularly in the Peat Hydrologic Unit area under §9 to §12 hereof; and
 - c. implementation of evaluation and audit of permit issuance for peatland use.

 - (3) Development of the early detection under point b of paragraph (1) of this article hereof shall include the following:
 - a. installation of one-off and continuous air quality monitoring device and use of various early detection technologies;
 - b. processing of information from a wide range of sources including community report; and
 - c. notification to community on potentials of land and forest fires occurrence.

 - (4) The strengthening of governmental institutional capacity and community endurance under point c of paragraph (1) of this article hereof shall include:
 - a. strengthening of coordination at central and local levels based on the applicable laws and regulations;
 - b. strengthening of institutional capacity on area management at site level of Forest Management Unit (FMU);
 - c. engagement of community elements including fire aware community, village community group, civil society organisation and volunteers based on the applicable laws and regulations;
 - d. strengthening of school institution in forest and land fire-prone areas by establishing environmentally aware student group under local government development; and

-
- e. training, assistance, access to public information, partnership pattern and development of mechanism of innovative corporate socially and environmentally responsible use to improve community economy.
10. Provision of point a of §23.3 hereof shall be amended and three (3) paragraphs added, namely paragraph (4), (5) and (6), thus §23 shall read as follow.

§23

- (1) Peat Ecosystem damage may strike:
 - a. Peat Ecosystem with protection function; and
 - b. Peat Ecosystem with cultivation function.
 - (2) Peat Ecosystem with protection function shall be declared to have been damaged when the following standard damage criteria are met:
 - a. manmade drainage is found in the authorised Peat Ecosystem with protection function;
 - b. pyrite and/or quartz sediments underlying the Peat layer are exposed; and/or
 - c. land cover area and/or volume in the authorised Peat Ecosystem with protection function shrinks;
 - (3) Peat Ecosystem with cultivation function shall be declared to have been damaged when the following standard damage criteria are met:
 - a. water table in the Peatland reaches more than zero point four (0.4) m below the Peat surface at point of compliance; and/or
 - b. pyrite and/or quartz sediments underlying the Peat layer are exposed.
 - (4) The water table measurement under point a of paragraph (3) of this article hereof shall be carried out at the instructed point of compliance.
 - (5) The point of compliance under paragraph (4) of this article hereof shall be set based on the land characteristics, topography, water management zone, canal and/or water system.
 - (6) Provision on procedure of water table measurement at point of compliance shall be regulated under Minister Regulation.
11. Provision of point a and c of §26 thereof shall be amended and added 1 (one) paragraph, namely paragraph (2), thus §26 thereof shall read as follow.

§26

- (1) No one shall:
 - a. clear any lands in Peat Ecosystem area until the establishment of zoning of protection and cultivation for particular plants;
 - b. construct drainage leading to dried Peat;
 - c. burn Peatland and/or allow fires to take place; and/or
 - d. carry out any other activities leading to exceed the Peat Ecosystem standard damage criteria under §23.2 and §23.3 hereof.
- (2) Further provision concerning the particular plants under point a of paragraph (1) of this article hereof shall be governed by Minister Regulation.

12. Provision of paragraph (3) and (4) of §30 thereof shall be amended, thus §30 thereof shall read as follow.

§30

- (1) Person in charge (PIC) of business and/or activity using Peat Ecosystem that causes damage to Peat Ecosystem within or outside the business concession and/or activity location shall carry out restoration in accordance with obligations provided under the environmental permit.
- (2) The restoration within and outside business concession and/or activity location under paragraph (1) of this article hereof shall be carried out by the business and/or activity PIC as provided under §27.2 hereof.
- (3) Restoration shall be carried out with the following:
 - a. natural succession;
 - b. rehabilitation;
 - c. restoration; and/or
 - d. other manners in line with scientific and technological advancement.
- (4) Further provision on technical guide to Peat Ecosystem function restoration shall be governed under Minister Regulation.

13. One (1) article shall be inserted between §30 and §31, namely §30A that shall read as follow.

§30A

-
- (1) The restoration under point c of §30.3 hereof shall be carried out using the following:
 - a. application of restoration techniques including water management on site level;
 - b. construction, operation and maintenance works including Peat rewetting infrastructure management; and/or
 - c. application of local wisdom-based cultivation.
 - (2) The restoration under paragraph (1) of this article hereof shall be carried out taking into account research and development and in accordance with scientific advancement and international perspective.
 - (3) Provision on technical guide to implementation of the activity under paragraph (1) of this article hereof shall be regulated by Minister Regulation.
14. Two (2) articles shall be inserted between §31 and §32, namely §31A and §31B that shall read as follow.

§31A

In case the restoration under §31 hereof is carried out due to fire and the business and/or activity PIC fails to restore Peat Ecosystem function as provided under §30 hereof within the period of thirty (30) days as of the date when the occurrence of fire was recognized, Minister, governor and district head/mayor shall coordinate to restore the Peat Ecosystem function at the expense of the PIC to cover field implementation costs.

§31B

- (1) In case of business concession and/or activity location where Peat has burnt, the Government may take actions to save and temporarily take over the previously burnt area.
- (2) The temporary takeover of the previously burnt area shall be carried out to allow verification by Minister.
- (3) Verification output may take form of the following:
 - a. further management by business and/or activity PIC; and
 - b. reduction of business concession and/or activity area.
- (4) Provision on procedure of takeover of previously burnt area by the Government under paragraph (1) of this article hereof shall be regulated by Minister Regulation.

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15. One (1) article shall be inserted between §32 and §33, namely §32A that shall read as follow.

§32A

- (1) Restoration of ecosystem function in Peatland and peat forest other than the area under §30 hereof shall be the Government responsibility.
- (2) Restoration of ecosystem function in Peatland and peat forest areas belonging to other uses shall be local government responsibility.
- (3) Restoration of ecosystem function in Peatland and peat forest owned by community or customary law community shall be the community or customary law community responsibility.

16. Provision of §44.1 shall be amended, thus §44 shall read as follow.

§44

- (1) Any business and/or activity PIC using Peat Ecosystem in violation of §30, §31, and §31A hereof shall be punishable with administrative sanction charged by the Government as provided under §40.3 hereof.
- (2) In case the business and/or activity PIC using Peat Ecosystem fails to observe the Government charge under paragraph (1) of this article hereof, Minister, governor or district head/mayor shall charge temporary suspension of environmental permit as the administrative sanction.
- (3) In case the business and/or activity PIC using Peat Ecosystem fails to observe the temporary suspension of environmental permit under paragraph (2) of this article hereof, Minister, governor, or district head/mayor shall revoke the environmental permit as the administrative sanction.
- (4) Further provision on criteria and duration in complying with the Government charge, the suspension and the revocation of environmental permit shall be regulated by Minister Regulation.

Article II

This Government Regulation shall take effect as of the promulgation date.

For public cognizance, this Government Regulation shall be announced by publishing it in the State Gazette of the Republic of Indonesia.

**Stipulated in Jakarta
on 2 December 2016
PRESIDENT OF THE REPUBLIC OF
INDONESIA
JOKO WIDODO**

**Promulgated in Jakarta
on 6 December 2016
MINISTER OF LAW AND HUMAN RIGHTS
OF THE REPUBLIC OF INDONESIA
YASONNA H. LAOLY**

STATE GAZETTE OF THE REPUBLIC OF INDONESIA YEAR 2016 NO. 260

**Certified as true copy
MINISTRY OF STATE SECRETARY
OF THE REPUBLIC OF INDONESIA
Assistant Deputy of Economic Affairs,
Deputy of Law and Regulation
[name unreadable]**

**ELUCIDATION
OF
REGULATION OF THE REPUBLIC OF INDONESIA
NO. 57 YEAR 2016
ON
AMENDMENT OF GOVERNMENT REGULATION NO. 71 YEAR 2014
ON PEAT ECOSYSTEM PROTECTION AND MANAGEMENT**

I. GENERAL

Forest and land fires in Indonesia until October 2015, have reached an area of one million and seven hundred thousand (1,700,000) hectares. One of the causes of forest and land fires is mismanagement of business activities on peatland.

In accordance with the characteristics of the Peat Ecosystem, Peat hydrological areas should not be disturbed. This means that such areas should not be used for land use that may harm the Peat Hydrologic Unit functions.

As a matter of fact, great fires occur in Peatlands, particularly in South Sumatera, Central Kalimantan and some parts of Riau, Jambi and South Kalimantan Provinces, indicating extreme difficulty in extinguishing the fires.

Therefore, it is imperative that amendment be made to the Government Regulation No. 71/2014 on Peat Ecosystem Protection and Management.

II. ARTICLE BY ARTICLE

Article I

Point 1

Self-explanatory.

Point 2

§9

Paragraph (1)

Self-explanatory.

Paragraph (2)

Self-explanatory.

Paragraph (3)

Self-explanatory.

Paragraph (4)

-
- Point a
 - Self-explanatory.*
 - Point b
 - 'Endemic germplasm' shall mean genetic resources only found in particular area, location, habitat type or island, which are not naturally found in any other location.
 - Point c
 - Self-explanatory.*
 - Point d
 - Self-explanatory.*
 - Paragraph (5)
 - Self-explanatory.*
 - Paragraph (6)
 - Self-explanatory.*
 - Point 3
 - §10
 - Self-explanatory.*
 - Point 4
 - §11
 - Paragraph (1)
 - Self-explanatory.*
 - Paragraph (2)
 - Self-explanatory.*
 - Paragraph (3)
 - Point a
 - Self-explanatory.*
 - Point b
 - 'Ecologic urgency' shall include Peat Ecosystem having undergone fires and damage.
 - Point c
 - Self-explanatory.*
 - Paragraph (4)
 - Self-explanatory.*
 - Paragraph (5)
 - Removed.*
 - Paragraph (6)
 - Removed.*
 - Point 5
 - §14
 - Self-explanatory.*
 - Point 6
 - §16
 - Self-explanatory.*
 - Point 7
 - §17
 - Paragraph (1)
 - Self-explanatory.*
 - Paragraph (2)
 - Point a
 - Self-explanatory.*
 - Point b
 - Self-explanatory.*
 - Point c
 - Self-explanatory.*

-
- Point d
 - Self-explanatory.*
 - Point e
 - Self-explanatory.*
 - Point f
 - Self-explanatory.*
 - Point g
 - Self-explanatory.*
 - Point h
 - 'Peat Ecosystem damage' may be partly caused by forest and land fires.
 - Paragraph (3)
 - Self-explanatory.*
 - Point 8
 - §18
 - Self-explanatory.*
 - Point 9
 - §22A
 - Self-explanatory.*
 - Point 10
 - §23
 - Paragraph (1)
 - Self-explanatory.*
 - Paragraph (2)
 - Point a
 - Self-explanatory.*
 - Point b
 - 'Exposed pyrite sediments' shall mean that pyrite sediments come out or otherwise exposed to oxidation zone and no longer soaked by water.
 - 'Exposed quartz sediments' shall mean that quartz sediments are exposed out of the surface or quartz is no longer covered by peat layer.
 - Point c
 - Self-explanatory.*
 - Paragraph (3)
 - Point a
 - 'Point of compliance' shall mean location set as point for monitoring water table level in peatland.
 - Point b
 - Self-explanatory.*
 - Paragraph (4)
 - Self-explanatory.*
 - Paragraph (5)
 - Self-explanatory.*
 - Paragraph (6)
 - Self-explanatory.*
 - Point 11
 - §26
 - Paragraph (1)
 - Point a
 - Self-explanatory.*
 - Point b
 - 'Drainage' shall mean canals that directly flow water out of

Peat Hydrologic Unit, e.g. channelling water directly from Peat Hydrologic Unit to river or sea.

Point c

Sanction against 'omission of fires' shall be charged based on the applicable laws and regulations.

Point d

Self-explanatory.

Paragraph (2)

Point 12

§30

Paragraph (1)

'Peat Ecosystem damage' may be because of, among others, peat fires or natural disasters.

Paragraph (2)

Self-explanatory.

Paragraph (3)

Point a

'Natural succession' shall mean restoration without involving human intervention.

Point b

'Rehabilitation' shall mean restorative effort to restore Peat Ecosystem function through, among others, revegetation.

Point c

'Restoration' shall mean restorative effort to bring back the function of Peat Ecosystem or its parts to the initial condition.

Point d

Self-explanatory.

Paragraph (4)

Self-explanatory.

Point 13

§30A

Self-explanatory.

Point 14

§31A

Self-explanatory.

§31B

Self-explanatory.

Point 15

§32A

Self-explanatory.

Point 16

§44

Self-explanatory.

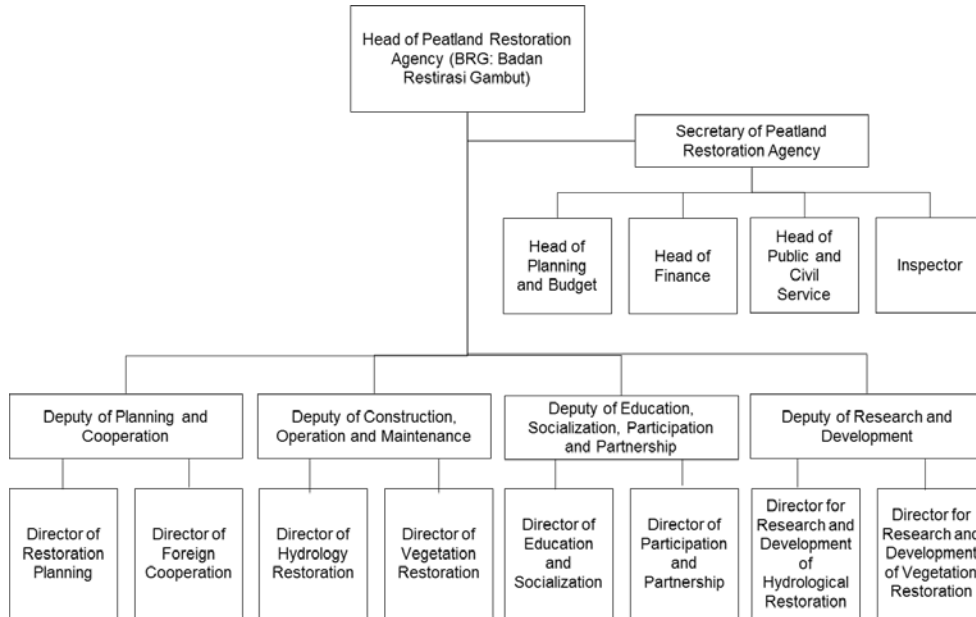
Article II

Self-explanatory.

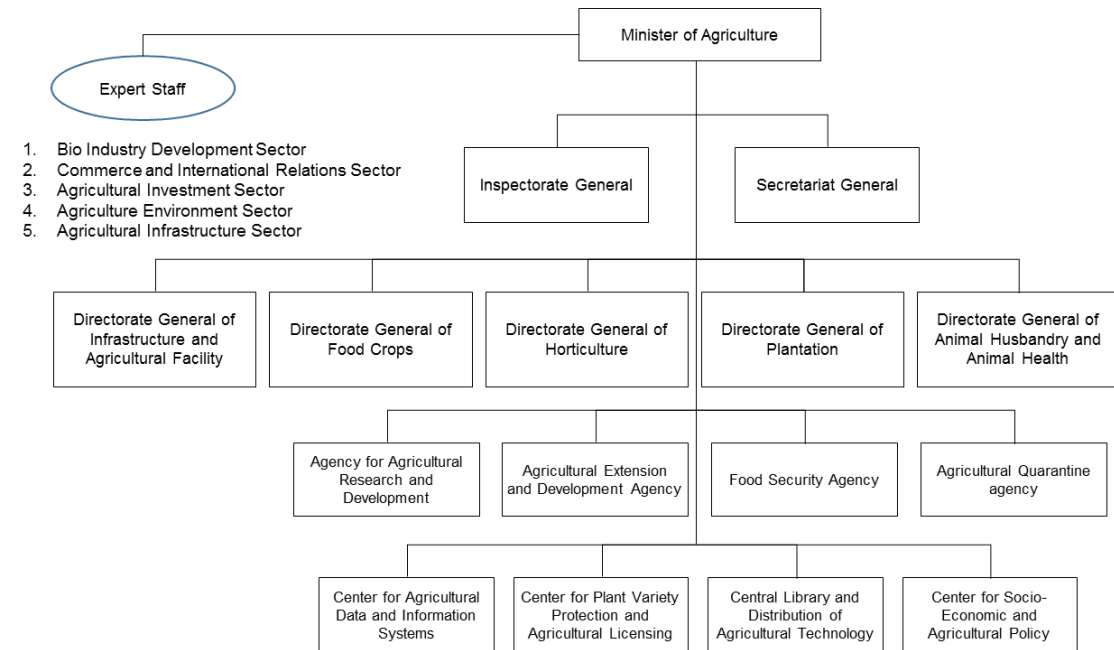
SUPPLEMENT TO STATE GAZETTE OF THE REPUBLIC OF INDONESIA NO. 5957

3 Organization Structures of Relevant Organization

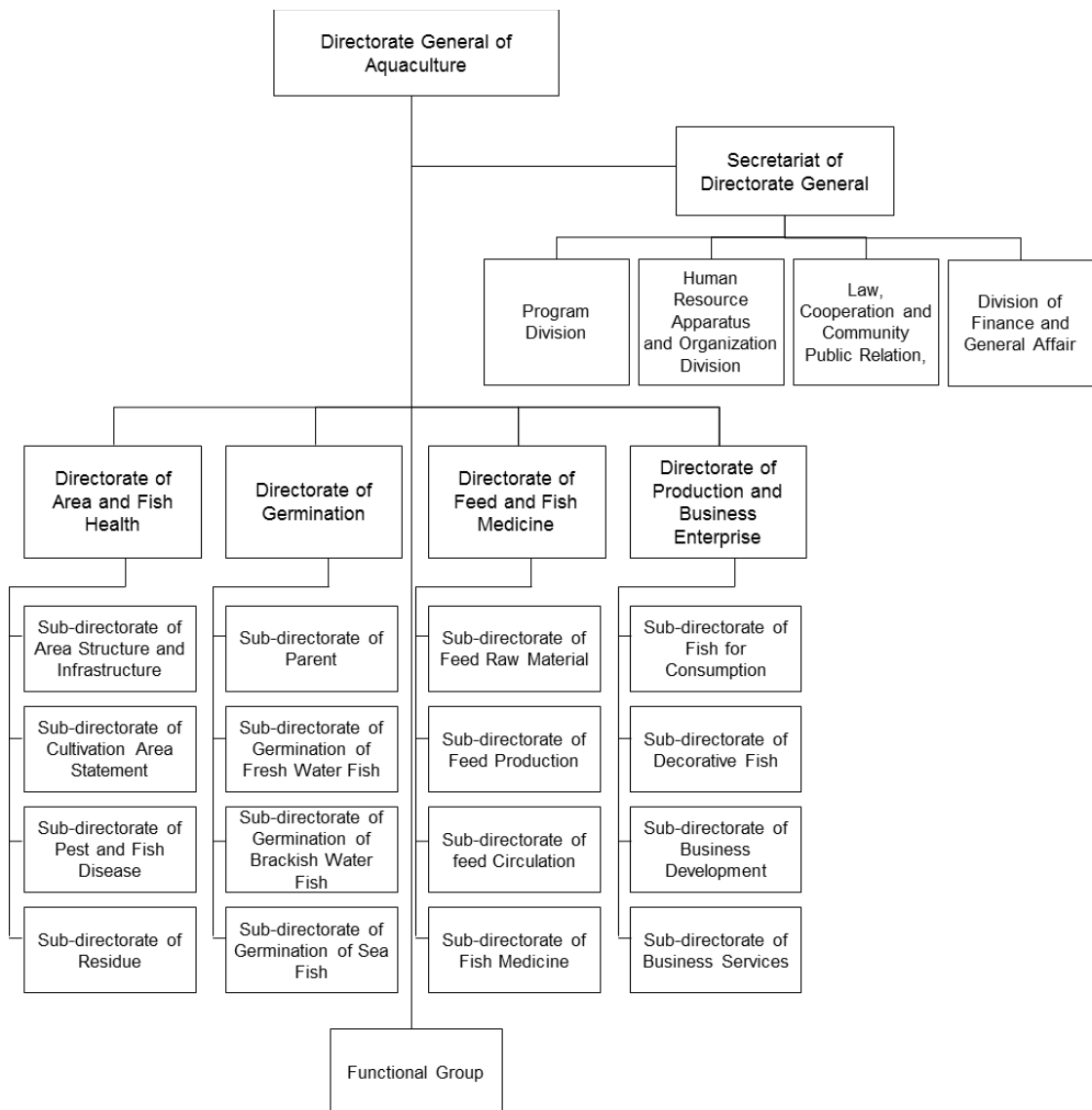
3.1. BRG/Peat Restoration Agency



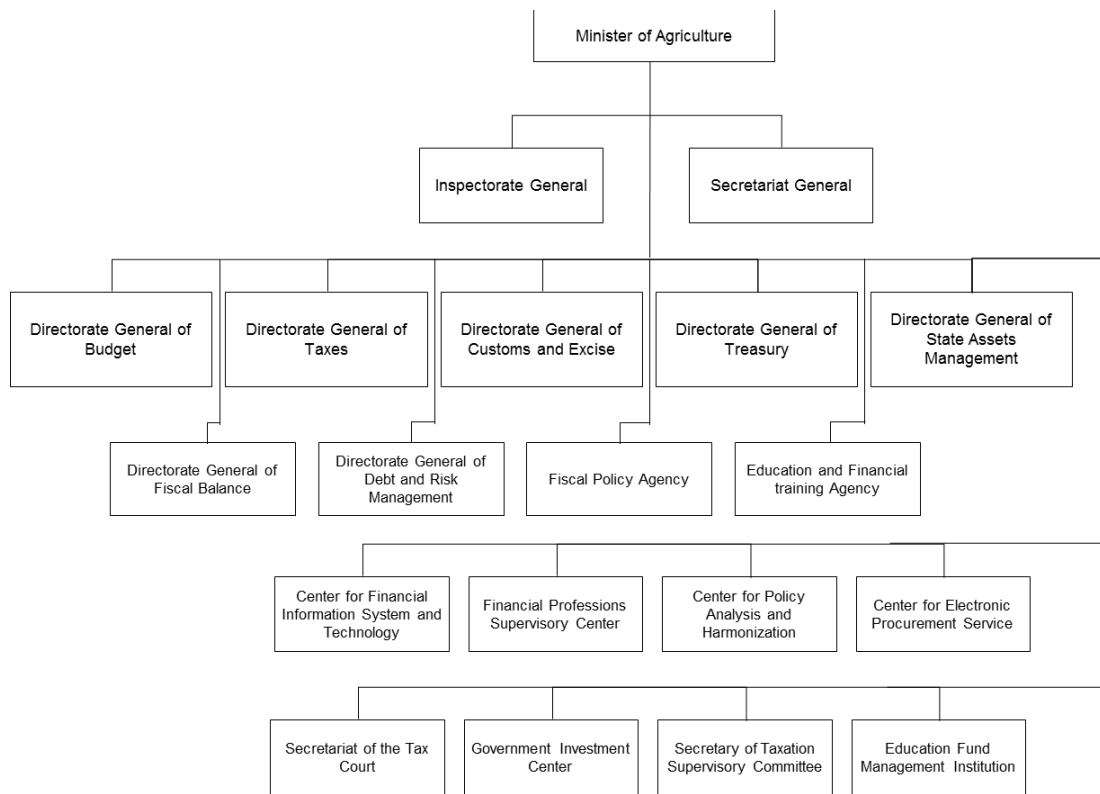
3.2. Ministry of Agriculture



3.3. Directorate General of Aquaculture, Ministry of Maritime Affairs and Fisheries



3.4. Ministry of Finance



4 Supporting Information of Profile Surveys

4.1 Introduction

Based on the results of the BRG-JICA Pre-Feasibility Study for Peatland Restoration Investment at Four Priority Areas in Indonesia, which are conducted the consortium of the three (3) universities in the target three provinces, the potential commodities crops and services in peatland environment have been identified for the target four (4) districts in three (3) provinces. Here are described the information on market analysis and cost-benefit analysis of each identified commodity and service.

4.2 Market Analysis of each Commodity

4.2.1 OKI District, South Sumatra Province

(1) Swamp Buffalo

“Gulo puan is the only product from swamp buffaloes that is produced and marketed from the area. Marketing is still limited in Palembang (Agung Mosque, Lemabang Market, and Pasar Ilir). Gulo puan business actors in OKI District sell products to Palembang on average once to twice a week, with shipping volume of 30-60 kg per shipment or sale. Consumers are limited since the product has not yet widely known, so the volume of market absorption is still limited. Its marketing distribution is still traditional and uses the path of relationship between individual producers and traders.

Pattern of gulo puan marketing chain in OKI District is done from producer or entrepreneur of gulo puan directly to trader in Palembang, which then proceeded from Palembang marketer to retailers in the area to reach the consumers. Generally, sales transactions between entrepreneurs gulo puan and traders take place in Terminal Jakabaring Palembang.

In general, there is no significant obstacle for gulo puan processors in marketing the product. The level of business competition for gulo puan processing between regions has not been seen. This is because the processed products of buffalo milk such as gulo puan newly known by the people of South Sumatra, so that the largest production market only in the area of South Sumatra Province. To increase the production, marketing, and popularity of processed products from buffalo milk, it is necessary to make buffalo milk processing technology into food products that have more economic value, popular and liked by everyone such as caramel milk candy, yoghurt drink and ice cream.

Price information is very important for manufacturers, including for gulo puan processors. From the survey conducted in the production center of gulo puan in OKI District, it was found that the price of fresh milk to be processed into gulo puan ranged from 15.000 to 20.000 rupiah per liter. After becoming gulo puan, then the price at the merchant level of 60.000 rupiah per kg and at the consumer level of 90.000 per kg.

(2) Swamp Fishery

The salted fish and smoked fish products from OKI District are mostly (90%) marketed outside the province, with the highest demand from Bandung, Bogor and Padang for salted fish, while Medan City for smoked fish. Nevertheless, there are still salted and smoked fish products marketed in the local market, with sales amounting to 10 % of total production. For local marketing, buyers generally come to the location directly, while sales to other regions are by sending by land transport to buyers outside the region.

Market expansion from production areas to other areas has tended to increase along with the better transportation facilities and infrastructure. The ordinal businessmen of the salted fish industry are able to sell salted fish products out of the region of 100 kg per day, delivered twice a week, with shipping volume of 300 kg per shipment or sale.

The marketing pattern of salted fish and smoked fish in OKI District is generally the same, that is through two marketing channels. First (95%) is from producers or entrepreneurs of salted fish and smoked fish directly to wholesalers in Bandung, Medan, and Padang area then proceed to retailers in the area to reach consumers. While the second marketing chain from producers directly to retailers or consumers who come to the location of the business (5 %).

In the marketing of salted fish and smoked fish, there are generally no significant constraints felt by businessmen, traders, or collectors. That is, for salted fish and smoked fish entrepreneurs, regardless of the product produced is always exhausted due to paid to the wholesalers and the demand has been stable, they generally already have a regular customer. The problem faced is the unavailability of a proper warehouse as storage place before being marketed to the merchant, so that the products cannot be stored long by producers. Each product that has dried directly packing and sent to a wholesaler outside the area.

Competitors of salted fish and smoked fish in OKI District between districts have not been seen yet. This is because the largest market outside the province, so the competition occurs at the national level, generally with salted fish and smoked fish products from Bengkulu, Jambi, North Sumatra, East Java and West Java.

Salted fish produced from OKI District has the specification of river fish with the most type of fish type sepat, while from other areas of the sea fish. Generally, salted fish and smoked fish processors have regular customers or outside fixed-field collectors. Whatever amount can be produced by salted fish processors and smoked fish can be accommodated by collectors or wholesalers outside the region. Therefore, the market for salted fish and smoked fish business is not the main problem.

Competition that may occur is the competition to get cheap fish raw materials and in sufficient quantities. This is because fishermen have two options to market their fish, which are marketed as fresh fish or processed into salted fish or smoked fish. In addition, the production of fresh fish that is not continuous, because depending on the season often makes it difficult for salted fish and smoked fish entrepreneurs to procure continuous raw materials at a stable price.

Thus, what should be done is how to fish entrepreneurs can keep the stock of raw materials in a long time and can produce salted fish and smoked fish quality and hygienic. Qualified, meaning not only process fish that have no economic value when sold in a fresh state.

Need to develop and enrich the type of dried fish produced. The low level of consumption per capita, the rising export value, the increasing number of catches, and the increasing of regional opening and the improvement of the transportation means provide an opportunity for salted fish and smoked fish entrepreneurs to keep increasing their production, both quantity and quality.

Market opportunities can also be created by expanding fish markets and diversifying salted fish and smoked fish both horizontally and vertically. Diversification of salted fish and smoked fish products means to enrich the type of fish that is processed into salted fish and smoked fish because it is still limited to fish for fish production, and catfish for the production of smoked fish. This needs to be done as one effort to share business risk. If the price of fresh fish drops, then process it into salted fish and smoked fish is an alternative that may be done. While the definition of vertical divesifikasi is developing salted fish and smoked fish products into downstream products that have higher added value than sold in the form of "asalan".

Price information is very important for producers, including for salted fish and smoked fish entrepreneurs. From the survey conducted in the production centers of salted fish and smoked fish in OKI District it was found that the price of fresh fish to be processed into salted fish ranged from 8.000 to 15.000 rupiah per kg with an average price of 10.000 rupiah per kg. As for catfish that will be smoked has a price 14.000 - 18.000 rupiah per kg, with the average price 16.000 rupiah per kg.

After becoming salted fish and smoked fish, the price at the consumer level averages 40.000 rupiah per kg for the salted fish, and 100.000 rupiah per kg for smoked fish. The selling price applies to marketing in local markets (buyers coming) as well as to buyers who are out of town. But the difference is that buyers who come to the location can choose the shape and quality of the existing salted fish, whereas if the buyers who produce salted fish are delivered on the spot, can not choose according to their wishes only.

(3) Purun

Processed purun products are generally made by order for a fixed activity. Product types, quantities, designs and motifs are adjusted to the taste and needs of the buyer. Thus, the distribution and marketing of purun processed products to date can be said to be closed. However, as one of the regional superior products, the local government has attempted to introduce and promote it through special outlets in the district capital.

Because the purun product is still based on order, the income from this business depends on the volume of ordering. Because the order depends on the event will take place, then the volume of ordering and craftsmen income also depends on the frequency and level of event.

Marketing method of purun handicraft in Ulak Kemang village still simple and conventional that is by waiting prospective buyer to come and ordering purun handicraft in the location and entrust some products

at place which have established cooperation that is “Toko Anisa”. Other than the product is exhibited at the local school cooperative. Because the product is influenced by business continuity, the product tends to have same motif but with different models and forms. Most of the purun handicraft demand in Ulak Kemang village comes from OKI local government through large orders.

As one of the handicraft business, this handicraft products need hand skill and tenacity, so the product has art and high sell value. Skill and tenacity of purun craftsmen in Ulak Kemang village is shown with their ability to fulfill the new model order, as long as the model comes from buyer. The weakness of the purun craftsmen is the lack of model innovation, because the craftsmen will create a new model when there is orders from buyers.

There is no competitor in purun handicraft between district yet. This is because the largest production market out of the province, so the competition occurs at the national level, in general the competitors are from West Java province, West Sumatera province and also Kalimantan island. However, purun handicrafts of OKI district often get orders from various countries and also private agencies.

In the meantime, the competition that occurs among craftsmen in OKI district and South Sumatera Province is not very clear. In general, purun handicraft business is dominated by Ulak Kemang village, Pampangan sub district. While in the Pedamaran area, the quality of the handicraft is still inferior to the craft produced by Ulak Kemang village. Regardless of the amount that can be generated by the handicraft entrepreneurs can be accommodated by merchant collector or wholesalers outside the region such as in “Toko Anisa”, Kayu Agung. Therefore, the market for handicrafts is not the main problem.

Competition might happen to get raw materials of purun and woven purun which ready to be made into handicraft. Problems related with the raw material are the process of taking purun plant that is usually can only take 10 bundles per day, so it is very difficult for purun craftsmen when getting a lot of orders.

Great opportunities can also be created by expanding markets and providing product variations resulting from purun handicrafts, both horizontally and vertically. This is needed as one effort to share business risks. Purun handicraft business has a huge opportunity to compete with other provinces because of its high selling value and market demand.

Purun’s craft is a handicraft product produced from simple and cheap raw materials but has artistic value. The average of purun handicraft products like a mat is sold at a price 25.000 –30.000 rupiah per pcs, purun bags at 40.000 –50.000 rupiah per pcs, purse at 25.000rupiah per pcs, sandals at 12.000 rupiah per pcs, pencil cases 7.000 rupiah per pcs. The difference of selling price is not only caused by the amount or raw material usage, but rather cause the model has a higher level of difficulty and art in the making process.

(4) Lowland Rice Field

Rice crops are generally marketed locally to meet local needs. This is because of the rice production in lowland is still low due to the planting can be done only once a year. When land optimization is successful and production can be increased, rice surplus increased and marketing can be expanded.

The income of lowland rice farmers is still low because farmers has not managed to overcome natural obstacles. If these natural constraints can be overcome with technology, then farmers can increase productivity and household farmers income can be improved.

Rice product produced by farmers in the form of dry grain harvest and it is sold to middlemen or collectors who come directly to the farmers' land. The price received by farmers ranges from 4.000 – 5.000 rupiah per kg of dry grain harvest.

There are generally no obstacles found by farmers in marketing rice production. That is, the production of rice must be sold and there must be demand from traders and middleman. But the harvest in the form of dry grain harvest is still very low price. If farmers can self-process their crops into rice and can market their rice directly to consumers without going through long marketing chains then farmers will be more profitable and the selling price of product is much higher.

(5) Liberica Coffee

Liberica coffee is one of the paludi culture options because it is suitable to be developed in peatlands. One of the peatlands that has developed liberica coffee is Tanjung Jabung Barat District, Jambi Province.

Liberica coffee has no specific market and the marketing system is still conventional. From farmers, coffee was collected by collectors and then taken to Kuala Tungkal (capital city of Tanjung Jabung Barat district). From Kuala Tungkal Liberica coffee will be marketed more widely. In addition to local buyers, there are also buyers who bring these products to Singapore and Malaysia. The market demand for liberica coffee is quite high. Therefore it needs special market innovation to raise the price. In Jambi, the price of liberica coffee is higher than Robusta and Arabica coffee, which is 25.000 rupiah per kg. There is only one cooperatives for one commodity, so that it can control the price.

The coffee produced can be divided into two types, which are unselected coffee and SOP coffee (selected coffee derived from red coffee beans). Coffee bean prices from farmers ranged from 37,000 to 38,000 rupiah per kg. They were purchased by middlemen, then from middlemen purchased by cooperatives with the price of 44,500-45,000 rupiah per kg. In the cooperatives, the price of unselected green bean was 46,000 rupiah per kg while SPO green bean was 100,000 rupiah per kg. The price of unselected coffee fruits was 3,000 rupiah per kg while the price of SOP coffee bean was 5,000 rupiah per kg.

The pre order for SOP coffee bean in the cooperatives could be reach 200 kg per month. However, sometimes this order cannot be fulfilled due to lack of coffee production, especially for the SOP type. This SOP coffee bean can be processed through 4 processes. Packaging of coffee in the marketing process is still not satisfactory, unless there is a special order for the exhibition or to be sent to another city.

(6) Betel/ Areca Palm

Betel palm is generally grown with an agroforestry pattern, with pineapple, palm oil, or coffee plant. Betel nut prices depend on and determined by the collectors. Betel nut in Tanjung Jabung Barat District has a good price after the presence of entrepreneurs from India and Malaysia who established the processing industry in Kuala Tungkal city especially the drying industry of Betel nut.

The price of betel nut depends on the quality, type, and post-harvest drying process. The betel nut should be dried in a clean and dry place, so the water content becomes quite low and the color remains brownish (not blackish). Based on these moisture levels, at the level of local exporters, betel nut can be classified into several qualities, i.e. 95, 90, 80, or ascertains. The main problem at the farmer level was the lack of quality of the betel nut because they do not know the best way of post-harvest processing. This results in the decline of betel nut prices.

In Kuala Tungkal city, particularly in Betara sub district, there is PT Aroma Jaya which already has business license for processing of young betel nut. However, operational license of this industry is not available yet. Until now, this company is in the process of physical development (infrastructure).

Young betel nut were exported to China and Korea (for candy raw materials), while old betel nut are exported to Pakistan (Karachi) and Thailand. The main destination country of betel nut that was exported to Pakistan and India. Exporters were indirectly ship to India because it will be taxed 200 percent. The 200 percent tax rate by the Indian government is intended to protect the price of betel nut at the local farmer level due to imported goods entered their country.

After the harvesting process, the farmer will split the betel nut into two parts. Furthermore, they will dry it under the sun for 1 or 2 days until the contents of the betel nut can be removed from the skin easily. After the betel nut is peeled off, the farmer will sell it to the collectors or directly to the local exporter in Kuala Tungkal city.

From local exporters, betel nut will be delivered to Jambi Province for further processing in the exporter's industries. All types of areca nut from the collectors are processed further, dried by oven, continuously sorted by quality, and finally packaged in sacks for export purposes.

At the farmer level, the price of young betel nut was 4000 - 5000 rupiah per kg, while the dry nut was 15,000 rupiah per kg. Moreover, this dried nut will be sold by the first collector at a price of 18,000 rupiah per kg. The first collectors will sell to the middle collectors in the sub districts (suppliers) at a price of 19,000-23,000 rupiah per kg. Furthermore, betel nut will be sold to local exporters.

Generally, marketing channels of betel nut was as follows:

- Farmers → Exporters,
- Farmers → First Collectors (Village Level) → Exporters,
- Farmers → First Collectors (Village Level) → Middle Collectors/Supplier (Sub district level) → Exporters

Grade of betel nut based on moisture content can be classified into 65-70, 70-75, 80-85, and 90-95 with price range 1200-1975 or 2000 USD. In general, farmers can only reach grade of 70-75. Furthermore, collectors, suppliers or local exporters will improve the grade of betel nut through the process of drying and sorting. In Jambi city there were approximately 35 companies of betel nut. There was also the Association of Betel Nut Entrepreneurs that exists in Jambi Province.

(7) Pineapple

Pineapple commodity has a big market prospect, both to fulfill requirement in domestic and abroad, in the form of fresh fruit and processed products. This can be seen from the projection of supply and demand of pineapples in 2017 -2019 conducted by the Center of Agricultural Information Systems and Data (2015), which the deficit in 2017 reached 17,149 tons and increased to 58,079 tons in 2019.

Farmers still market the crops in the form of fresh fruit, both with wholesale and retail systems. Therefore price is determined by buyer (middleman). With the post-harvest processing in the form of processed products is expected to increase the added value of pineapple. This has been done by PT Great Giant Pineapple (PT GGP) which process pineapple into various derivative products, such as canned food, juice, and enzyme bromelin which have high economic value.

In Lampung Province, there is PT GGP which has a land area of 32,000 ha and 19,000 ha of which are planted with pineapple, with a production amount of 90 tons per ha. Harvesting activities conducted in a day is 2,000 tons to meet the production needs of processed pineapple. Processed pineapple products are produced for export needs (100 %). At present, exports have been made to 60 countries, among them are countries in continental Europe, America, Asia, and the Middle East.

At this time PT GGP realized that the productivity of their land decreased and needed rest, so it cannot be continuously used to plant pineapple. Therefore, starting in 2018 will be a partnership with the community. However, the partnership model that will be applied has not been decided yet.

In addition to producing canned pineapple, PT GGP also sells pineapple in the form of fresh fruit. Fresh pineapple is sold approximately 13 kg per box, and in one box can contain 7-9 pieces. In addition to local sale (the Grade A), fresh fruit is also sold for export purposes, namely to Japan, Korea, and China.

The process of selling the crops is usually done on a whole sales basis, collecting traders will buy in bulk quantities some time before harvest. In one hectare on average will be hired at a price of 60 million to 80 million rupiah, depending on the size of the condition of fruit and fruit uniformity in the landscape with pineapple. There are two marketing chain of pineapple in Lampung Province in general namely:

- Farmers - Traders Gatherers - Large Traders in the District - Large Traders in Jakarta / Bali
- Farmers - Large Traders in the District - Large Traders in Jakarta / Bali

(8) Beriang and Gelam

Beriang and Gelam is a typical plant of peat land that is pioneer, so they have good enough ability of regeneration and growth. These plants are widely used by the community as firewood and limited construction timber. Woody plants (Beriang) are not only intended as conservation crop, but can also be harvested by copies method to preserve production, while the Gelam plants are harvested with selective logging system.

Beriang seedlings can be used natural seedling that grown in secondary forests or community gardens, or seeds obtained from the selected main tree. Beriand and Gelam seeds can be obtained by adding seeds

to the sowing beds and after germination (having 1 or 2 pairs of leaves) Is directly weaned into poly bags containing topsoil growing media and maintained in weaning beds for 3 - 4 months until ready to plant.

The nursery and sprinkling from the natural tillers takes the process of acclimatization in the form of plastic covering process. Natural seedlings removed about 5 cm in size with the number of leaves 3-4 pairs, then planted in poly bags and placed in a plastic lid for 1-2 months. The opening of the lid is done gradually for 2 weeks, then the seeds are kept as usual in the nursery until ready to plant.

Gelam and Berieng that have been cultivated by the community in OKI District still rely on the maintenance of natural seedlings with maintenance in the form of thinning (population arrangement) and cleaning of weeds. For the need of cultivation of Gelam or Berieng at a intensice specific location, seedlings cultivation can be done. Wooden and brass jugs are harvested according to the size of the product specifications that received by the market. For Gelam is done by selective cutting system, while Berieng is done with coppices system, harvesting by selecting stems as the result of trubusan methods.

Market analysis and BCR are not performed in this activity. The cultivation of Berieng and Gelam has a primary goal for peat revegetation and restoration, not for commercial purposes.

4.2.2 MUBA District, South Sumatra Province

Peat friendly superior commodities which potential to be developed in PHU of Sungai Air Hitam Laut – Sungai Buntu Kecil of MUBA District are kenaf, Areca nut, pineapple, food and horticultural crops, swamp fishery-canal blocking, and environmental service of carbon absorption.

Development pattern for superior commodities of Areca nut, pineapple, food and horticultural crops as well as swamp fishery is relatively similar to that of OKI District. Therefore, discussion on peat friendly superior commodities at MUBA District will be focused on kenaf commodity and environmental service of carbon absorption.

(1) Kenaf

Market prospect for kenaf plant is relatively promising because the market demand for fiber is relatively high. Moreover, harvest time for this plant is relatively short and is easily cultivated. According to Bambang Prayitno, kenaf plant grower from Malang of East Java, kenaf plant can be harvested within 3.5 months since its planting time. The higher yield will be achieved if kenaf plant is harvested at age of more than 3.5 months provided that sufficient water supply is available.

Demand for kenaf fiber is relatively high, but kenaf plant production is still limited because only few farmers that eager to cultivate this plant.

According to Bambang Prayitno, the price of kenaf fiber was depended on international fiber price. The current selling price of kenaf fiber is in the range of 9,000 to 20,000 rupiahs per kilogram. Its selling price can be drop to 8,000 rupiahs per kg during peak production period and can be increase up to 25,000 rupiahs per kg during low production period. Bambang could sold about 100 tons of kenaf fiber per month. He

also accommodates kenaf fiber from farmers around East Java so that his turnover could achieved 900 million rupiahs per month. Most of his kenaf fiber production was sold into automotive producers.

Other kenaf plant grower is Samsul Rusli in Samarinda, East Kalimantan. He had cultivated kenaf plant in area of 20 hectares. According to Samsul Rusli, kenaf plant should be cultivated on extensive area in order to achieve optimum kenaf fiber production. Samsul currently can produce about 10 tons of kenaf fiber per month with turnover of about 50 million rupiahs.

Bangun Sari Village in Kampar of Riau Province had been used as pilot village of kenaf plant by Plantation Council of Riau. Planting season for kenaf plant had been started in December 2013 by farmers group of Pematang Subur and the prime harvest was conducted in the end of April 2014 with planting period of 110 days. Average planting density of kenaf plant was 145 thousands per hectare and can produce 1.9 tons of kenaf fiber. The average buying price of kenaf fiber by PT Global Agrotek Nusantara as the collector was 5,000 rupiahs per kg so that each farmer can receive 9.5 millions rupiah per hectare.

Although kenaf plant cultivation is simple and profitable, but only few of farmers that interested to grow this plant. Farmers had difficulty in marketing of this kenaf fiber even though demand for kenaf fiber was relatively high. They had difficulty in developing of initial marketing network because most of buyers are big companies such as automotive industry.

There are some private companies in Indonesia that utilize kenaf fiber as main raw material such as PT Indonesia Nihon Seima in Tangerang which produce gunny sack and geotextile as well as PT Abadi Barindo Autotech (PT ABA) in Purwosari, Pasuruan of East Java Province which produce fiberboard for automotive industry which cover domestic and overseas markets. PT ABA needs kenaf fiber of about 3,000 tons per year, but this company only capable to fulfill of about 1,500 tons so that the rest should be imported from Vietnam. PT Global Agrotek Nusantara (PT GAN) currently as field management in Lamongan of East Java and Kutai of East Kalimantan and as fiber supplier to PT ABA had given production input credit without interest to farmers. PT GAN will directly deduct the credit received by farmers during fiber buying by PT GAN.

Japan automotive experts currently glance kenaf fiber as raw material for car trim production. Kenaf fiber in Japan and United States is mostly used as interior and chair for luxurious cars. Cars nowadays not only require the physical performance, but they should also light in weight and have high speed. Therefore, automotive experts had started to use lighter materials for several car components. Automotive experts nowadays select plastic because it is cheap, light, easily formed and has excellence strength. In addition, environmental issue also triggers automotive experts to develop alternative material because plastic is considered has potential as pollutant. Japan automotive experts currently glance kenaf fiber as raw material for car trim production. Kenaf fiber in Japan and United States is mostly used as interior and chair for luxurious cars. Kenaf fiber is easily formed and has excellence strength. Part of kenaf plant that is utilized for car's interior is skin of trunk which mainly contain fiber. Kenaf fiber is mixed with phenol and then it

is pressed under heating condition into flat slab similar to slices of triplex wood. Fiber slab is ready to be processed into interior materials of car such as filling material of chair and inner layer of car wall.

Kenaf plant can grow throughout year in Indonesia that has tropical climate. Some of Japanese companies are eager to enact Indonesia as kenaf fiber producer. One of the company that had been conducted trials at Balittas is PT ARACO. This company is one of first automotive company in the world that used kenaf fiber for interior of luxurious cars.

PT Araco was currently had imported kenaf fiber from Vietnam. Kenaf plant in Japan can only be cultivated one time per year due to winter season so that kenaf fiber should be imported from tropical countries. This company since the last three years had set up its branch in Indonesia because kenaf plant can be cultivated in Indonesia throughout the year.

There are four requirements that should be considered in industrial development of kenaf fiber for car interior. These requirements are as follows: supply should match with demand, quality should be match with stated requirement, cost of kenaf fiber should be competitive with cost of plastic material as well as kenaf fiber price offered by China and Vietnam as well on time delivery in order to prevent process interference for automotive industry itself.

PT Kaderaar Indonesia (KI) had classified kenaf fiber into A quality fiber which is used for luxurious car and B quality fiber which is used for car of Toyota Kijang class based on the quality standard. PT Toyota Astra Motor had produced about 5,000 units of Toyota Kijang per month. If one unit of Toyota Kijang requires 11 kg kenaf fiber, then 55 tons of kenaf fiber is required per month. However, this huge market potential cannot be fulfilled by Indonesia. In order to fulfill the demand for the whole year, kenaf should be planted and harvested for the whole year as well. Therefore, planting area should also be matched with kenaf planting for the whole year. In addition, spread seeds of superior variety that can be planted for the whole year should be provided. Because of limited agricultural land availability in Java island, then alternative for kenaf plant development is outside of Java island.

(2) Environmental Services

Specifically, in the production forest area, there is already a Regulation of the Minister of Forestry regulating the Business License for the Utilization of Environmental Services of Carbon Absorption and/or Carbon Saving namely Minister of Forestry Regulation no. P.36 Menhut-II 2009 that be settled on May 22, 2009. Business License for Utilization of Environmental Services in production forest is defined as a business license that give to utilize environmental services in production forest that have been granted permits or rights or which have not been burdened permission or rights. All above may be extended based on the evaluations results by the licensor.

Carbon absorption and/or carbon saving business is one of the most exciting business opportunities. This is not regardless from the global mechanisms associated with climate change agendas that require reducing of carbon emissions.

4.2.3 Kepulauan Meranti District, Riau Province

(1) Sago

Market prospect of sago is depending on its form during the selling. If sago is sold in form of stems or pieces, then it is only covering of local market such as within one village or between vicinity villages due to transportation difficulty and high cost. Buyers of sago pieces or stems usually are sago refineries owners which subsequently process sago pieces or stems into wet sago.

If sold as wet sago, then its market can be wider covering village up to district levels. For instance, wet sago produced in Sungai Tohor can be sold to Selat Panjang or even to Malaysia.

Sago commodity in form of sago starch can reach wider market. According to some information sources, most of sago starch produced in Kepulauan Meranti District was sold to Cirebon and sago starch from this city was further processed or resold to wider market.

Because sago starch has higher economic value, then the central government had plan to build integrated sago processing plant. This plant which worth 20 billions rupiah will have capacity to process hundreds of pieces per day and capable to process ready to sold products such as sago starch, liquid sugar, sago kerupuk, sago noddle and sago mutiara. The plan that will be put into effect within period of 2018-2020 at Sungai Tohor can absorb sago stems or pieces produced from community sago plantation as well as giving opportunity for community members to process their sago yield into products as previously cited. Development of this plant will be an asset for Sungai Tohor and will be managed by BUMDES as well as capable to absorb sago yield from community members plantation even in the simplest form, i.e. sago pieces.

(2) Straw Mushroom

Straw mushroom as food substance is extensively consumed especially in Southeast Asia or East Asia countries, including Indonesia. Therefore, market for straw mushroom is widely opened either domestic or overseas.

(3) Wood Pellet Industry

The prospect of this temporary wood pellet market is more abroad. Consumers of this product are industrial and home industries. South Korea is one example of a country that absorbs wood pellets from Indonesia. In addition to South Korea, many other countries have expressed their interest in wood pellets from Indonesia, such as China, Japan and various countries joined in the European Union.

(4) Liberica Coffee (*Coffea liberica* or *Coffea*)

Coffee is one of the most important drink commodity in the world produced by plant of *Coffea* spp. Coffee consumption is very extensive all over the world. As commerce commodity, coffee ranks second after crude oil. Although the biggest coffee market was found in developed countries, but this commodity is only produced in the developing countries especially which are located at equator region. Indonesia is the biggest coffee producer country which ranks fourth after Honduras, India and Ethiopia.

Coffee drinking culture is continuously developed resulting in increase of coffee consumer numbers and it is estimated that the world's demand for coffee will increase by 5 percent per year. The numbers of coffee consumer in Indonesia had increased significantly in the last ten years. According to Indonesian Coffee Industry and Exporter Association (AEKI), coffee consumption at domestic market in Indonesia currently had reach 1.6–1.7 kg per capita, whereas coffee consumption in the last ten years was only 0.8 kg per capita. This indicates high market potential either at domestic or overseas level.

Market for Liberica coffee is still widely opened, either at domestic or overseas level. Malaysia is the biggest importer of Liberica coffee produced in Indonesia. For example, about 80 percent of coffee yield from plantations at Sempian and Kedabu Rapat was exported into Malaysia country.

4.2.4 Pulang Pisau District, Central Kalimantan Province

(1) Gelam (*Melaleuca cajuputi*)

Gelam tree can be harvested when it is five years old, and can be sold locally in the form of logs both within Central Kalimantan Province and outside Central Kalimantan for example to South Kalimantan Province. The buyers are government, local communities, private companies. The price of Gelam wood is varied, depends on the size of diameter of the wood. The bigger the size of the wood the more expensive the price, and vice-versa.

The products made from Gelam wood have good prospect in international market., especially the charcoal of Gelam and wood pellet used for producing biomass energy. However, the problem is that the industry for developing the product is not available in Pulang Pisau Regency, Central Kalimantan province. Therefore, the it is strong suggested that the industry for processing the product of Gelam wood should be established in Pulang Pisau regency.

(2) Laban (*Vitex pinnata* L)

Laban tree can be harvested when it is reaching 7 years old after planting. It is sold in the form of log outside Central Kalimantan, i.e., to South Kalimantan province. Laban wood product has international prospect as it can be made into charcoal and wood pellet to produce biomass energy. However, the problem is that the industries for processing Laban wood to become various products, are not available in Pulang Pisau Regency.

(3) Balangeran (*Shorea balangeran* (Korth.))

Balangeran tree needs longer time to be harvested, 15 years after planting. Balangeran wood can be processed to produce various type of mechanic building materials. The Balangeran wood has good market prospective both inside and outside the Central Kalimantan province, for example, it is can be marketed in South Kalimantan province. The buyers are the local communities, government and also private companies.

(4) Rubber

Small scale rubber plantation managed by the local communities produces lumps of latex. The rubber tree can be tapped to produce latex when it is 7 years old after planting. Lumps of latex have can also be marketed both inside and outside Central Kalimantan, such as in South Kalimantan. The buyers are the middle traders as the collectors in village level, sub-district, regency, and province. Then it is sold to the companies which producing crumb rubber.

(5) Alabio Duck

Alabio ducks can produce eggs and meat. Alabio duck will produce eggs when it is 6-month old. while its meat can be harvested when it is 1 year old. Eggs and meat of dug can be marketed locally within Central Kalimantan province. The buyers are house hold families, middle man traders, and restaurant owners.

(6) Paddy Field Rice

Paddy field land is harvesting once in a year. Paddy field land is sold in local market within Central Kalimantan Province and also in regional market outside Central Kalimantan, such as in South Kalimantan Province. The buyers are the traders as collectors in the level of regency and province, and then processed to become rice and sold to the communities as the main staple food of local communities.

4.3 Cost Benefit Analysis by Commodity

4.3.1 OKI District, South Sumatra Province

(1) Swamp Buffalo

The calculation of financial aspects for the gulo puan business uses the following assumptions:

- The selection of business location is centered in Pampangan Sub District with the consideration that the production of gulo puan as raw material in this area is quite high and stable. People live around the river and make the business of swamp buffalo as the main livelihood, therefore, raw milk to support the development of gulo puan processing business in this region. There is a gulo processor who has been doing business for more than 10 years and involves a lot of locals, and this region is included in the target of peat restoration located in KHG Sibumbang River-Batok River;
- The acceptance of the gulo puan processing business is the result of multiplication between the selling price of gulo puan and the production. The amount of production used is based on the survey results, so it is assumed that the calculation with production scale of 30 kg (in June - October) per month and 60 kg (in November - May). The selling price uses the assumption of the prevailing selling price of 60.000 rupiah per kg. Thus the assumption of income for gulo puan business is 1.800,00 rupiah per month (in June - October), and 3.600.000 rupiah per month (in November - May)
- Investment costs do not take into account buildings and land as the majority is cultivated in processing houses.

In essence the cost of gulo puan business consists of investment and operational costs. The investment cost is the amount of money used by the entrepreneur or the gulo puan processing business investor as the initial capital in establishing the gulo puan business. Thus, in general any form of capital used for various activities undertaken during the gulo puan business has not resulted then the capital is called investment.

The investment cost of the gulo puan business consists of a plastic filter, aluminum pot, aluminum cauldron, wood stirrer, covered bucket, towel and cupak. While operational costs consist of buffalo milk, sugar, gas, labor and transportation.

The results of financial analysis with detail calculations are shown in the Attachment 1 1).

(2) Swamp Fishery

The calculation of financial aspects for salted fish and smoked fish business use the following assumptions:

- The selection of business location is centered in Pampangan Sub District with the consideration that the production of fresh fish as raw material in this area is quite high and stable, the people live around the river and make fishery business as main livelihood and expected to increase fisherman's income, In the form of fresh fish supporting the development of salted fish and smoked fish processing business in this region, at the location there are salted fish and smoked fish entrepreneurs who have been doing business for more than 10 years and involve many local people, and this region is included in the target of peat restoration which is at KHG Sibumbang River - Batok River.
- The acceptance of salted fish and smoked fish processing is the result of the multiplication of the selling price of salted fish and smoked fish with the production. The amount of production used is based on the survey results, so it is assumed that the calculation with the scale of production business of 100 kg per day for salted fish (3.000 kg per month) and 100 kg per day for smoked fish (3.000 kg per month). The selling price uses the prevailing selling price of 40.000 rupiah per kg for the salted fish, and 100.000 copies per kg for smoked fish. Thus the assumption of receipt for each business is 4.000.000 rupiah per day (120.000.000 rupiah per month) for salted fish, and 10.000.000 rupiah per day (300.000.000 rupiah per month), *ceteris paribus*.
- Investment costs do not take into account buildings and land because the majority is cultivated in the home of the entrepreneur and on the home page of the entrepreneur for drying and fumigating.

In essence the cost of processing salted fish and smoked fish consists of investment and operational costs. Investment Cost is the amount of money used by entrepreneurs or investors to process salted fish or smoked fish as initial capital in the establishment of salted fish or smoked fish processing business.

Thus, in general any form of capital used for various activities undertaken during the salted fish or smoke processing business has not produced, then the capital is called investment. This investment is a component of fixed costs in accordance with its economic age, salted fish and smoked fish processing business investment is determined for 5 years. The calculation of investment is done for 5 years with the consideration that the business of salted fish and smoked fish using investment equipment with the life of

wear for 5 years. The results of financial analysis with detail calculations are shown in the Attachment 1 2.

Investment cost of salted fish processing business is used to procure drum, basket, pond (para-para), and pillar (para-para). For the smoked fish business, the investment cost includes drums, baskets, and curing ovens. Operational costs are costs incurred that are influenced by factors of production. Operational costs used in salted fish and smoked fish processing are raw material cost, relief materials cost, and labor cost. From the cost incurred and the resulting production can be calculated income earned in the period of one month business. The results of financial analysis with detail calculations are shown in the Attachment 1 2).

(3) Purun handicraft

Calculation of financial aspect for this purun handicraft business use the following assumptions:

- The selection of business location is centered in Pampangan sub district with the consideration that the raw material in this region is quite high and stable, many people make woven purun as main raw material.
- Purun handicraft income is the result of multiplication between selling price of handicrafts per product with the price of each bag (45.000 rupiah per unit), pencil case (7.000 rupiah per unit), purse (25.000 rupiah per unit), key chain (3.000 rupiah per unit), and sandals (12.000 rupiah per unit). The amount of production based on survey results, so assumed the calculation of bags production (200 unit per day), purses (50 unit per day), pencil cases (20 unit per day), key chain (500 unit per day), sandals (500 unit per day), and hand held fan (500 unit per day) with 50 employees.
- Investment cost doesn't calculate building and land cost due to purun handicraft activities can be done at the chair of group home.

The cost of purun handicraft business consist of investment cost and operational cost. The investment cost is the amount of money used by entrepreneurs or investors as initial capital in the establishment of purun handicraft. So, in general any form of capital used for various activities undertaken during the purun craft business doesn't produce then the capital called investment.

Investment is a component of fixed costs accordance with its economic time, purun business investment is determined for 3 years. Investment is calculated for 3 years consider that purun craft business uses the investment tools with 3 years life time.

Investment cost of purun handicraft business consist of scissors, needles and stainless ruler. Operational costs are the costs incurred that are influenced by production factors. The operational costs which are used in the purun handicraft business is the cost of raw materials, cost of supporting materials and other operational. The results of financial analysis with detail calculations are shown in the Attachment 1 3).

(4) Lowland Swamp Paddy

The calculation of financial aspects for rice farming in lowland swamp area uses the following assumptions:

- The selection of business location is centered in Pampangan sub district with the consideration that the lowland swamp area in Pampangan subdistrict can represent the rice farming of lowland swamp in OKI district and the region is one of target of peat restoration.
- Lowland swamp farming income is the result of multiplication between selling price of dry grain harvest. The amount of production based on survey results, so assumed the calculation of land area used for 2,5 hectares, production per hectare of 4 tons. Selling price uses the prevailing price is 4.000 rupiah per kg dry grain harvest. Thus assuming the acceptance of rice farming of 40.000.000 rupiah per planting season.
- Land investment cost is not taken into the calculation because the majority of farming is an inheritance land of parents.

The cost of paddy rice farming consists of investment and operational costs. Investment cost is the amount of money that used by farmers as initial capital in rice farming. Thus, in general any form of capital used for various activities undertaken during the rice farming business has not yielded, then the capital is called investment.

This investment is a component of fixed costs in accordance with its economic life, investment on rice farming is determined for 5 years. Investment calculation is done for 1 year with the consideration that the rice farming business using the investment equipment with 1 year life time.

Investment cost of rice farming business is boat and machetes. Operational costs are costs incurred that are influenced by factors of production. The operational costs used in the rice farming business are the cost of fertilizer use, the cost of the use of chemicals, and labor. The results of financial analysis with detail calculations are shown in the Attachment 1 4).

(5) Liberica Coffee

Commodities: Coffee and Betel Nut

The combination of coffee and betel nut can be chosen as alternative commodities to cultivate on peatlands. Both of these commodities are quite adaptive on the peatlands. The information of the feasibility of this business can be gained by utilize cost-benefit analysis.

Coffee grown on peatlands will begin to bear fruit at the age of 2.5-3 years and reach the peak of the fruiting period at the age of 5-10 years. After that, the coffee plant will bear fruit normally until the age of 25 years. The average productivity of coffee is 560 kg per ha per year. This figure is in the form of coffee beans that have been peeled and dried (dried peeled beans). The price of dried peeled coffee beans ranges from 20,000 to 25,000 rupiah per kg and fresh fruit ranges from 3,000 to 5,000 rupiah per kg.

Meanwhile, betel nut plants on peatlands will start flowering on the age of 4 years. Betel nut plants reach the normal fruiting period on the age of 5 or 5.5 years and attain the peak of fruiting period on the age of 9 to 15 years. The price of dried betel nut ranges from 12,000 to 13,000 rupiah per kg.

Feasibility analysis of the combination of coffee and betel nut has done by calculating NPV, BCR, and IRR. These indicators are calculated on 11 % of interest rate level. The period of the analysis was conducted for 25 years. The result of calculation showed that the use of peatlands for the cultivation of these two commodities is financially feasible as indicated by NPV (positive value), BCR (more than 1) and IRR (above the interest rate). The results of financial analysis with detail calculations are shown in the Attachment 1 5).

(6) Betel/Areca Palm

Commodities: Betel Nut and Paddy/Corn

In addition to coffee, betel nut on peatlands also can be combined with agricultural crops, such as paddy and corn. Both of agricultural commodities can be planted alternately within one year during the betel nut cycle (25 years). By applying this cultivation pattern, the yields will be obtained by harvest of paddy and harvest of corn per year while the cycle period or during 25 years.

Cropping pattern for this combination applies Surjan system. The land for planting betel nut made in the form of bundle as wide as 3 meters and the distance between two bundles is 10 meters. By applying this pattern, the number of betel nut tree which is embedded in one hectare of land is 528 stems and there is an area of 8,000 m² for paddy or corn cultivation.

To get the business feasibility of this cultivation pattern, the cost-benefit analysis has been done by using indicators of NPV, BCR, and IRR. The business analysis of this cultivation pattern is also used 25 years of cycle and 11 percent of interest rate. The results of financial analysis with detail calculations are shown in the Attachment 1 6).

The results of the analysis, as shown in Table 4.4.8., presented that the pattern of mixed cropping between betel nut with rice/corn is financially feasible. At 11 % of interest rate level, the mixed cropping of betel nut with paddy/corn is predicted to provide benefits as indicated by NPV (a positive value), BCR (more than one) and IRR (above interest rate).

(7) Pineapple

Commodities: Pineapple and Areca nut

Another use of peat swamp land by the community is the pattern of pineapple and Areca nut cultivation. Areca nut planted with a distance of 3 x 12 meters with the number of plants as much as 278 stems. Pineapples are planted with a distance of 30 x 100 cm, so the number of plants in one area per hectare of 21,500 stems.

The cost of plant investment at the beginning of the year to the immature plant consists of the cost of land clearing and processing, planting and planting, planting, fertilizing, and crop planting. Non-plant

investment costs in the form of land purchase, purchase of farm equipment, harvesting and processing costs. The cost of land opening and processing is a joint cost between pineapple and areca nut plants.

Pineapple will be harvested every 9 months to 1 year. The business analysis was performed by calculating the NPV, BCR, and IRR values during the 25-year cycle. The analysis was performed at an interest rate of 11 percent. The results of financial analysis with detail calculations are shown in the Attachment 1 7).

Based on the results of the analysis can be stated that the cultivation of pineapple plants with areca nut in peat lands is financially feasible. At a real interest rate of 11%, the exploitation of pineapple and areca nut is able to provide benefits with positive NPV values, BCR values of more than one, and IRR above the interest rate.

4.3.2 MUBA District, South Sumatra Province

(1) Kenaf

Kenaf plant can be cultivated by using intercropping system, either on the side lines of main crop (for instance forest wood) or with other crops having similar growing period (for instance corn). Kenaf plant cultivation is economically can give benefit for community members which in turn can increase economic status of community or farmers income.

4.3.3 Kepulauan Meranti District, Riau Province

(1) Sago

Sago is sold by community members in several forms and the simplest forms are consisted of plant stem and stem pieces. The price of sago plant was in the range of 250,000 to 400,000 rupiahs per stem depending on its length and weight. The price of sago pieces was in the range of 35,000 to 45.000 rupiahs per piece.

Other sago products are consisted of wet sago or paste sago which produced from sago flour extraction of stem pith having price of 1,800 to 2,000 rupiahs per kg. Each sago pieces will produce wet sago of 25-30 percent from piece weight. Wet sago with weight of 25 to 30 kg will be produced from 100 kg of piece. If wet sago is further processed into sago flour, then its price will increase by 250-300 percent from wet sago price, i.e. in the range of 4,500 to 6,000 rupiahs per kg.

However, numbers of sago plant equipped with drying facilities are limited and can only be used by the owners. Small fraction of wet sago produced by community members was processed into traditional foods such as sago noodle, egg sago and lipid sago which are usually marketed within villages up to districts.

For the development of sago garden that can increase the income of the community can be diversified sago with wood Selumar. Selumar wood is very useful for construction and carpentry purposes. Selumar wood has a high growth incubation and can be harvested at the age of 10 with minimal plant maintenance, so it does not cost a lot.

The model of diversifying sago palm and Selumar gardens in forested areas, especially in the Village Forest permits and unlicensed areas managed directly by KPHP Tebing Tinggi, needs to be done with the Partnership model with the company. Companies that potential to be invited to partner is PT. NSP is still short of raw materials to meet the production capacity of the plant that has been built on Pulau Tebing Tinggi. At present, besides being supplied from its own concession area, it also accommodates community sago from Indragiri Hilir Regency and Siak Regency. PT. NSP can act as avalis (loan guarantor) or as a financier, provide technical guidance, and accommodate the production of tual sago. With the form of partnership model between forest manager and PT. NSP then the degraded peat areas can be restored.

The financial viability of diversifying sago palm and hectares plantations per hectare for 20 years with detail calculations are shown in the Attachment 2 1):

(2) Straw Mushroom

Potential of sago pith utilization as cultivation medium for straw mushroom has two positive impacts at once, i.e. reducing the pollutant substance to environment and creating new livelihood source for community members. Market for straw mushroom is widely opened either in domestic or overseas. The price of straw mushroom in Indonesia was generally in the range of 25,000 to 40,000 rupiahs per kg.

Economic analysis of straw mushroom production had been done by Dedi Suyerman. Calculation obtained by using sample of his pilot plant with detail calculations are shown in the Attachment 2 2).

(3) Wood Pellet Industry

Sago waste in the form of stem bark reaches ± 739.000 ton/year. With the amount of raw materials it can produce ± 465.000 tons of wood pellets/year. The potential of raw materials and production can grow 20 wood pellet factories with an average production capacity of 6 tons/hour or about 23 thousand tons/year. Detail calculations are shown in the Attachment 2 3)

(4) Liberica Coffee (*Coffea liberica* or *Coffea*)

Liberica coffee from Sempian and Kedabu Rapat nowadays was recognized as one of the best quality coffee from Indonesia. The price of this coffee in form of green bean was in the range of 40,000 to 50,000 rupiahs per kg, whereas its price in form of roasted bean was in the range of 120,000 to 130,000 rupiahs per kg.

Potential development for Liberica coffee is still exist although condition of coffee cultivation and marketing nowadays was very apprehensive. The success found at Sempian and Kedabu Rapat showed that proper management of coffee plantation could increase its productivity in the range of 8,000 to 10,000 kg green bean/ha/year. If the threshold of coffee seeds into green bean is only 10 percent, then plantation productivity of Liberica coffee farmer is in the range of 800 to 1,000 kg/ha/year which equivalent to income magnitude of 36,000,000 to 45,000,000 rupiahs per year. The results of financial analysis with detail calculations are shown in the Attachment 2 4).

4.3.4 Pulang Pisau District, Central Kalimantan Province

(1) Gelam (*Melaleuca cajuputi*)

There are economic benefits to plant Gelam trees on the peatland as listed below:

- Gelam wood has important role for house construction and building as well as utilized for pole wood foundation and supporting material during concrete casting.
- Gelam wood is used as cerucuk (Banjar language) or supporting material during construction of fly over road and crossing bridge.
- Gelam wood as “siring” (temporary soil buffer) for road or house yard.
- Gelam wood as raw material for art craft such as cigarette ashtray.
- Gelam wood as raw material for saw mill, charcoal making and charcoal briquette.

Gelam sold in form of round wood (log) was only 52 % and the remaining of 48 % was washed away even though this wood waste can be used as raw material for charcoal making. Charcoal price was 2,500 rupiah per kg so that the selling value differences between log wood and log wood charcoal was 11,589 rupiahs per stem (selling price of round wood (log) is 5,500 rupiahs per stem and selling price of charcoal is 17,089 rupiahs per stem, not included charcoal cost making).

Based on the information above, economic analysis was consisted of enterprise scale component, investment cost, Net Present Value (NPV), Benefit Cost Ratio (BCR) and Payback Period (PBP). The results of financial analysis with detail calculations are shown in the Attachment 3 1).

(2) Laban (*Vitex pinnata* L)

Laban tree is called kalapapa in Dayak language. Laban wood is used as raw material for industries of interior design, furniture, house construction and charcoal making. Leaves and roots of Laban tree can be utilized as herbal medicine. Laban wood sold in form of round wood (log) is only 70% and the remaining 30% is wasted away, even though this wood waste can be used as raw material for charcoal making and other products. Charcoal price was 4,000 rupiah per kg so that the selling value differences between log wood and log wood charcoal was 33,333 rupiahs per stem (selling price of log wood is 26,667 rupiahs per wood stem and selling price of charcoal is 60,000 rupiahs per wood stem, not included charcoal production cost).

The results of financial analysis with detail calculations are shown in the Attachment 3 2).

(3) Balangeran (*Shorea balangeran* (Korth.))

Only few of community members cultivate Balangeran tree, although Balangeran wood is highly demanded. This is estimated due to long cutting harvest time of this tree (more than 20 years) so that community members tend to choose quick yield trees such as Balangeran (*Dyera polyphylla*) to tap its sap, rubber and oil palm. Balangeran wood was currently difficult to be found in market due to continuous exploitation without offset by planting effort, resulting in scarcity of balangeran natural population as had already occurred for other wood types in peat swamp, for instance Ramin wood (*Gonystyllus bancanus*).

This was indicated by less natural stands of Balangeran trees having good potential. Price of Balangeran wood was 3 million rupiahs per m³.

The results of financial analysis with detail calculations are shown in the Attachment 3 3).

(4) Rubber

Economic analysis was consisted of enterprise scale component, investment cost, Net Present Value (NPV), Benefit Cost Ratio (BCR) and Payback Period (PBP). The results of financial analysis with detail calculations are shown in the Attachment 3 4).

(5) Alabio Duck

Alabio duck can properly grow and flourish on wet land. There are several steps that should be considered in raising of alabio duck as follows:

- Location Selection.

Suitable location for alabio duck raising is site covered by trees or it can be an open area which is close to the coast or mountain. This location should receive full sun light every day and the surface can be covered by stones or grasses.

- Cages Making.

One duck ideally requires area of 0.25m² or there are 4 ducks in 1 m² area. For raising of 100 ducks, cages area should be ±24 m². These cages can be built in yard area which ease duck raising or controlling.

- Seeds Provision and Raising.

Duck seeds was bought from Alabio Subdistrict at 2 months of age with price of 40,000 rupiahs per duck. The most important aspect for Alabio duck raising is feeding. This feed substances are consisted of rice bran, ilung, kayapu, giyanggang and lilies.

- Harvest or Egg Production.

Alabio duck starts to produce egg at age of 5-6 months with productive age of 2 years and egg production period of 18 months. Egg production will be decrease in line with the increase of duck's age.

Economic analysis was consisted of enterprise scale component, investment cost, Net Present Value (NPV), Benefit Cost Ratio (BCR) and Payback Period (PBP). The results of financial analysis with detail calculations are shown in the Attachment 3 5).

(6) Paddy Field Rice

Economic analysis was consisted of enterprise scale component, investment cost, Net Present Value (NPV), Benefit Cost Ratio (BCR) and Payback Period (PBP). The results of financial analysis with detail calculations are shown in the Attachment 3 6).

4.3.5 Services applicable to all the target areas

(1) Environmental Services

The mechanism for reducing emissions from deforestation and forest degradation in the developing countries has been agreed by the parties in the 13th climate change conference (COP 13) in Bali, known as REDD (Reducing Emission from Deforestation and Forest Degradation).

REDD benefit and cost assessments have been conducted in several countries, such as Silva-Chavez (2005) in Bolivia, Osafo (2005) in Ghana, Nepstad, et al. (2007) in Brazil, Bellassen and Gitz (2008) in Cameroon, as well as Karky and Skutsch (2009) in Nepal. Bellassen and Gitz (2008) conducted a study on primary forest with a utilization choices as forest conservation; wood extraction; or forest conversion into agricultural cultivation area. While Karky and Skutsch (2009) conducted profitability analysis on community forest.

Evaluation of the benefits and costs of reducing emissions from deforestation and forest degradation in Indonesia that are part of a global level of analysis have been conducted by Grieg-Gran (2008). While the study at the level of management units is conducted by the Forestry Research Institute of Palembang (2010) in the industrial plantation forest management unit of PT. Bumi Bumi Andalas Wood Industries (HTI PT SBA WI), South Sumatera.

At discount rate 10 % in 8 years, timber concession at PT. SBA WI is not feasible because it shows negative NPV, BCR less than one, and IRR less than 10 %. However, if forest exploitation is intended for CO₂ emission reduction services or for timber and carbon concessions simultaneously, the results are profitable.

The HTI Exploitation Break-Even Cost of PT. SBA WI in an effort to reduce emissions from deforestation and forest degradation is 14,932 rupiah equivalent to 1.61 USD. These costs are quite competitive compared to the cost of reducing emissions in some other tropical countries, as well as compared to the prevailing carbon price in the voluntary market.

Attachment: Detail Calculation of Cost-Benefit Analyses of each Business Model

(1) Attachment 1: OKI District, South Sumatra Province

1) Swamp buffalo

INVESTMENT COST								
NO	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE (Rp)	PRICE	ECONOMIC AGE (MONTH)	DEPRECIATION COST	RESIDUAL VALUE
1 Production Equipment								
	Plastic filter	1	unit	30,000	30,000	12	2,500	-
	Aluminum pan	1	unit	100,000	100,000	12	8,333	-
	Aluminum frying pan	1	unit	150,000	150,000	12	12,500	-
	Wood stirrer	1	unit	100,000	100,000	12	8,333	-
	Gas stove	1	unit	250,000	250,000	12	20,833	-
Total					630,000		52,500	

OPERATIONAL COST							
Production (June-Oct)							
NO	DESCRIPTION	QUANTITY/WEUNIT	UNIT PRICE (RP)	COST/WEEK H	COST/MONT	COST/5 MONTHS	
1	Milk	8 liter	20,000	160,000	640,000	3,200,000	
2	Sugar	2 kg	10,000	20,000	80,000	400,000	
3	Gas	1 unit	25,000	25,000	100,000	500,000	
4	Labor	1 people	50,000	50,000	200,000	1,000,000	
5	Transportation			40,000	160,000	800,000	
TOTAL				295,000	1,180,000	5,900,000	

OPERATIONAL COST							
Production (Nov-May)							
NO	DESCRIPTION	QUANTITY/WEUNIT	UNIT PRICE	COST/WEEK H	COST/MONT	COST/7 MONTHS	
1	Milk	20 liter	15,000	300,000	1,200,000	8,400,000	
2	Sugar	5 kg	10,000	50,000	200,000	1,400,000	
3	Gas	1 unit	25,000	25,000	100,000	700,000	
4	Labor	1 People	50,000	50,000	200,000	1,400,000	
5	Transportation			40,000	160,000	1,120,000	
TOTAL				465,000	1,860,000	13,020,000	

SUMMARY OF OPERATIONAL COST		
1 year		
No	Description	Total
1	June-October	5,900,000
2	November-May	13,020,000
Total		18,920,000

Production						
NO	DESCRIPTION	QUANTITY	UNIT	PRICE (/kg)	REVENUE (Rp/Month)	REVENUE (Rp/Year)
1	Jun - Oct (5 months)	30	kg	60,000	1,800,000	9,000,000
2	Nov - May (7 months)	60	kg	60,000	3,600,000	25,200,000
Total					5,400,000	34,200,000

June-Oct unit price 60,000
variable cost per unit 9,833 6 50,167

Nov-May unit price 60,000 8
variable cost per unit 7,750 52,250

PROJECTION OF REVENUES AND COSTS OF "GULO PUAN"														
NO	DESCRIPTION	MONTH												TOTAL
		0	1	2	3	4	5	6	7	8	9	10	11	
1	Revenue													
	a. Sales		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	3,600,000	3,600,000
	b. Residual Value													
	Total		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	3,600,000	3,600,000
														34,200,000
2	Cost													
	a. Investment													
	Production Equipments	52,500												
	Total A	52,500												
	b. Operational Cost													
	Milk		1,200,000	1,200,000	1,200,000	1,200,000	1,200,000	640,000	640,000	640,000	640,000	640,000	1,200,000	1,200,000
	Sugar		200,000	200,000	200,000	200,000	200,000	80,000	80,000	80,000	80,000	80,000	200,000	200,000
	Gas		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
	Labor		200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
	Transportation		160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
	Total B		1,860,000	1,860,000	1,860,000	1,860,000	1,860,000	1,180,000	1,180,000	1,180,000	1,180,000	1,180,000	1,860,000	1,860,000
	Total A+B	52,500	1,860,000	1,860,000	1,860,000	1,860,000	1,860,000	1,180,000	1,180,000	1,180,000	1,180,000	1,180,000	1,860,000	1,860,000
														18,920,000
3	Revenue													
	Production of Gulo Puan		3,600,000	3,600,000	3,600,000	3,600,000	3,600,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000	3,600,000	3,600,000
4	Income		1,740,000	1,740,000	1,740,000	1,740,000	1,740,000	620,000	620,000	620,000	620,000	620,000	1,740,000	1,740,000
	Tax (10%)		174,000	174,000	174,000	174,000	174,000	62,000	62,000	62,000	62,000	62,000	174,000	174,000
	Net income		1,566,000	1,566,000	1,566,000	1,566,000	1,566,000	558,000	558,000	558,000	558,000	558,000	1,566,000	1,566,000

BEP (rupiah) 62,791
 BEP (Unit) 1.05

60,287
 1.00

RC Ratio	Overall (12 month)	1.81
	June-October (5 month)	1.53
	November-May (7 month)	1.94

2) Swamp Fishery

a) Salted Fish Business

Investment Cost

No.	Description	Quantity	Price (Rp)	Total Cost (Rp)	Economic Age (month)	Depreciation cost (Rp/month)
1	Drums	20	250,000	5,000,000	12	416,667
2	Empty / Para-Para	60	50,000	3,000,000	60	50,000
3	Pillars of fish / Para-Para	60	50,000	3,000,000	36	83,333
4	Basket	20	50,000	1,000,000	12	83,333
	TOTAL			12,000,000		633,333

Operational Cost

No.	Description	Quantity	Unit	Unit Price (Rp)	Total Cost (Rp)
1	Fresh fish (raw materials)	9,000	kg	10,000	90,000,000
2	Salt (supporting materials)	2,250	kg	500	1,125,000
3	Cardboard (weight capacity: 50 Kg)	60	unit	6,000	360,000
4	Rope and Sealer (roll)	15	rolls	30,000	450,000
5	Labor				
	Cleaning fresh fish	9,000	kg	500	4,500,000
	Salting and drying	120	manday	35,000	4,200,000
6	Packaging	90	manday	60,000	5,400,000
7	Shipping	60	boxes	80,000	4,800,000
	Total				110,835,000

Income

Total Cost	111,468,333
Total Production (Kg)	3,000
Selling Price (Rp/Kg)	40,000
Total Revenue (Rp/month)	120,000,000
Total Income (Rp/month)	8,531,667
R/C	1.08

b) Smoked Fish Business

Investment Cost

Description	Quantity	Unit Price	Total Cost	Economic age (month)	Depreciation cost (Rp/month)
Drum	20	250,000	5,000,000	12	416,667
Concrete Oven capacity 1 ton	1	10,000,000	10,000,000	36	277,778
Baskets	20	50,000	1,000,000	12	83,333
Baking tool (for smoking)	20	100,000	2,000,000	24	83,333
Total			18,000,000		861,111

Operational Cost

No.	Description	Quantity	Unit	Unit Price	Total Cost
1	Fresh Fish (raw material)	9000	kg	16,000	144,000,000
2	Firewood	30	day	300,000	9,000,000
3	Cardboard (capacity: 50 Kg)	120	unit	6,000	720,000
4	Rope and Sealer (roll)	30	rolls	30,000	900,000
5	Labor				
	Cleaning Fresh Fish	9000	kg	500	4,500,000
	Smoking	90	manday	60,000	5,400,000
	Packaging	90	manday	60,000	5,400,000
6	Shipping	120	boxes	80,000	9,600,000
	Total				179,520,000

Income

Total Cost (Rp)	180,381,111
Total Production (Kg)	3,000
Selling Price (Rp/Kg)	100,000
Total Revenue (Rp/month)	300,000,000
Total Income (Rp/month)	119,618,889
R/C	1.663

3) Purun Handicraft

Investment Cost

No.	Description	Quantity	Unit	Unit Price (Rp/Unit)	Price	Economic Age (year)	Economic Age (month)	Depreciation (year)	Depreciation (month)		Residual Value (1 year)
1	Scissor	50	unit	12,000	600,000	2	24	300,000	25,000	25,000	300,000
2	Needle	50	unit	1,700	85,000	1	12	85,000	7,083	7,083	-
3	Ruler	50	unit	12,500	625,000	3	36	208,333	17,361	17,361	416,667
Total					1,310,000			593,333	49,444		716,667

Operational Cost

No.	Description	Quantity	Unit	Unit Price	Value
A	Main Materials				
1	webbing of purun	1,950	sheet	30,000	58,500,000
2	Purun (buttons)	4	sope	5,000	20,000
	Total				58,520,000
B	Supporting materials				
1	carton (layer)	3,720	sheet	8,000	29,760,000
2	colouring	4	bottle	60,000	240,000
3	rubber sandal base 1x1 m	600	sheet	150,000	90,000,000
4	aibon glue	5	can	32,000	160,000
5	newspaper (design)	1,050	bundle	1,000	1,050,000
6	carton (design)	4,200	sheet	4,000	16,800,000
7	fox glue	3	pack	10,000	30,000
8	sewings	5	set	48,000	240,000
9	kerosene	2	liter	4,500	9,000
10	zippers	1,500	unit	7,000	10,500,000
11	fabric furing	900	meter	4,000	3,600,000
12	fabric batik	25	m2	20,000	500,000
13	bamboo	15,000	stem	150	2,250,000
14	hanging key	105	gross	40,000	4,200,000
	Total				159,339,000
C	Operational				
1	Electricity	1	month	200,000	200,000
2	Labor	50	people	750,000	37,500,000
3	Wages sewing	53,100	unit	3,000	159,300,000
	Total				197,000,000
	Contingency 10%				41,485,900
	Total				456,344,900

Revenue per Month

No.	Product	Quantity	Unit	Unit price	Revenue	Unit per day	Income
1	bag	6,000	unit	45,000	270,000,000	200	
2	purse	1,500	unit	25,000	37,500,000	50	
3	pencil case	600	unit	7,000	4,200,000	20	
4	key chain	15,000	unit	3,000	45,000,000	500	
5	sandals	15,000	unit	15,000	225,000,000	500	
6	hand held fan	15,000	unit	7,000	105,000,000	500	
	TOTAL	53,100	unit		686,700,000		230,355,100

PROJECTION OF BENEFIT AND COST OF PURUN CRAFT

NO	DESCRIPTION	MONTH												TOTAL	
		0	1	2	3	4	5	6	7	8	9	10	11		12
A	Income of Depreciation		230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	230,355,100	231,071,767	2,764,977,867
	1 Revenue	0	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	8,240,400,000
	2 Residual Value													716,667	716,667
	TOTAL	0	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	686,700,000	687,416,667	8,241,116,667
B	Fixed Cost														-
	1 Investment	1,310,000													1,310,000
	2 Depreciation	-													-
C	Variable Cost														-
	1 The main materials		58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	58,520,000	702,240,000
	2 Supporting materials		159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	159,339,000	1,912,068,000
	3 Operational		197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	197,000,000	2,364,000,000
	Contingency 10%		41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	41,485,900	497,830,800
	TOTAL		456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	5,476,138,800
	TOTAL FC+VC	1,310,000	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	5,477,448,800
	TOTAL Depr+VC	-	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	456,344,900	5,476,138,800
	BC Ratio	0.50479301		0.50											
	RC Ratio	1.504423008		1.50											

4) Swampy paddy production

Investment Cost (2.5 ha)

No.	Investment Cost	Volume(Unit)	Price (Rp)	Total Cost (Rp)	Economic Age (year)	Depreciation cost (year)
1	Boat (Unit)	1	6,000,000	6,000,000	4	1,500,000
2	Cleaver	2	80,000	160,000	2	80,000
	Investment cost total			6,160,000		1,580,000

Operational Cost (2.5 ha)

No.	Operational Cost	Volume	Unit	Price (Rp)	Total Cost (Rp)
1	Seeds				
	Ciherang	10	kg	17,000	170,000
	Indramayu	10	kg	17,000	170,000
	Sub Total				340,000
2	Fertilizer				
	Urea	3	sack	115,000	345,000
	NPK	3	sack	160,000	480,000
	Sub Total				825,000
3	Herbicide and Insecticide				
	Round-Up	3	litre	13,000	39,000
	Remasol	2	litre	30,000	60,000
	Bimastar	2	litre	30,000	60,000
	Rakus	30	pack	5,000	150,000
	Sub Total				309,000
4	Labor				
	Land Clearing	1	pack	7,200,000	7,200,000
	Planting	1	pack	8,400,000	8,400,000
	Fertilization	1	pack	840,000	840,000
	Crop	1	pack	2,500,000	2,500,000
	Sub Total				18,940,000
	Total Operational Cost				20,414,000

Income (2.5 ha)

Total Cost (Rp)	21,994,000
Production (4,000 Kg/ ha)	10,000
Selling Price (Rp/ Kg)	4,000
Revenue (Rp)	40,000,000
Income (Rp)	18,006,000
R/ C	1.82

Cash flow of plantation combination of betel nut and coffee per hectar for 25 year

No	Description	Years														
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	Direct investment															
1	Land preparation															
a	Land preparation: seedling (arecanut and coffee), planting	17,000,000.00														
b	Land	30,000,000.00														
c	Embroidery plant (labor, herbicide,)		1,950,000.00													
2																
	Total	47,000,000.00	1,950,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Maintenance															
1	Fertilizing and maintaince															
a.	Fertilizing :															
a.	Ponska															
b.	Urea															
b.	Labor															
2	Herbicide															
a.	Herbicide		550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00	550,000.00
b.	Labor		210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00	210,000.00
	Total	0.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00	760,000.00
B	Fix Investment															
1	equipment	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00
2																
	Total	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00	0.00	200,000.00
	Harvesting coffee	0.00	0.00	0.00	200,000.00	300,000.00	600,000.00	700,000.00	800,000.00	800,000.00	800,000.00	700,000.00	700,000.00	600,000.00	600,000.00	700,000.00
	Harvesting areca nut	0.00	0.00	0.00	0.00	0.00	0.00	360,000.00	840,000.00	1,200,000.00	1,440,000.00	1,800,000.00	1,800,000.00	1,680,000.00	1,800,000.00	1,800,000.00
	Coffee processing				300,000.00	450,000.00	900,000.00	1,050,000.00	1,200,000.00	1,200,000.00	1,200,000.00	1,050,000.00	1,050,000.00	1,050,000.00	900,000.00	1,050,000.00
	Total	0.00	0.00	0.00	500,000.00	750,000.00	1,500,000.00	2,110,000.00	2,840,000.00	3,200,000.00	3,440,000.00	3,550,000.00	3,550,000.00	3,430,000.00	3,300,000.00	3,550,000.00
	Total Cost	47,200,000.00	2,710,000.00	960,000.00	1,260,000.00	1,710,000.00	2,260,000.00	3,070,000.00	3,600,000.00	4,160,000.00	4,200,000.00	4,510,000.00	4,310,000.00	4,390,000.00	4,060,000.00	4,510,000.00
C	Revenue															
a	Plant															
	Coffee	-	-	-	4,000,000	6,000,000	12,000,000	14,000,000	16,000,000	16,000,000	16,000,000	14,000,000	14,000,000	14,000,000	12,000,000	14,000,000
b	Plant															
	Areca nut	-	-	-	-	-	-	3,600,000	8,400,000	12,000,000	14,400,000	18,000,000	18,000,000	16,800,000	18,000,000	18,000,000
	Total	0.00	0.00	0.00	4,000,000.00	6,000,000.00	12,000,000.00	17,600,000.00	24,400,000.00	28,000,000.00	30,400,000.00	32,000,000.00	32,000,000.00	30,800,000.00	30,000,000.00	32,000,000.00
	Saldo	-47,200,000.00	-2,710,000.00	-960,000.00	2,740,000.00	4,290,000.00	9,740,000.00	14,530,000.00	20,800,000.00	23,840,000.00	26,200,000.00	27,490,000.00	27,690,000.00	26,410,000.00	25,940,000.00	27,490,000.00
	Discount Factor (DF=11%)	1.00	0.91	0.81	0.73	0.68	0.59	0.53	0.48	0.43	0.39	0.35	0.32	0.29	0.26	0.23
	Discount Cost (DC)	47,200,000.00	2,463,636.36	779,157.54	921,301.14	1,167,953.01	1,341,200.00	1,641,347.37	1,733,970.28	1,805,134.22	1,641,884.04	1,588,352.00	1,367,491.08	1,254,841.22	1,045,507.88	1,046,296.66
	Discount Benefit (DB)	0.00	0.00	0.00	2,924,765.53	4,098,080.73	7,121,415.94	9,409,678.72	11,752,465.23	12,149,941.90	11,884,113.05	11,269,903.32	10,153,066.05	8,803,897.37	7,725,427.67	7,423,834.39
	NPV															
	BCR															
	IRR															

Cashflow of plantation combination of paddy rice/maize and betel nut per hectare for 25 year

6) Areca nuts and Paddy/ Maize

No.	Description	Year												
		1	2	3	4	5	6	7	8	9	10	11	12	13
COST														
A.	Planting investment													
	Paddy													
	-land preparation	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000
	-planting	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000
	-maintaining	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000
	Amount of paddy	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000
	Batel nut													
	- embroidery plant	520,000												
	Amount of betel nut	520,000												
	Maize													
	-land preparation and planting	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000
	-maintaining	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200
	-Amount of Maize	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200
	Amount of A	11,081,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200
B.	Non planting investment													
	Paddy													
	-harvesting	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000
	-land preparation equipment	510,000						510,000						510,000
	-harvesting equipment 1	1,200,000						1,200,000						1,200,000
	-harvesting equipment 2	600,000						600,000						600,000
	Amount of paddy	6,030,000	3,720,000	3,720,000	3,720,000	3,720,000	6,030,000	3,720,000	3,720,000	3,720,000	3,720,000	6,030,000	3,720,000	3,720,000
	Batel nut													
	-harvesting						452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571
	-equipment	520,000					520,000					520,000		
	Amount of betel nut	520,000					972,571	452,571	452,571	452,571	452,571	972,571	452,571	452,571
	-land	30,000,000												
	Amount of B	36,550,000	3,720,000	3,720,000	3,720,000	3,720,000	7,002,571	4,172,571	4,172,571	4,172,571	4,172,571	7,002,571	4,172,571	4,172,571
	Sum of A + B	47,631,200	14,281,200	14,281,200	14,281,200	14,281,200	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771
BENEFIT														
C	Batel nut				8,553,600	17,962,560	27,371,520	27,371,520	27,371,520	34,214,400	34,214,400	34,214,400	34,214,400	34,214,400
	Maize	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000
	Paddy	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000
	Amount C	56,240,000	56,240,000	56,240,000	64,793,600	74,202,560	83,611,520	83,611,520	83,611,520	90,454,400	90,454,400	90,454,400	90,454,400	90,454,400
	TOTAL COST	47,631,200	14,281,200	14,281,200	14,281,200	14,281,200	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771
	TOTAL BENEFIT	56,240,000	56,240,000	56,240,000	64,793,600	74,202,560	83,611,520	83,611,520	83,611,520	90,454,400	90,454,400	90,454,400	90,454,400	90,454,400
	SALDO	8,608,800	41,958,800	41,958,800	50,512,400	59,921,360	66,047,749	68,877,749	68,877,749	75,720,629	75,720,629	72,890,629	75,720,629	75,720,629
	DISCOUNT FACTOR (DF=11%)	0.900900901	0.811622433	0.731191381	0.658730974	0.593451328	0.534640836	0.481658411	0.433926496	0.390924771	0.352184479	0.317283314	0.285840824	0.257514256
	DISCOUNTED COST (DC)	42,910,991	11,590,942	10,442,290	9,407,469	8,475,197	9,390,309	7,096,645	6,393,374	5,759,796	5,189,006	5,572,692	4,211,513	3,794,156
	DISCOUNTED BENEFIT (DB)	50,666,667	45,645,646	41,122,203	42,681,551	44,035,608	44,702,133	40,272,192	36,281,254	35,360,866	31,856,636	28,699,672	25,855,560	23,293,297
	NPV (DB-DC)													
	BCR													
	IRR													

Cashflow of plantation combination of paddy rice/maize and betel nut per hectare for 25 year

No.	Description	Year											Total	Residu	Netto		
		14	15	16	17	18	19	20	21	22	23	24				25	
COST																	
A.	Planting investment																
	Paddy																
	-land preparation	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	2,710,000	67,750,000		67,750,000	
	-planting	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	788,000	19,700,000		19,700,000	
	-maintaining	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	22,500,000			
	Amount of paddy	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	4,398,000	109,950,000			
	Batel nut																
	- embroidery plant													520,000			
	Amount of betel nut													520,000			
	Maize																
	-land preparation and planting	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000	40,000,000			
	-maintaining	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	4,563,200	114,080,000			
	-Amount of Maize	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	6,163,200	154,080,000			
	Amount of A	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	10,561,200	106,132,000	-	106,132,000	
B.	Non planting investment																
	Paddy																
	-harvesting	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	3,720,000	93,000,000		93,000,000	
	-land preparation equipment			510,000					510,000					2,550,000			
	-harvesting equipment 1			1,200,000					1,200,000					6,000,000		6,000,000	
	-harvesting equipment 2			600,000					600,000					3,000,000		3,000,000	
	Amount of paddy	3,720,000	3,720,000	6,030,000	3,720,000	3,720,000	3,720,000	3,720,000	6,030,000	3,720,000	3,720,000	3,720,000	3,720,000	104,550,000			
	Batel nut																
	-harvesting	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	9,051,429			
	-equipment			520,000					520,000					2,600,000			
	Amount of betel nut	452,571	452,571	972,571	452,571	452,571	452,571	452,571	972,571	452,571	452,571	452,571	452,571	11,651,429			
	-land													30,000,000		30,000,000	
	Amount of B	4,172,571	4,172,571	7,002,571	4,172,571	4,172,571	4,172,571	4,172,571	7,002,571	4,172,571	4,172,571	4,172,571	4,172,571	262,402,857		262,402,857	
	Sum of A + B	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	368,534,857		368,534,857	
BENEFIT																	
C	Batel nut	19,958,400	34,214,400	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	15,966,720	27,371,520	596,185,920		
	Maize	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	35,840,000	896,000,000		
	Paddy	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	20,400,000	35,840,000	525,440,000		525,440,000	
	Amount C	76,198,400	90,454,400	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	72,206,720	99,051,520	2,017,625,920		2,017,625,920
	TOTAL COST	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	17,563,771	14,733,771	14,733,771	14,733,771	14,733,771	368,534,857		368,534,857	
	TOTAL BENEFIT	76,198,400	90,454,400	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	83,611,520	72,206,720	99,051,520	2,017,625,920		2,017,625,920
	SALDO	61,464,629	75,720,629	66,047,749	68,877,749	68,877,749	68,877,749	68,877,749	66,047,749	68,877,749	68,877,749	68,877,749	57,472,949	84,317,749	1,649,091,063		
	DISCOUNT FACTOR (DF=11%)	0.231994825	0.209004347	0.188292204	0.169632616	0.152822177	0.137677637	0.124033907	0.111742259	0.100668701	0.090692524	0.081704976	0.073608087				
	DISCOUNTED COST (DC)	3,418,159	3,079,422	3,307,121	2,499,328	2,251,647	2,028,511	1,827,487	1,962,615	1,483,230	1,336,243	1,203,822	1,084,525		116,656,020		
	DISCOUNTED BENEFIT (DB)	17,677,634	18,905,363	15,743,397	14,183,241	12,777,695	11,511,436	10,370,664	9,342,940	8,417,063	7,582,940	5,899,648	7,290,993		412,624,755		
	NPV (DB-DC)														295,968,735		
	BCR														3.537106411		
	IRR														0.309152106		

Cash Flow of plantation combination of Areca nut Pineapple per hectar for 25 year

7) Pineapple and Areca nuts

No.	Description	Year												
		1	2	3	4	5	6	7	8	9	10	11	12	13
COST														
A. Planting Investment														
Pineapple														
	-Land preparation and planting	800,000			800,000			800,000			800,000			800,000
	Planting	10,912,000			10,912,000			10,912,000			10,912,000			10,912,000
	Maintenance	7,632,000			7,632,000			7,632,000			7,632,000			7,632,000
	Amount of Pineapple	19,344,000			19,344,000			19,344,000			19,344,000			19,344,000
Betel nut														
	- Land preparation and seedling	3,010,000												
	-Embroidery	256,000												
	- Maintenance	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640
	Amount of betel nut	3,446,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640
	Amount of A	22,790,640	180,640	180,640	19,524,640	180,640	180,640	19,524,640	180,640	180,640	19,524,640	180,640	180,640	19,524,640
B. Non investment planting														
Pineapple														
	-Equipment	320,000					320,000				320,000			
	Amount of pineapple	320,000					320,000				320,000			
Betel nut														
	-Harvesting			452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571
	- Equipment	104,000				104,000					104,000			
	Amount of betel nut	104,000		452,571	452,571	556,571	452,571	452,571	452,571	452,571	556,571	452,571	452,571	452,571
	- Land	30,000,000												
	Amount of B	30,424,000			452,571	452,571	876,571	452,571	452,571	452,571	452,571	876,571	452,571	452,571
	Sum of A+B	53,214,640	180,640	180,640	19,977,211	633,211	1,057,211	19,977,211	633,211	633,211	19,977,211	1,057,211	633,211	19,977,211
BENEFIT														
C	Betel nut				8,553,600	17,962,560	27,371,520	27,371,520	27,371,520	34,214,400	34,214,400	34,214,400	34,214,400	34,214,400
	Pineapple	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000
	Amount of C	48,000,000	48,000,000	48,000,000	56,553,600	65,962,560	75,371,520	75,371,520	75,371,520	82,214,400	82,214,400	82,214,400	82,214,400	82,214,400
	Total Cost	53,214,640	180,640	180,640	19,977,211	633,211	1,057,211	19,977,211	633,211	633,211	19,977,211	1,057,211	633,211	19,977,211
	Total Revenue	48,000,000	48,000,000	48,000,000	56,553,600	65,962,560	75,371,520	75,371,520	75,371,520	82,214,400	82,214,400	82,214,400	82,214,400	82,214,400
	SALDO	-5,214,640	47,819,360	47,819,360	36,576,389	65,329,349	74,314,309	55,394,309	74,738,309	81,581,189	62,237,189	81,157,189	81,581,189	62,237,189
	DISCOUNT FACTOR (DF=11%)	0.9009	0.8116	0.7312	0.6587	0.5935	0.5346	0.4817	0.4339	0.3909	0.3522	0.3173	0.2858	0.2575
	DISCOUNTED COST (DC)	47,941,117	146,611	132,082	13,159,608	375,780	565,228	9,622,192	274,767	247,538	7,035,664	335,436	180,998	5,144,417
	DISCOUNTED BENEFIT (DB)	43,243,243	38,957,877	35,097,186	37,253,608	39,145,569	40,296,692	36,303,327	32,705,700	32,139,646	28,954,636	26,085,257	23,500,232	21,171,380
	NPV (DB-DC)													
	BCR													
	IRR													

No.	Description	Year												Amount	Residu	Netto
		14	15	16	17	18	19	20	21	22	23	24	25			
COST																
A.	Planting Investment															
	Pineapple															
	-Land preparation and planting			800,000			800,000			800,000			800,000	7,200,000		7,200,000
	Planting			10,912,000			10,912,000			10,912,000			10,912,000	98,208,000		98,208,000
	Maintenance			7,632,000			7,632,000			7,632,000			7,632,000	68,688,000		
	Amount of Pineapple			19,344,000			19,344,000			19,344,000			19,344,000	174,096,000		
	Betel nut													0		
	- Land preparation and seedling													3,010,000		
	-Embroidery													256,000		
	- Maintenance	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	4,516,000		
	Amount of betel nut	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	180,640	7,782,000		
	Amount of A	180,640	180,640	19,524,640	180,640	180,640	19,524,640	180,640	180,640	19,524,640	180,640	180,640	19,524,640	82,448,400	0	82,448,400
B.	Non investment planting															
	Pineapple															
	-Equipment			320,000					320,000					1,600,000		1,600,000
	Amount of pineapple			320,000					320,000					1,600,000		
	Betel nut															
	-Harvesting	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	452,571	9,956,571		
	- Equipment			104,000					104,000					520,000		
	Amount of betel nut	452,571	452,571	556,571	452,571	452,571	452,571	452,571	556,571	452,571	452,571	452,571	452,571	10,476,571		
	- Land													30,000,000		30,000,000
	Amount of B	452,571	452,571	876,571	452,571	452,571	452,571	452,571	876,571	452,571	452,571	452,571	452,571	54,153,143		54,153,143
	Sum of A+B	633,211	633,211	20,401,211	633,211	633,211	19,977,211	633,211	1,057,211	19,977,211	633,211	633,211	19,977,211	136,601,543		136,601,543
BENEFIT																
C	Betel nut	19,958,400	34,214,400	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	27,371,520	15,966,720	27,371,520	596,185,920		
	Pineapple	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	1,200,000,000		
	Amount of C	67,958,400	82,214,400	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	63,966,720	75,371,520	1,796,185,920		1,796,185,920
	Total Cost	633,211	633,211	20,401,211	633,211	633,211	19,977,211	633,211	1,057,211	19,977,211	633,211	633,211	19,977,211	136,601,543		136,601,543
	Total Revenue	67,958,400	82,214,400	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	75,371,520	63,966,720	75,371,520	1,796,185,920		1,796,185,920
	SALDO	67,325,189	81,581,189	54,970,309	74,738,309	74,738,309	55,394,309	74,738,309	74,314,309	55,394,309	74,738,309	63,333,509	55,394,309	1,659,584,377		
	DISCOUNT FACTOR (DF=11%)	0.2320	0.2090	0.1883	0.1696	0.1528	0.1377	0.1240	0.1117	0.1007	0.0907	0.0817	0.0736			
	DISCOUNTED COST (DC)	146,902	132,344	3,841,389	107,413	96,769	2,750,415	78,540	118,135	2,011,080	57,428	51,737	1,470,484	79,500,588		
	DISCOUNTED BENEFIT (DB)	15,765,997	17,183,167	14,191,870	12,785,468	11,518,440	10,376,973	9,348,624	8,422,184	7,587,553	6,835,633	5,226,399	5,547,953	364,097,483		
	NPV (DB-DC)													284,596,894		
	BCR													4.5798087		
	IRR													32.1%		

(2) Attachment 2: Kepulauan Meranti District, Riau Province

1) Sago Palm and Semular Tree Mixed farming

Assumptions

1. Suitable land (1 ha as the smallest unit of land) is available
2. Sago palm is mixed-cropped with selumar (a fast-growing native tree species)
3. Sago palm is planted with a spacing system of 9 m x 9 m, creating a population of 124 palm seedlings/ha.
4. Selumar is planted between two neighbouring sago palms (in a regular distance of 4.5 m to the
5. Sago palm can be harvested at the latest 15 years after planting
6. About a half (50%) of the selumar can be harvested 7 years after planting (up to 247 trees/ha)
7. Each sago palm tree produces at least 8 tuals and the price of each tual is Rp 42.000,-
8. Each 7 year-old selumar log will be priced Rp 800.000,-
9. There is no cost for using the land (no land rental)

Component	Cost (Rp)	Total	Investment		
			Year ke-0	Year ke-10	Year ke-20
Decline of Equipments					
Spade	100000	4	400,000	400,000	400,000
Rope/line	1000	200	200,000		
Machete	20000	5	100,000	100,000	100,000
Permanent Cost			700,000	500,000	500,000

Decline of equipments	70,000
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B. Variable Cost of Sago Palm-Selumar Mixed Farming

No	Component	Unit	Cost (Rp)	Number of Units	Total (Rp)									
					Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-11	Year 12-20
A	Input													
1	Supporting cane	Canes	500	500	250,000									
2	Sago seedling	Seedling	10,000	135	1,354,568									
3	Selumar seedling	Seedling	10,000	394	3,943,704									
	Production Cost													
1	Fertilizer (Urea)	Kg	2,500	100	250,000									
2	Fertilizer SP 36	Kg	3,500	100	350,000									
3	Fertilizer NPK	Kg	4,500	100	450,000									
B	Man Power													
1	Land clearance	Ha	500,000	1	500,000	-	-	-	-					
2	Digging boundary ponds	Ha	500,000	1	500,000									
3	Digging planting holes	Man-day	100,000	4	400,000									
4	Planting of seedlings	Man-day	100,000	4	400,000									
5	Substitutive planting of seedlings	Man-day	100,000	2	200,000	200,000	200,000	-	-					
6	Weeding	Ha	500,000	4	2,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
7	Pest control	Man-day	100,000	5	500,000	500,000	500,000							
8	Pond maintenance	Man-day	100,000	2	200,000		200,000				200,000			200,000
9	Cluster care (pruning)	Man-day	100,000	2	200,000			400,000	400,000	400,000	400,000	400,000	400,000	400,000
10	Fertilizer application	Man-day	100,000	5	500,000									
11	Harvest of selumar trees	Man-day	100,000	20								2,000,000		
12	Harvest of sago palm trees	Log	15,000	60										900,000
Total					11,998,272	1,700,000	1,900,000	1,400,000	1,400,000	1,400,000	1,600,000	3,400,000	1,400,000	2,500,000

Income

Year	Cost			Sago Palm Harvest (Logs/ha)	Price (Rp/log)	Selumar Harvest (Logs/ha)	Price (Rp/log)	Total Price (Rp)	Cash Flow (Rp)
	Permanent Cost (Rp)	Variable Cost (Rp)	Total (Rp)						
0	700,000	11,998,272	12,698,272	-	-	-	-	-	(12,698,272)
1	-	1,700,000	1,700,000	-	-	-	-	-	(1,700,000)
2	-	1,900,000	1,900,000	-	-	-	-	-	(1,900,000)
3	-	1,400,000	1,400,000	-	-	-	-	-	(1,400,000)
4	-	1,400,000	1,400,000	-	-	-	-	-	(1,400,000)
5	-	1,400,000	1,400,000	-	-	-	-	-	(1,400,000)
6	-	1,600,000	1,600,000	-	-	-	-	-	(1,600,000)
7	-	3,400,000	3,400,000	-	-	247	400,000	98,765,432	95,365,432
8	-	1,400,000	1,400,000	-	-	-	-	-	(1,400,000)
9	-	1,470,000	1,470,000	-	-	-	-	-	(1,470,000)
10	500,000	1,470,000	1,970,000	-	-	-	-	-	(1,970,000)
11	-	1,470,000	1,470,000	-	-	-	-	-	(1,470,000)
12	-	2,500,000	2,500,000	-	-	-	-	-	(2,500,000)
13	-	2,570,000	2,570,000	-	-	-	-	-	(2,570,000)
14	-	2,570,000	2,570,000	-	-	-	-	-	(2,570,000)
15	-	2,570,000	2,570,000	20	336,000	-	-	6,720,000	4,150,000
16	-	2,570,000	2,570,000	20	336,000	-	-	6,720,000	4,150,000
17	-	2,570,000	2,570,000	20	336,000	-	-	6,720,000	4,150,000
18	-	2,570,000	2,570,000	20	336,000	-	-	6,720,000	4,150,000
19	-	2,570,000	2,570,000	20	336,000	-	-	6,720,000	4,150,000
20	500,000	2,570,000	3,070,000	20	336,000	85	2,000,000	177,675,556	174,605,556
Total	1,700,000	53,668,272	55,368,272	120	2,016,000	332	2,400,000	310,040,988	254,672,716

Percentage of permanent cost	3.07
Percentage of variable cost	96.93
Total cost	55,368,272

Assumptions

1. Suitable land (1 ha as the smallest unit of land) is available
2. Sago palm is mixed-cropped with selumar (a fast-growing native tree species)
3. Sago palm is planted with a spacing system of 9 m x 9 m, creating a population of 124 palm seedlings/ha.
4. Selumar is planted between two neighbouring sago palms (in a regular distance of 4.5 m to the palm), creating a population of 370 tree seedlings/ha
5. Sago palm can be harvested at the latest 15 years after planting
6. About a half (50%) of the selumar can be harvested 7 years after planting (up to 247 trees/ha)
7. Each sago palm tree produces at least 8 tuals and the price of each tual is Rp 42,000,-
8. Each 7 year-old selumar log will be priced Rp 800,000,-
9. There is no cost for using the land (no land rental)

Year	Cost	Income	DF (16%)	Net Income	Present Value NI	Present Value Cost	Present Value Cash Income
0	12,698,272	-	1.000	(12,698,272)	(12,698,272)	12,698,272	-
1	1,700,000	-	0.862	(1,700,000)	(1,465,517)	1,465,517	-
2	1,900,000	-	0.743	(1,900,000)	(1,412,010)	1,412,010	-
3	1,400,000	-	0.641	(1,400,000)	(896,921)	896,921	-
4	1,400,000	-	0.552	(1,400,000)	(773,208)	773,208	-
5	1,400,000	-	0.476	(1,400,000)	(666,558)	666,558	-
6	1,600,000	-	0.410	(1,600,000)	(656,708)	656,708	-
7	3,400,000	98,765,432	0.354	95,365,432	33,743,106	1,203,020	34,946,126.41
8	1,400,000	-	0.305	(1,400,000)	(427,036)	427,036	-
9	1,470,000	-	0.263	(1,470,000)	(386,541)	386,541	-
10	1,970,000	-	0.227	(1,970,000)	(446,567)	446,567	-
11	1,470,000	-	0.195	(1,470,000)	(287,263)	287,263	-
12	2,500,000	-	0.168	(2,500,000)	(421,157)	421,157	-
13	2,570,000	-	0.145	(2,570,000)	(373,232)	373,232	-
14	2,570,000	-	0.125	(2,570,000)	(321,752)	321,752	-
15	2,570,000	6,720,000	0.108	4,150,000	447,897	277,372	725,269.53
16	2,570,000	6,720,000	0.093	4,150,000	386,118	239,114	625,232.36
17	2,570,000	6,720,000	0.080	4,150,000	332,861	206,133	538,993.41
18	2,570,000	6,720,000	0.069	4,150,000	286,949	177,701	464,649.49
19	2,570,000	6,720,000	0.060	4,150,000	247,370	153,190	400,559.91
20	3,070,000	177,675,556	0.051	174,605,556	8,972,186	157,753	9,129,939.46
Total	55,368,272	310,040,988		254,672,716	23,183,746	23,647,024	46,830,771

NPV	23,183,746
IRR	10.74%
RCR	1.98
BCR	0.98

2) Straw Mushroom with usage of Sago Waste

Assumption

*Based on 4 incubation chambers with a medium of 5000 kg sago palm pith dregs

Expenses

No.	Component	Unit	Price (Rp)	Numebr of Units	Cost (Rp)			
					Month 0	Month 1	Month 3	Month 4
A	Construction of Incubation Chambers (4 units)							
1	Bamboo pole	Pole	10,000	250	2,500,000			
2	Nail 10	Kg	20,000	20	400,000			
3	Nail 7	Kg	20,000	3	60,000			
4	Nail 4	Kg	20,000	7	140,000			
5	Brick	Piece	750	1500	1,125,000			
6	Plastic PE	Kg	45,000	40	1,800,000			
7	Plastic tape	Roll	15,000	3	45,000			
8	Plastic rope/line	Roll	85,000	6	510,000			
9	Plastic terpoline	Sheet	200,000	4	800,000			
10	Man power	Man-day	100,000	40	4,000,000			
	Total					11,380,000		
B	Equipments							
1	Drum	Unit	200,000	3	600,000			
2	Hose	Meter	15,000	15	225,000			
3	Terpoline	Unit	400,000	3	1,200,000			
4	Sprayer	Unit	250,000	1	250,000			
5	Thermometer	Unit	100,000	1	100,000			
6	Hydrometer	Unit	200,000	1	200,000			
7	PH-meter	Unit	200,000	1	200,000			
8	Hook	Unit	80,000	1	80,000			
9	Pengki	Unit	10,000	3	30,000			
10	Bucket	Unit	40,000	5	200,000			
	Total					3,085,000		
Sum of Investment Cost						14,465,000		
C	Additional Cost							
1	Pith dregs	Kg	100	5,000		500,000	500,000	500,000
2	Cotton	Kg	4,000	200		800,000	800,000	800,000
3	Urea	Kg	3,500	5		17,500	17,500	17,500
4	Chalk	Kg	20,000	5		100,000	100,000	100,000
5	Grinded rice husk	Kg	4,000	120		480,000	480,000	480,000
6	Bibit	Set	100,000	6		600,000	600,000	600,000
7	Molase	Liter	10,000	5		50,000	50,000	50,000
8	Alcohol	Liter	35,000	1		35,000	35,000	35,000
9	Wood planks	Set	200,000	1		200,000	200,000	200,000
10	Man power	Man-day	100,000	40		4,000,000	4,000,000	4,000,000
	Jumlah Modal Kerja					6,782,500	6,782,500	6,782,500

Assumption

*Based on 4 incubation chambers with a medium of 5000 kg sago palm pith dregs

Profit

Month	Expense (Rp)	Harvest of Mushrooms (kg)	Price of Mushrooms (Rp/kg)	Pith Dregs (kg)	Price of Pith Dregs (Rp/kg)	Income (Rp)			Profit (Rp)
						Mushroom	Puth Dregs	Total	
0	14,465,000	0	0	0	0	-	-	-	(14,465,000)
1	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
2	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
3	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
4	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
5	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
6	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
7	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
8	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
9	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
10	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
11	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
12	6,782,500	600	25,000	3,500	500	15,000,000	1,750,000	16,750,000	9,967,500
Total	95,855,000	7,200	300,000	42,000	6,000	180,000,000	21,000,000	201,000,000	105,145,000

RCR	2.10
BCR	1.10

3) Wood Pellet with usage of Sago Waste

Annual production of sago flour	198,162,000	Kg
Estimate of sago palm trees cut annually	1,321,080	Palm trees
	1,056,864,000	Kg
Raw material available	739,804,800	Kg
Bark (30% of the log)	317,059,200	Kg
Pith dregs (40% of the log)	422,745,600	Kg
Conversion rate to wood pellet	465,020,160	Kg
Bark (80%)	253,647,360	Kg
Pith dregs (50%)	211,372,800	Kg
Potential number of mills with a capacity of 6 ton/hour	21	Unit
Price of wood pellet	1,400	Rp/Kg
Potential brutto income	651,028,224,000	Rp/year

Total production in the district	198,162	Ton
Estimate of sago palm trees cut annually	1,321,080	Logs
Wet weight of sago palm log	1,056,864	Ton
Raw material available	739,805	Ton
Bark (30% x log's weight)	317,059	Ton
Residual mass of the pith (40%)	422,746	Ton
Conversion rate to wood pellet	465,020	Ton
Bark (80%)	253,647	Ton
Pith dregs (50%)	211,373	Ton
Potential number of mills with a capacity of 6 ton/hour	20.55	Unit
Price of wood pellet	1,400	Rp/Kg
Potential brutto income	651,028,224	Rp.000/tahun

Estimate of sago bark and pith dregs in Kepulauan Meranti District

No.	Subdistrict	Production of Flour	Number of Mills	Estimate of Palm Trees	Raw material potentially available (ton/year)		
					Bark (30%)	Pith Dregs (40%)	Total
Subdistricts within KHG Pulau Tebing Tinggi					271,170	361,560	632,730
1	Tebing Tinggi	2,754	3	18,360	5,508	7,344	12,852
2	Tebing Tinggi Barat	61,317	32	408,780	122,634	163,512	286,146
3	Tebing Tinggi Timur	71,514	17	476,760	143,028	190,704	333,732
Other subdistricts					125,154	166,872	292,026
4	Rangsang	2,358	1	15,720	4,716	6,288	11,004
5	Rangsang Barat	1,485	-	9,900	2,970	3,960	6,930
6	Merbau	13,185	5	87,900	26,370	35,160	61,530
7	Pulau Merbau	7,209	1	48,060	14,418	19,224	33,642
8	Rangsang Pesisir	14,535	4	96,900	29,070	38,760	67,830
9	Tasik Putri Puyu	23,805	4	158,700	47,610	63,480	111,090
Total					396,324	528,432	924,756

Sago paste (eq. to 2 x sago flour)	396,324	
Conversion rate of sago log to sago paste (30%)	1,321,080	
Bark (30% of sago palm log)	396,324	674
Pith dregs (40% of sago palm log)	528,432	898

Cost and Income

Mill's processing capacity	6	Ton/hour		
Working hour	20	Hours/day		
Working day	25	Days/month		
Monthly demand for raw material	3,000	Ton/month		
Annual demand for raw material	36,000	Ton/year	36,000,000	Kg/year

(Rp. 000)

No.	Komponen	Unit	Volume	Cost/Unit	Total
1	Land for establishing a mill	Ha	4	250,000	1,000,000
2	Construction of mill, storage, and fence	M2	1200	3,000	3,600,000
3	Wood processing machine (cap. 6 ton/hour)	Set	1	3,000,000	3,000,000
4	Mini loader (cap. 2 ton)	Unit	2	175,000	350,000
5	Forklift. (cap 3-5 ton)	Unit	2	150,000	300,000
6	Balance (cap. 15 ton)	Unit	1	500,000	500,000
7	Truck	Unit	2	350,000	700,000
8	Pickup	Unit	1	350,000	350,000
9	Operational car	Unit	1	400,000	400,000
10	Genset 850 kVA	Set	1	1,000,000	1,000,000
11	Others (consultant fee, permit, legal process etc.)	%	7	11,200,000	784,000
12	Total Investment Cost				11,984,000
13	Estimate of annual operational cost				21,587,563
14	Estimate of annual income	Rp/year			30,240,000
	Production of wood pellet (60% of the mill's capacity)	Kg/year	21,600,000		
	Price of wood pellet	Rp/Kg	1,400		

Assumptions:

- Annual sago flour production in Kepulauan Meranti District (available statistics) 198,162,000 Kg/year
- Estimate of the number of sago palm trees cut annually 1,321,080 Sago palm trees 1,056,864,000 Kg
- Proportion of sago palm bark produced annually 317,059,200 Kg 739,804,800 Kg of raw material
- Proportion of sago pith dregs produced annually 422,745,600 Kg WP
- Processing capacity of wood-pellet mill 6,000 Kg/hour 36,000,000 Kg/tahun
- Price of wood pellet 1,400 Rp/kg Demand of mill with a capacity of 6 ton/hour 20.55

Year	Cost	Income	DF (16%)	Net Income	Present Value NI	Present Value Cost	Present Value Case Income
0	11,984,000,000	-	1.000	(11,984,000,000)	(11,984,000,000)	11,984,000,000	-
1	21,587,563,333	30,240,000,000	0.862	8,652,436,667	7,458,997,126	18,609,968,391	26,068,965,517.24
2	21,587,563,333	30,240,000,000	0.743	8,652,436,667	6,430,169,937	16,043,076,199	22,473,246,135.55
3	21,587,563,333	30,240,000,000	0.641	8,652,436,667	5,543,249,945	13,830,238,103	19,373,488,047.89
4	21,587,563,333	30,240,000,000	0.552	8,652,436,667	4,778,663,746	11,922,619,054	16,701,282,799.91
5	21,587,563,333	30,240,000,000	0.476	8,652,436,667	4,119,537,712	10,278,119,874	14,397,657,586.13
6	21,587,563,333	30,240,000,000	0.410	8,652,436,667	3,551,325,614	8,860,448,167	12,411,773,781.14
7	21,587,563,333	30,240,000,000	0.354	8,652,436,667	3,061,487,598	7,638,317,386	10,699,804,983.74
8	21,587,563,333	30,240,000,000	0.305	8,652,436,667	2,639,213,447	6,584,756,367	9,223,969,813.57
9	21,587,563,333	30,240,000,000	0.263	8,652,436,667	2,275,184,006	5,676,514,109	7,951,698,115.15
10	21,587,563,333	30,240,000,000	0.227	8,652,436,667	1,961,365,522	4,893,546,646	6,854,912,168.23
Total	227,859,633,333	302,400,000,000		74,540,366,667	29,835,194,653	116,321,604,296	146,156,798,949

NPV	29,835,194,653
IRR	48.17%
RCR	1.26
BCR	0.26

4) Liberica Coffee Farming

Assumptions:

1. Coconut plot (1 ha) to be enriched with liberica coffee is already available (with coconut palm as shade trees)
2. There is no sharing of production cost between coffee and the crop used as shade trees
3. Reinvestment is to be done every 10 years
4. Liberica coffee starts producing at the age 4 years old and its productivity declines after reaching the age of 20 years old.
5. Number of coffee seedling planted will be 880 seedlings/ha with additional seedlings (10%) to replace dying ones.
6. Price of liberica coffee berries is Rp 3000,-/kg.
7. Pests (esp. wild boars and monkeys) can be effectively controlled.

A. Cost of Liberica Coffee Farming

Component	Cost (Rp)	Number	Investment	
			Year 1	Year 10
Sprayer	350	2 units	700,000	700,000
Spade	50	10 units	500,000	500,000
Fork	50	8 units	400,000	400,000
Water pump & water hose	1.000.000	1 unit	1,000,000	1,000,000
Ember	25	10 units	250,000	250,000
Sickle	20	5 units	100,000	100,000
Supporting cane	500	1.600 units	800,000	-
Permanent cost			3,750,000	2,950,000
Total Investment Cost				

Decline of equipments			375,000
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B. Cost Analysis of Liberica Coffee Farming (unit land of 1 ha)

No	Component	Unit	Cost (Rp)	Number of Units	Total (Rp)								
					Year 0	Year 1	Year 2	Year 3	Year 4	Year 18	Year 19	Year 20	
A	Input												
1	Supporting cane	Cane	500	800	400,000								
2	Coffee seedling	Seedling	9,000	880	7,920,000								
B	Supporting materials & equipments												
1	Penyusutan alat					375,000	375,000	375,000	375,000				
2	Organic fertilizer	Kg	1,000	800	800,000	800,000	800,000	800,000	800,000				
C	Man power												
1	Land preparation	Man-day	100,000	4	400,000	-	-	-	-				
2	Making of planting holes	Man-day	100,000	4	400,000	-	-	-	-				
3	Planting of seedlings	Man-day	100,000	4	400,000	-	-	-	-				
4	Substitutive planting	Man-day	100,000	2		200,000	-	-	-				
5	Tilling	Man-day	100,000	2	200,000	200,000	200,000	200,000	200,000				
6	Fertilizer application	Man-day	100,000	2	200,000	200,000	200,000	200,000	200,000				
7	Weeding	Man-day	100,000	2	200,000	200,000	200,000	200,000	200,000				
8	Pest control	Man-day	100,000	4	400,000	400,000	400,000	400,000	400,000				
9	Pruning	Man-day	100,000	4	400,000	400,000	400,000	400,000	400,000				
10	harvesting	Man-day	100,000	20					2,000,000	2,000,000	2,000,000	2,000,000	
Total					11,720,000	2,775,000	2,575,000	2,575,000	4,575,000	2,000,000	2,000,000	2,000,000	

C. Net Income of Liberica Coffee Farming (on 1-ha land)

Year	Total Harvest (kg)	Price of Coffee* (Rp)	Income (Rp)	Expense (Rp)	Profit (Rp)
0	0	0	0	11,720,000	(11,720,000)
1	0	0	0	2,775,000	(2,775,000)
2	0	0	0	2,575,000	(2,575,000)
3	0	0	0	2,575,000	(2,575,000)
4	4000	3,000	12,000,000	4,575,000	7,425,000
5	5000	3,000	15,000,000	4,575,000	10,425,000
6	6000	3,000	18,000,000	4,575,000	13,425,000
7	7000	3,000	21,000,000	4,575,000	16,425,000
8	8000	3,000	24,000,000	4,575,000	19,425,000
9	9000	3,000	27,000,000	4,575,000	22,425,000
10	10000	3,000	30,000,000	4,575,000	25,425,000
11	11000	3,000	33,000,000	4,575,000	28,425,000
12	10000	3,000	30,000,000	4,575,000	25,425,000
13	9500	3,000	28,500,000	4,575,000	23,925,000
14	8500	3,000	25,500,000	4,575,000	20,925,000
15	8000	3,000	24,000,000	4,575,000	19,425,000
16	7500	3,000	22,500,000	4,575,000	17,925,000
17	7000	3,000	21,000,000	2,000,000	19,000,000
18	6000	3,000	18,000,000	2,000,000	16,000,000
19	4500	3,000	13,500,000	2,000,000	11,500,000
20	4250	3,000	12,750,000	2,000,000	10,750,000
Total			375,750,000	87,120,000	288,630,000

*Fresh berries

Assumptions:

1. Coconut plot (1 ha) to be enriched with liberica coffee is already available (with coconut palm as shade trees)
2. There is no sharing of production cost between coffee and the crop used as shade trees
3. Reinvestment is to be done every 10 years
4. Liberica coffee starts producing at the age 4 years old and its productivity declines after reaching the age of 20 years old.
5. Number of coffee seedling planted will be 880 seedlings/ha with additional seedlings (10%) to replace dying ones.
6. Price of liberica coffee berries is Rp 3000,-/kg.
7. Pests (esp. wild boars and monkeys) can be effectively controlled.

Year	Cost	Income	DF (16%)	Net Income	Present Value NI	Present Value Cost	Present Value Cash Income
0	11,720,000	0	1	-11,720,000	-11,720,000	11,720,000	0
1	2,775,000	0	1	-2,775,000	-2,392,241	2,392,241	0
2	2,575,000	0	1	-2,575,000	-1,913,644	1,913,644	0
3	2,575,000	0	1	-2,575,000	-1,649,694	1,649,694	0
4	4,575,000	12,000,000	1	7,425,000	4,100,761	2,526,732	6,627,493
5	4,575,000	15,000,000	0	10,425,000	4,963,478	2,178,217	7,141,695
6	4,575,000	18,000,000	0	13,425,000	5,510,187	1,877,773	7,387,961
7	4,575,000	21,000,000	0	16,425,000	5,811,650	1,618,770	7,430,420
8	4,575,000	24,000,000	0	19,425,000	5,925,119	1,395,491	7,320,611
9	4,575,000	27,000,000	0	22,425,000	5,896,721	1,203,010	7,099,730
10	4,575,000	30,000,000	0	25,425,000	5,763,431	1,037,077	6,800,508
11	4,575,000	33,000,000	0	28,425,000	5,554,725	894,032	6,448,758
12	4,575,000	30,000,000	0	25,425,000	4,283,168	770,718	5,053,885
13	4,575,000	28,500,000	0	23,925,000	3,474,546	664,412	4,138,958
14	4,575,000	25,500,000	0	20,925,000	2,619,712	572,769	3,192,481
15	4,575,000	24,000,000	0	19,425,000	2,096,482	493,766	2,590,248
16	4,575,000	22,500,000	0	17,925,000	1,667,751	425,660	2,093,412
17	2,000,000	21,000,000	0	19,000,000	1,523,940	160,415	1,684,354
18	2,000,000	18,000,000	0	16,000,000	1,106,308	138,289	1,244,597
19	2,000,000	13,500,000	0	11,500,000	685,482	119,214	804,696
20	2,000,000	12,750,000	0	10,750,000	552,394	102,771	655,165
Total	87,120,000	375,750,000		288,630,000	43,860,277	33,854,695	77,714,973

NPV	43,860,277.37
IRR	16.61%
RCR	2.30
BCR	1.30

(3) Attachment 1: Pulang Pisau District, Central Kalimantan Province

1) Gelam (*Melaleuca cajuputi*) plantation

Tabel 1. Budidaya Tanaman Gelam per Hektar

Umur Proyek (Tahun)	Nilai Lahan (Rp)	Penyusutan Lahan (Rp.)	Bibit (batang)	Harga (@ Rp)	Nilai (Rp.)	Pembersihan Lahan (Rp)	Penanaman (Btg)	Harga (@ Rp)	Nilai (Rp.)	Pemeliharaan (Rp.)	Jumlah Biaya (Rp.)
0	10,000,000		11,000	1,000	11,000,000	5,000,000	10,000	1,500	15,000,000		41,000,000
1		454,545								1,500,000	1,500,000
2		454,545								1,500,000	1,500,000
3		454,545								1,500,000	1,500,000
4		454,545								1,500,000	1,500,000
5		454,545								1,500,000	1,500,000
Total	10,000,000	2,272,727	11,000		11,000,000	5,000,000	10,000		15,000,000	7,500,000	48,500,000

Tabel 2. Perkiraan Penerimaan Budidaya Tanaman Gelam

Umur Tanaman (Tahun)	Produksi (Btg)	Harga (Rp)	Total Penerimaan (Rp)	Kumulatif Penerimaan (Rp)
1			0	0
2			0	0
3			0	0
4			0	0
5	25,000	5,500	137,500,000	137,500,000
Total	25,000	5,500	137,500,000	

Tabel 3. Proyeksi Laba-Rugi Budidaya Tanaman Gelam

Umur Proyek (Tahun)	Pengeluaran (Rp)	Penerimaan (Rp)	Surplus/ Defisit (Rp)	Kumulatif Surplus (Rp)	Pay Back Period
0	41,000,000	0	-41,000,000	-41,000,000	
1	1,500,000	0	-1,500,000	-42,500,000	
2	1,500,000	0	-1,500,000	-44,000,000	
3	1,500,000	0	-1,500,000	-45,500,000	
4	1,500,000	0	-1,500,000	-47,000,000	
5	1,500,000	137,500,000	136,000,000	89,000,000	*****
Total	48,500,000	137,500,000	89,000,000	-	-

Tabel 4. Analisis Kelayakan Budidaya Tanaman Gelam

Umur Proyek (Tahun)	DF	PV Pengeluaran	PV Penerimaan
0	1.0000	41,000,000	0
1	0.8621	1,684,953	0
2	0.7432	1,452,546	0
3	0.6407	1,252,195	0
4	0.5523	1,079,478	0
5	0.4761	930,585	65,465,540
Total		47,399,756	65,465,540
	NPV	18,065,784	
	BCR	1.38	

2) Laban (*Vitex pinnata* L) plantation

Tabel 1. Budidaya Tanaman Laban per Hektar

Umur Proyek (Tahun)	Nilai Lahan (Rp)	Penyusutan			Nilai (Rp.)	Pembersihan		Harga (@ Rp)	Nilai (Rp.)	Pemeliharaan (Rp.)	Jumlah Biaya (Rp.)
		Lahan (Rp.)	Bibit (batang)	Harga (@ Rp)		Lahan (Rp)	Penanaman (Btg)				
0	20,000,000		2,700	1,000	2,700,000	5,000,000	10,000	1,500	15,000,000		42,700,000
1		909,091								1,500,000	1,500,000
2		909,091								1,500,000	1,500,000
3		909,091								1,500,000	1,500,000
4		909,091								1,500,000	1,500,000
5		909,091								1,500,000	1,500,000
6		909,091								1,500,000	1,500,000
7		909,091								1,500,000	1,500,000
8		909,091								1,500,000	1,500,000
9		909,091								1,500,000	1,500,000
10		909,091								1,500,000	1,500,000
11		909,091								1,500,000	1,500,000
12		909,091								1,500,000	1,500,000
13		909,091								1,500,000	1,500,000
14		909,091								1,500,000	1,500,000
15		909,091								1,500,000	1,500,000
16		909,091								1,500,000	1,500,000
17		909,091								1,500,000	1,500,000
18		909,091								1,500,000	1,500,000
19		909,091								1,500,000	1,500,000
20		909,091								1,500,000	1,500,000
Total	20,000,000	18,181,818	2,700		2,700,000	5,000,000	10,000			15,000,000	30,000,000

Tabel 2. Perkiraan Penerimaan Budidaya Tanaman Laban

Umur Tanaman (Tahun)	Produksi (Btg)	Harga (Rp)	Total Penerimaan (Rp)	Kumulatif Penerimaan (Rp)
5			0	0
6			0	0
7	1,250	55,000	68,750,000	68,750,000
8	1,250	55,000	68,750,000	137,500,000
9			0	137,500,000
10			0	137,500,000
11			0	137,500,000
12			0	137,500,000
13			0	137,500,000
14	1,250	55,000	68,750,000	206,250,000
15	1,250	55,000	68,750,000	275,000,000
16			0	275,000,000
17			0	275,000,000
18			0	275,000,000
19			0	275,000,000
20	1,250	55,000	68,750,000	343,750,000
Total	6,250	275,000	343,750,000	

Tabel 3. Proyeksi Laba-Rugi Budidaya Tanaman Laban

Umur Proyek (Tahun)	Pengeluaran (Rp)	Penerimaan (Rp)	Surplus/ Defisit (Rp)	Kumulatif Surplus (Rp)	Pay Back Period
0	42,700,000	0	-42,700,000	-42,700,000	
1	1,500,000	0	-1,500,000	-44,200,000	
2	1,500,000	0	-1,500,000	-45,700,000	
3	1,500,000	0	-1,500,000	-47,200,000	
4	1,500,000	0	-1,500,000	-48,700,000	
5	1,500,000	0	-1,500,000	-50,200,000	
6	1,500,000	0	-1,500,000	-51,700,000	
7	1,500,000	68,750,000	67,250,000	15,550,000	*****
8	1,500,000	68,750,000	67,250,000	82,800,000	
9	1,500,000	0	-1,500,000	81,300,000	
10	1,500,000	0	-1,500,000	79,800,000	
11	1,500,000	0	-1,500,000	78,300,000	
12	1,500,000	0	-1,500,000	76,800,000	
13	1,500,000	0	-1,500,000	75,300,000	
14	1,500,000	68,750,000	67,250,000	142,550,000	
15	1,500,000	68,750,000	67,250,000	209,800,000	
16	1,500,000	0	-1,500,000	208,300,000	
17	1,500,000	0	-1,500,000	206,800,000	
18	1,500,000	0	-1,500,000	205,300,000	Pendapatan
19	1,500,000	0	-1,500,000	203,800,000	per bulan
20	1,500,000	68,750,000	67,250,000	271,050,000	1,129,375
Total	30,000,000	343,750,000	313,750,000	-	-

Tabel 4. Analisis Kelayakan Budidaya Tanaman Laban

Umur Proyek (Tahun)	DF 0.16	PV Pengeluaran	PV Penerimaan
0	1.0000	42,700,000	0
1	0.8621	2,076,803	0
2	0.7432	1,790,347	0
3	0.6407	1,543,403	0
4	0.5523	1,330,519	0
5	0.4761	1,147,000	0
6	0.4104	988,793	0
7	0.3538	852,408	24,325,780
8	0.3050	734,834	20,970,500
9	0.2630	633,478	0
10	0.2267	546,101	0
11	0.1954	470,777	0
12	0.1685	405,842	0
13	0.1452	349,864	0
14	0.1252	301,607	8,607,179
15	0.1079	260,006	7,419,982
16	0.0930	224,143	0
17	0.0802	193,227	0
18	0.0691	166,575	0
19	0.0596	143,599	0
20	0.0514	123,792	3,532,750
Total		56,983,117	64,856,192
	NPV	7,873,075	
	BCR	1.14	

3) Balangeran (*Shorea balangeran* (Korth.)) plantation

Tabel 1. Budidaya Tanaman Balangeran per Hektar

Umur Proyek (Tahun)	Nilai Lahan (Rp)	Penyusutan		Harga (@ Rp)	Nilai (Rp.)	Pembersihan		Penanaman		Nilai (Rp.)	Pemeliharaan (Rp.)	Jumlah Biaya (Rp.)
		Lahan (Rp.)	Bibit (batang)			Lahan (Rp)	Harga (@ Rp)					
0	10,000,000		5,000	2,000	10,000,000	5,000,000	5,000	1,500	7,500,000			32,500,000
1		454,545									1,500,000	1,500,000
2		454,545									1,500,000	1,500,000
3		454,545									1,500,000	1,500,000
4		454,545									1,500,000	1,500,000
5		454,545									1,500,000	1,500,000
6		454,545									1,500,000	1,500,000
7		454,545									1,500,000	1,500,000
8		454,545									1,500,000	1,500,000
9		454,545									1,500,000	1,500,000
10		454,545									1,500,000	1,500,000
11		454,545									1,500,000	1,500,000
12		454,545									1,500,000	1,500,000
13		454,545									1,500,000	1,500,000
14		454,545									1,500,000	1,500,000
15		454,545									1,500,000	1,500,000
16		454,545									1,500,000	1,500,000
17		454,545									1,500,000	1,500,000
18		454,545									1,500,000	1,500,000
19		454,545									1,500,000	1,500,000
20		454,545									1,500,000	1,500,000
Total	10,000,000	9,090,909	5,000		10,000,000	5,000,000	5,000		7,500,000		30,000,000	62,500,000

Tabel 2. Perkiraan Penerimaan Budidaya Tanaman Balangeran

Umur Tanaman (Tahun)	Produksi (m3)	Harga (@]Rp)	Total Penerimaan (Rp)	Kumulatif Penerimaan (Rp)
5				0
6				0
7				0
8				0
9				0
10				0
11				0
12				0
13				0
14				0
15	250	3,000,000	750,000,000	750,000,000
16				750,000,000
17				750,000,000
18				750,000,000
19				750,000,000
20	250	3,000,000	750,000,000	1,500,000,000
Total	500		1,500,000,000	

Tabel 3. Proyeksi Laba-Rugi Budidaya Tanaman Balangeran

Umur Proyek (Tahun)	Pengeluaran (Rp)	Penerimaan (Rp)	Surplus/ Defisit (Rp)	Kumulatif Surplus (Rp)	Pay Back Period
0	32,500,000	0	-32,500,000	-32,500,000	
1	1,500,000	0	-1,500,000	-34,000,000	
2	1,500,000	0	-1,500,000	-35,500,000	
3	1,500,000	0	-1,500,000	-37,000,000	
4	1,500,000	0	-1,500,000	-38,500,000	
5	1,500,000	0	-1,500,000	-40,000,000	
6	1,500,000	0	-1,500,000	-41,500,000	
7	1,500,000	0	-1,500,000	-43,000,000	
8	1,500,000	0	-1,500,000	-44,500,000	
9	1,500,000	0	-1,500,000	-46,000,000	
10	1,500,000	0	-1,500,000	-47,500,000	
11	1,500,000	0	-1,500,000	-49,000,000	
12	1,500,000	0	-1,500,000	-50,500,000	
13	1,500,000	0	-1,500,000	-52,000,000	
14	1,500,000	0	-1,500,000	-53,500,000	
15	1,500,000	750,000,000	748,500,000	695,000,000	*****
16	1,500,000	0	-1,500,000	693,500,000	
17	1,500,000	0	-1,500,000	692,000,000	
18	1,500,000	0	-1,500,000	690,500,000	Pendapatan
19	1,500,000	0	-1,500,000	689,000,000	per bulan
20	1,500,000	750,000,000	748,500,000	1,437,500,000	5,989,583
Total	30,000,000	1,500,000,000	1,437,500,000	-	-

Tabel 4. Analisis Kelayakan Budidaya Tanaman Balangeran

Umur Proyek (Tahun)	DF 0.16	PV Pengeluaran	PV Penerimaan
0	1.0000	32,500,000	0
1	0.8621	1,684,953	0
2	0.7432	1,452,546	0
3	0.6407	1,252,195	0
4	0.5523	1,079,478	0
5	0.4761	930,585	0
6	0.4104	802,228	0
7	0.3538	691,576	0
8	0.3050	596,186	0
9	0.2630	513,954	0
10	0.2267	443,063	0
11	0.1954	381,951	0
12	0.1685	329,268	0
13	0.1452	283,852	0
14	0.1252	244,700	0
15	0.1079	210,948	80,945,260
16	0.0930	181,852	0
17	0.0802	156,769	0
18	0.0691	135,146	0
19	0.0596	116,505	0
20	0.0514	100,435	38,539,092
Total		44,088,189	119,484,353
NPV		75,396,164	
BCR		2.71	

4) Plantation and production of Rubber tree

Tabel 1. Budidaya Tanaman Karet per Hektar

Umur Proyek (Tahun)	Nilai			Pembersihan			Penanaman			Jumlah Biaya (Rp.)
	Lahan (Rp)	Bibit (batang)	Harga (@ Rp)	Nilai (Rp.)	Lahan (Rp)	Harga (@ Rp)	Nilai (Rp.)	Pemeliharaan (Rp.)	Panen (Rp.)	
0	20,000,000	450	1,000	450,000	5,000,000	450	1,500	675,000		26,125,000
1									1,730,000	1,730,000
2									1,730,000	1,730,000
3									1,730,000	1,730,000
4									1,730,000	1,730,000
5									1,730,000	1,730,000
6									1,730,000	1,730,000
7									1,730,000	2,281,250
8									1,730,000	2,281,250
9									1,730,000	2,281,250
10									1,730,000	2,281,250
11									1,730,000	2,281,250
12									1,730,000	2,281,250
13									1,730,000	2,281,250
14									1,730,000	2,281,250
15									1,730,000	2,281,250
16									1,730,000	2,281,250
17									1,730,000	2,281,250
18									1,730,000	2,281,250
19									1,730,000	2,281,250
20									1,730,000	2,281,250
21									1,730,000	2,281,250
22									1,730,000	2,281,250
23									1,730,000	2,281,250
24									1,730,000	2,281,250
25									1,730,000	2,281,250
Total	20,000,000	450		450,000	5,000,000	450		675,000	43,250,000	112,718,750

Tabel 2. Perkiraan Penerimaan Budidaya Tanaman Karet

Umur Tanaman (Tahun)	Produksi (kg)	Harga (@ Rp)	Total Penerimaan (Rp)	Kumulatif Penerimaan (Rp)
7	2,738	6,000	16,425,000	16,425,000
8	2,938	6,000	17,625,000	34,050,000
9	3,138	6,000	18,825,000	52,875,000
10	3,338	6,000	20,025,000	72,900,000
11	3,538	6,000	21,225,000	94,125,000
12	3,738	6,000	22,425,000	116,550,000
13	3,938	6,000	23,625,000	140,175,000
14	4,138	6,000	24,825,000	165,000,000
15	4,338	6,000	26,025,000	191,025,000
16	4,138	6,000	24,825,000	215,850,000
17	3,938	6,000	23,625,000	239,475,000
18	3,738	6,000	22,425,000	261,900,000
19	3,538	6,000	21,225,000	283,125,000
20	3,338	6,000	20,025,000	303,150,000
21	3,138	6,000	18,825,000	321,975,000
22	2,938	6,000	17,625,000	339,600,000
23	2,738	6,000	16,425,000	356,025,000
24	2,538	6,000	15,225,000	371,250,000
25	2,338	6,000	14,025,000	385,275,000
Total	64,213		385,275,000	

Tabel 3. Proyeksi Laba-Rugi Budidaya Tanaman Karet

Umur Proyek (Tahun)	Pengeluaran (Rp)	Penerimaan (Rp)	Surplus/ Defisit (Rp)	Kumulatif Surplus (Rp)	Pay Back Period
0	26,125,000	0	-26,125,000	-26,125,000	
1	1,730,000	0	-1,730,000	-27,855,000	
2	1,730,000	0	-1,730,000	-29,585,000	
3	1,730,000	0	-1,730,000	-31,315,000	
4	1,730,000	0	-1,730,000	-33,045,000	
5	1,730,000	0	-1,730,000	-34,775,000	
6	1,730,000	0	-1,730,000	-36,505,000	
7	4,011,250	16,425,000	12,413,750	-24,091,250	
8	4,011,250	17,625,000	13,613,750	-10,477,500	
9	4,011,250	18,825,000	14,813,750	4,336,250	****
10	4,011,250	20,025,000	16,013,750	20,350,000	
11	4,011,250	21,225,000	17,213,750	37,563,750	
12	4,011,250	22,425,000	18,413,750	55,977,500	
13	4,011,250	23,625,000	19,613,750	75,591,250	
14	4,011,250	24,825,000	20,813,750	96,405,000	
15	4,011,250	26,025,000	22,013,750	118,418,750	
16	4,011,250	24,825,000	20,813,750	139,232,500	
17	4,011,250	23,625,000	19,613,750	158,846,250	
18	4,011,250	22,425,000	18,413,750	177,260,000	
19	4,011,250	21,225,000	17,213,750	194,473,750	
20	4,011,250	20,025,000	16,013,750	210,487,500	
21	4,011,250	18,825,000	14,813,750	225,301,250	
22	4,011,250	17,625,000	13,613,750	238,915,000	
23	4,011,250	16,425,000	12,413,750	251,328,750	
24	4,011,250	15,225,000	11,213,750	262,542,500	
25	4,011,250	14,025,000	10,013,750	272,556,250	
Total	86,593,750	385,275,000	272,556,250	-	-

Tabel 4. Analisis Kelayakan Budidaya Tanaman Karet

Umur Proyek (Tahun)	DF 0.16	PV Pengeluaran	PV Penerimaan
0	1.0000	26,125,000	0
1	0.8621	1,491,379	0
2	0.7432	1,285,672	0
3	0.6407	1,108,338	0
4	0.5523	955,464	0
5	0.4761	823,676	0
6	0.4104	710,065	0
7	0.3538	1,419,299	5,811,650
8	0.3050	1,223,533	5,376,074
9	0.2630	1,054,770	4,950,090
10	0.2267	909,285	4,539,339
11	0.1954	783,866	4,147,724
12	0.1685	675,747	3,777,779
13	0.1452	582,540	3,430,978
14	0.1252	502,190	3,107,974
15	0.1079	432,922	2,808,801
16	0.0930	373,209	2,309,731
17	0.0802	321,732	1,894,899
18	0.0691	277,355	1,550,560
19	0.0596	239,099	1,265,161
20	0.0514	206,120	1,028,994
21	0.0443	177,690	833,906
22	0.0382	153,181	673,059
23	0.0329	132,052	540,719
24	0.0284	113,838	432,081
25	0.0245	98,136	343,126
Total		42,176,156	48,822,645
	NPV	6,646,489	
	BCR	1.16	

5) Raising of Alabio Duck

Tabel 1. Biaya Pemeliharaan Itik Alabio

Umur Proyek (Bulan)	Nilai Kandang (Rp)	Penyusutan Kandang (Rp.)	Bibit (ekor)	Harga (@ Rp)	Nilai (Rp.)	Broiler (kg)	Harga (@ Rp)	Nilai (Rp.)	Dedak (kg)	Harga (@ Rp)	Nilai (Rp.)	Jumlah Biaya (Rp.)
0	2,000,000		100	40,000	4,000,000							6,000,000
1		90,909				20	8,000	160,000	50	5,000	250,000	410,000
2		90,909				30	8,000	240,000	80	5,000	400,000	640,000
3		90,909							100	5,000	500,000	500,000
4		90,909							200	5,000	1,000,000	1,000,000
5		90,909							350	5,000	1,750,000	1,750,000
6		90,909							350	5,000	1,750,000	1,750,000
7		90,909							350	5,000	1,750,000	1,750,000
8		90,909							350	5,000	1,750,000	1,750,000
9		90,909							350	5,000	1,750,000	1,750,000
10		90,909							350	5,000	1,750,000	1,750,000
11		90,909							350	5,000	1,750,000	1,750,000
12		90,909							350	5,000	1,750,000	1,750,000
13		90,909							350	5,000	1,750,000	1,750,000
14		90,909							350	5,000	1,750,000	1,750,000
15		90,909							350	5,000	1,750,000	1,750,000
16		90,909							350	5,000	1,750,000	1,750,000
17		90,909							350	5,000	1,750,000	1,750,000
18		90,909							350	5,000	1,750,000	1,750,000
19		90,909							350	5,000	1,750,000	1,750,000
20		90,909							350	5,000	1,750,000	1,750,000
21		90,909							350	5,000	1,750,000	1,750,000
22		90,909							350	5,000	1,750,000	1,750,000
Total	2,000,000	2,000,000	100	40,000	4,000,000	50	16,000	400,000	6,730	110,000	33,650,000	40,050,000

Tabel 2. Perkiraan Penerimaan Telor Itik Alabio

Umur Proyek (Bulan)	Umur Itik Bulan ke-	Produksi Telor/ Hari/100 ekor (Butir)	Produksi Telor/ Bulan (Butir)	Produksi Daging (Kg)	Harga Telor (Rp/Butir)	Harga Daging (Rp/Kg)	Penerimaan Telor (Rp)	Penerimaan Daging (Rp)	Total Penerimaan (Rp)	Kumulatif Penerimaan (Rp)
4	6	45	1,350		2,000		2,700,000	0	2,700,000	2,700,000
5	7	70	2,100		2,000		4,200,000	0	4,200,000	6,900,000
6	8	90	2,700		2,000		5,400,000	0	5,400,000	12,300,000
7	9	92	2,760		2,000		5,520,000	0	5,520,000	17,820,000
8	10	89	2,670		2,000		5,340,000	0	5,340,000	23,160,000
9	11	87	2,610		2,000		5,220,000	0	5,220,000	28,380,000
10	12	84	2,520		2,000		5,040,000	0	5,040,000	33,420,000
11	13	81	2,430		2,000		4,860,000	0	4,860,000	38,280,000
12	14	77	2,310		2,000		4,620,000	0	4,620,000	42,900,000
13	15	75	2,250		2,000		4,500,000	0	4,500,000	47,400,000
14	16	72	2,160		2,000		4,320,000	0	4,320,000	51,720,000
15	17	70	2,100		2,000		4,200,000	0	4,200,000	55,920,000
16	18	68	2,040		2,000		4,080,000	0	4,080,000	60,000,000
17	19	65	1,950		2,000		3,900,000	0	3,900,000	63,900,000
18	20	62	1,860		2,000		3,720,000	0	3,720,000	67,620,000
19	21	58	1,740		2,000		3,480,000	0	3,480,000	71,100,000
20	22	54	1,620		2,000		3,240,000	0	3,240,000	74,340,000
21	23	48	1,440		2,000		2,880,000	0	2,880,000	77,220,000
22	24	42	1,260	160	2,000	70,000	2,520,000	11,200,000	13,720,000	90,940,000
		1,329	39,870	160	38,000	70,000	79,740,000	11,200,000	90,940,000	

Tabel 3. Proyeksi Laba-Rugi Pemeliharaan Itik Alabio

Umur Proyek (Bulan)	Pengeluaran (Rp)	Penerimaan (Rp)	Surplus/ Defisit (Rp)	Kumulatif Surplus (Rp)	Pay Back Period
0	6,000,000	0	-6,000,000	-6,000,000	
1	410,000	0	-410,000	-6,410,000	
2	640,000	0	-640,000	-7,050,000	
3	500,000	0	-500,000	-7,550,000	
4	1,000,000	2,700,000	1,700,000	-5,850,000	
5	1,750,000	4,200,000	2,450,000	-3,400,000	
6	1,750,000	5,400,000	3,650,000	250,000	*****
7	1,750,000	5,520,000	3,770,000	4,020,000	
8	1,750,000	5,340,000	3,590,000	7,610,000	
9	1,750,000	5,220,000	3,470,000	11,080,000	
10	1,750,000	5,040,000	3,290,000	14,370,000	
11	1,750,000	4,860,000	3,110,000	17,480,000	
12	1,750,000	4,620,000	2,870,000	20,350,000	
13	1,750,000	4,500,000	2,750,000	23,100,000	
14	1,750,000	4,320,000	2,570,000	25,670,000	
15	1,750,000	4,200,000	2,450,000	28,120,000	
16	1,750,000	4,080,000	2,330,000	30,450,000	
17	1,750,000	3,900,000	2,150,000	32,600,000	
18	1,750,000	3,720,000	1,970,000	34,570,000	
19	1,750,000	3,480,000	1,730,000	36,300,000	
20	1,750,000	3,240,000	1,490,000	37,790,000	Pendapatan
21	1,750,000	2,880,000	1,130,000	38,920,000	per bulan
22	1,750,000	13,720,000	11,970,000	50,890,000	2,313,182
Total	40,050,000	90,940,000	50,890,000	-	-

Tabel 4. Analisis Kelayakan Pemeliharaan Itik Alabio

Umur Proyek (Bulan)	DF 0.013	PV Pengeluaran	PV Penerimaan
0	1.0000	6,000,000	0
1	0.9868	494,318	0
2	0.9739	711,801	0
3	0.9610	567,889	0
4	0.9484	1,034,616	2,560,675
5	0.9359	1,722,942	3,930,861
6	0.9236	1,700,272	4,987,464
7	0.9115	1,677,900	5,031,214
8	0.8995	1,655,822	4,803,111
9	0.8876	1,634,035	4,633,397
10	0.8759	1,612,535	4,414,762
11	0.8644	1,591,317	4,201,077
12	0.8530	1,570,379	3,941,069
13	0.8418	1,549,716	3,788,194
14	0.8307	1,529,325	3,588,816
15	0.8198	1,509,202	3,443,217
16	0.8090	1,489,344	3,300,828
17	0.7984	1,469,748	3,113,687
18	0.7879	1,450,409	2,930,900
19	0.7775	1,431,324	2,705,733
20	0.7673	1,412,491	2,485,985
21	0.7572	1,393,906	2,180,688
22	0.7472	1,375,565	10,251,865
Total		36,584,856	76,293,543
	NPV	39,708,686	
	BCR	2.09	

6) Production of paddy

1	Biaya	Jumlah	Satuan	Harga/unit (Rp)	Nilai (Rp)
a	Pembelian alat				
	Cangkul	2	unit	60,000	120,000
	Parang	2	unit	75,000	150,000
	Sprayer	1	unit	450,000	450,000
	Sabit	3	unit	50,000	150,000
					870,000
	Penyusutan alat				310,000
b	Pembelian bahan				
	Herbisida	6	liter	60,000	360,000
	Benih	30	kg	15,000	450,000
	Urea	150	kg	5,000	750,000
					1,560,000
c	Tenaga kerja				
	Persiapan lahan	15	HOK	75,000	1,125,000
	Penanaman	10	HOK	75,000	750,000
	Pemeliharaan	9	HOK	75,000	675,000
	Panen	15	HOK	75,000	1,125,000
	Perontokan	7	HOK	75,000	525,000
	Pembersihan	6	HOK	75,000	450,000
	Penjemuran	4	HOK	75,000	300,000
					4,950,000
	Total biaya				6,820,000
2	Produksi				
a	Padi	980	kg	6,000	5,880,000
b	Jagung	225	tongkol	2,000	450,000
c	Ubi kayu	300	kg	3,000	900,000
d	Sayuran	150	ikat	1,000	150,000
	Total Manfaat				7,380,000
	BCR				1.08
	NPV				560,000

5 Summary on Green Finance

Green finance can be understood as financing of investments that provide environmental benefits in the broader context of environmentally sustainable development¹. Such investments are called "green investments", and they include not only climate related investments but also the others such as waste processing and recycling, biodiversity protection, water sanitation, industrial pollution control, etc. (Figure 5.1)².

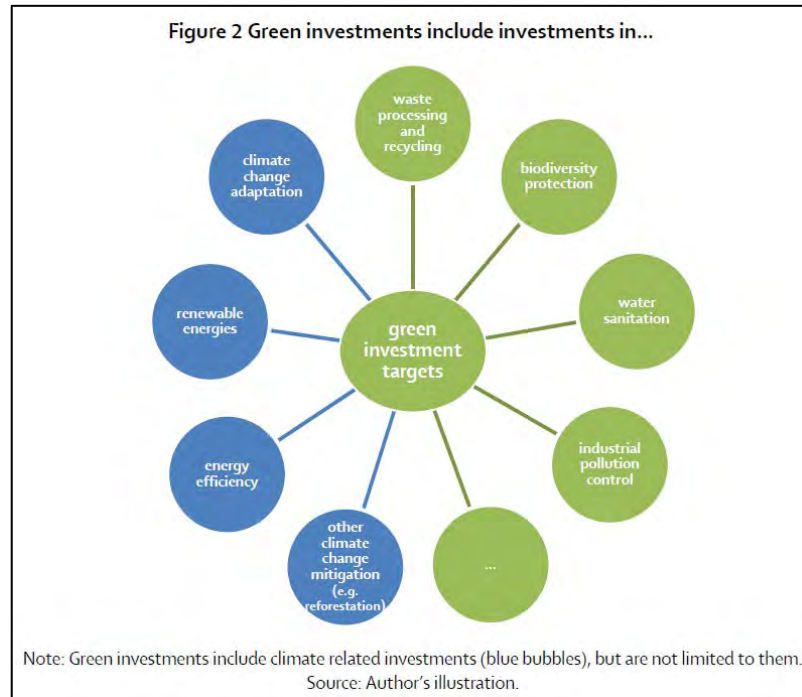


Figure 5.1 The scope of green investment targets.

Source: Definition of Green Finance. Nannette Lindenberg, 2014

Recently, some financial systems are developed to be specialized into the green investment, and one of the leading example is Green Bond. Green Bonds are any type of bond instrument where the proceeds will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects and which are aligned with the four core components of the Green Bond Principles (GBP)³.

The GBP are voluntary process guidelines that recommend transparency and disclosure and promote integrity in the development of the Green Bond market by clarifying the approach for issuance of a Green Bond. The GBP have four core components:

1. Use of Proceeds
2. Process for Project Evaluation and Selection
3. Management of Proceeds
4. Reporting

Annual issuance of Green Bonds grows rapidly, and it is estimated to reach about 150 billion

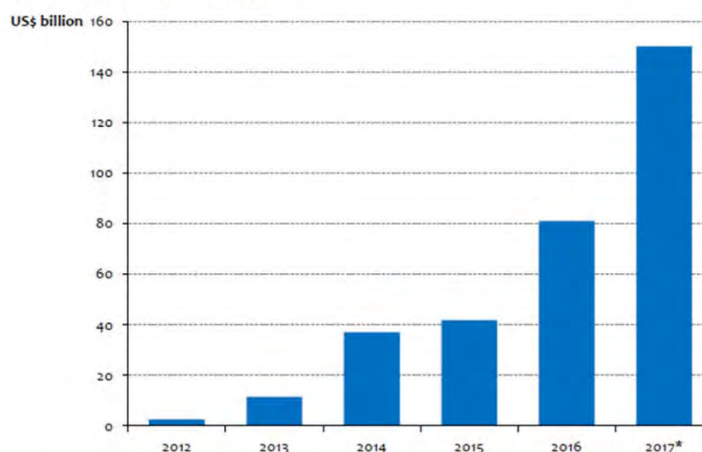
¹ G20 Green finance synthesis report. G20 Green Finance Study Group, 2016

² Definition of Green Finance. Nannette Lindenberg, 2014

³ The Green Bond Principles 2017. International Capital Market Association, 2017

dollars in 2017 (Figure 5.2)⁴. However, further growth is expected in the future.

FIGURE 1: GREEN BONDS ANNUAL ISSUANCE



Source: Climate Bonds Initiative; *Climate Bonds Initiative estimated value for 2017

Figure 5.2 Green bonds annual issuance.

Source: Green Finance Progress Report. UN environment, 2017

A large and liquid green bonds market can support countries in achieving the targets (Nationally Determined Contribution: NDCs) set out in the Paris Climate Agreement. Global climate leaders have recently set a milestone of 1 trillion dollars in green bonds by 2020 (Figure 5.3)⁵.



Figure 5.3 Growth targets of Green Bonds market.

Source: Green Bonds Policy: Highlights from Q1-Q2 2017. Climate Bonds Initiative, 2017

The most commonly used types of projects supported or expected to be supported by the Green Bond market are as follows⁶:

1. Renewable energy
2. Energy efficiency
3. Pollution prevention and control
4. Environmentally sustainable management of living natural resources and land use
5. Terrestrial and aquatic biodiversity conservation

⁴ Green Finance Progress Report. UN environment, 2017

⁵ Green Bonds Policy: Highlights from Q1-Q2 2017. Climate Bonds Initiative, 2017

⁶ The Green Bond Principles 2017. International Capital Market Association, 2017

6. Clean transportation
7. Sustainable water and wastewater management
8. Climate change adaptation
9. Eco-efficient and/or circular economy adapted products, production technologies and processes
10. Green buildings which meet regional, national or internationally recognized standards or certifications

However, in actuality, 80% of the Green Bonds were invested in Energy, Building & Industry and Transport sectors (Figure 5.4)⁷. On the other hand, only 2.1% were invested in Agriculture & Forestry sector and most of them belonged to Multi-sector. The low proportion in Agriculture & Forestry sector is also found in case the other climate-aligned funds are taken into account (Figure 5.5).

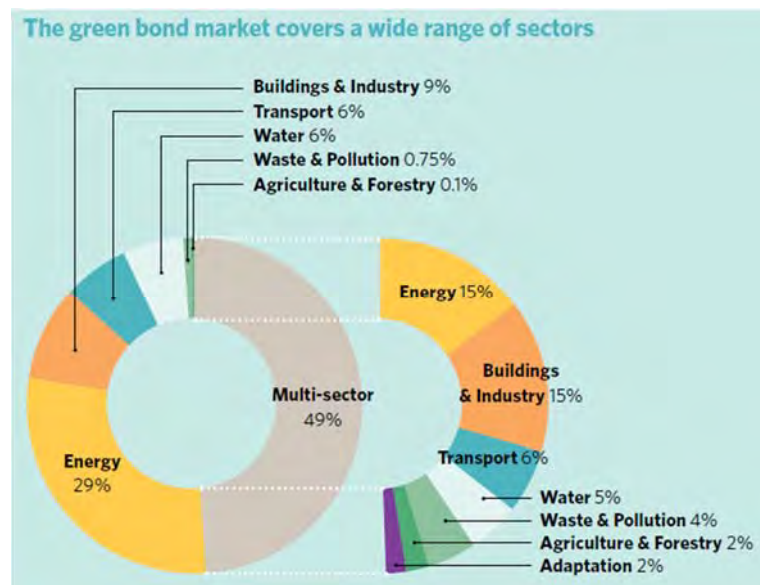


Figure 5.4 Proportion of each sector supported by Green Bonds.

Source: Bonds and Climate Change: The state of market 2016. Climate Bond Initiative, 2016

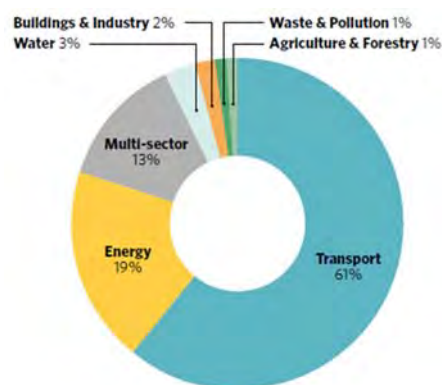


Figure 5.5 Proportion of each sector supported by Climate-aligned Bonds that include the Green Bonds.

Source: Bonds and Climate Change: The state of market 2016. Climate Bond Initiative, 2016

⁷ Bonds and Climate Change: The state of market 2016. Climate Bond Initiative, 2016

These are far from the proportion of source of greenhouse-gas emission where Agriculture, Forestry and Other Land Use (AFOLU) occupy about 25% of the total amount (Figure 5.6)⁸. Therefore, in the context of climate change mitigation, investment to the Agriculture & Forestry sector would be insufficient.

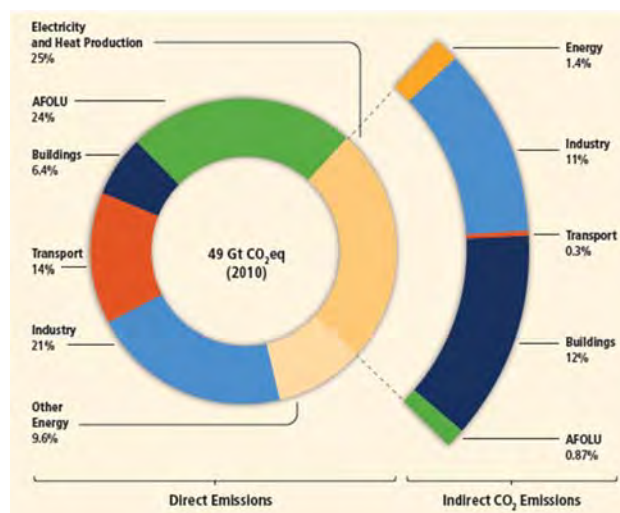


Figure 5.6 Greenhouse-gas emissions by economic sectors in 2010.

Source: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, 2014

Forest bonds can play a powerful role in financing forest preservation as the policy landscape, globally and within countries, takes shape⁹. However, sufficient investment has not been obtained under present circumstances. Carbon markets are an important source of cash flows that could be used to back a bond, but they are not yet reliable enough.

Therefore, Forest bonds should not rely solely on forest carbon revenue and could potentially be linked to income from other ecosystem service markets, sustainable timber and agricultural markets, regulation (e.g. taxes, liability regulation), and forest-friendly lending (e.g. to ecosystem-dependent small- and medium-sized enterprises).

Building a feasible business model would be indispensable for attracting investment to the Agriculture & Forestry sector. Green Bonds and/or the other Bonds would become a candidate to finance the activities.

⁸ Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, 2014

⁹ Unlocking Forest Bonds: A High-Level Workshop on Innovative Finance for Tropical Forests. Cranford et al., 2011

6 List of Collected References

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
Peatland Restoration (PR)									
1	Decree of the Head of Peatland Restoration Agency No. SK 05/BRG/Kpts/2016 on the Establishment of the Indicative Map for Peat Restoration	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
2	Circular Letter of Head of Peatland Restoration Agency No. SE 02/KB/11/2016 on Tutorial for Pre arrangement of Peat land in the area of Forest Product Utilization License in Production Forest	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
3	Ministerial Decree of Environmental and Forestry No. P.14/MenLHK/Setjen/Kum.1/2/2017 on Procedures of Inventory and Determination of Peat Ecosystem Function	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
4	Ministerial Decree of Environmental and Forestry No. P.15/MenLHK/Setjen/Kum.1/2/2017 on Procedures for Measuring groundwater levels at the point of Peat Ecosystem Planning	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
5	Ministerial Decree of Environmental and Forestry No. P.16/MenLHK/Setjen/Kum.1/2/2017 concerning Technical Guidelines for Restoration of Peat Ecosystem Function	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
6	Ministerial Decree of Environmental and Forestry No. P.17/MenLHK/Setjen/Kum.1/2/2017 On Amendment to Ministerial Decree of Environmental and Forestry No.12/MenLHK-II/2015 on the Development of Industrial Plantation Forest	Ministry of Environment and Forestry	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
7	Decree of Head of Peatland Restoration Agency No. P.3/KB BRG-SB/11/2016 on Procedures for Verification and Location Determination For Responsible Peatland Restoration Effort	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
8	Government Regulation No. 71 of 2014 on Protection and Management of Peat Ecosystem	Government of Indonesia	Digital	1				JR • CR ()	
9	Government Regulation No. 57 of 2016 on Change of Governmental Regulation No. 71 of 2014 on Protection and Management of Peat Ecosystem	Government of Indonesia	Digital	1				JR • CR ()	
10	Development `prospect of Some Alternative Species in Wetland Area	Forest Research and Development Innovation Agency, MOEF	Digital	1				JR • CR ()	
11	Guidance and Procedures for Nursery Development in Peatlands	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
12	Guidance and Procedures for Forest Cultivation at Peat Swamp	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
13	Guidelines and Procedures for Planting in Peatlands and Maintenance	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
14	Technical Guideline of Peatland Revegetation	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
15	Rencana Strategis Badan Restorasi Gambut 2016-2020	Badan Restorasi gambut (BRG)	Digital	1				JR • CR ()	
16	Peraturan Presiden Republik Indonesia Nomor 1 Tahun 2016 tentang Badan Restorasi Gambut	Government of Indonesia	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
17	Undang-undang No.32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup	Government of Indonesia	Digital	1				JR • CR ()	
18	Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut	Government of Indonesia	Digital	1				JR • CR ()	
19	Peraturan Pemerintah Republik Indonesia Nomor 57 Tahun 2016 tentang Perubahan atas Peraturan Pemerintah Nomor 71 Tahun 2014 tentang Perlindungan dan Pengelolaan Ekosistem Gambut	Government of Indonesia	Digital	1				JR • CR ()	
20	Peraturan Menteri Lingkungan Hidup dan Kehutanan Republik Indonesia Nomor P.15/Menlhk/Setjen/Kum.1/2/2017 tentang Tata Cara Pengukuran Muka Air Tanah di Titik Penaatan Ekosistem Gambut	Government of Indonesia	Digital	1				JR • CR ()	
21	Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.14/MenLHK/Setjen/Kum.1/2/2017 tentang Tata Cara Inventarisasi dan Penetapan Fungsi Ekosistem Gambut	Government of Indonesia	Digital	1				JR • CR ()	
22	Peraturan Menteri Lingkungan Hidup dan Kehutanan Nomor P.16/MenLHK/Setjen/Kum.1/2/2017 tentang Pedoman Teknis Pemulihan Fungsi Ekosistem Gambut	Government of Indonesia	Digital	1				JR • CR ()	
23	平成 22 年度 CDM/JI 事業調査「インドネシア・泥炭管理 NAMA 実現可能性調査」報告書	環境省	Digital	1				JR • CR ()	
24	PEAT-CO2, Assessment of CO2 emissions from drained peatlands in SE Asia	Delft Hydraulics	Digital	1				JR • CR ()	
Forest Management (FM)									
1	Challenges of GPP & Eco-Labeling; Indonesia Perspectives - The International Symposium on GPP and Eco-Labeling towards Sustainable Consumption &	Directorate for Standardization and	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	Production Tokyo, Japan, 11-12 December 2014	Technology Ministry of Environment and Forestry							
2	Ministerial Decree of Forestry No. P.36/Menhut-II/2009 on Procedures for Licensing of Commercial Utilization of Carbon Sequestration and/or Storage in Production and Protected Forests	Ministry of Forestry	Digital	1				JR • CR ()	
3	Decree of the Minister of Environment and Forestry No. P.9/Menlhk-II/2015 on Procedures for Granting, Extension of working area and Extension of Business License for Timber Forest Product Utilization in Natural Forest, Utilization License Timber Forest Ecosystem Restoration or Permit utilization of Wood Forest Plantation Industry in Production Forest	Direktur Jenderal Pengelolaan Hutan Produksi Lestari, Ministry Of Environment And Forestry	Digital	1				JR • CR ()	
4	Decree of the Director General of Sustainable Production Forest Management No. P.10/PHPL-SET/2015 on Guidelines for Preparation, Assessment and Approval of Work Plan, Annual Work Plan on Business Work Chart of Utilization License for Timber Forest Ecosystem Restoration	Direktur Jenderal Pengelolaan Hutan Produksi Lestari, Ministry Of Environment And Forestry	Digital	1				JR • CR ()	
5	Decree of the Minister of Forestry No. P8/Menhut-II/2014 on Restrictions Area of Utilization License Timber Forest Products (IUPHHK) in Natural Forests, Utilization License Timber Forest Products Industrial Plant Forest or Ecosystem Restoration in Production Forest	Moinistry of Forestry	Digital	1				JR • CR ()	
6	Decree of the Director General of Sustainable Production Forest Management No. P.9/SFM-SET/2015 on Technical Guidelines on Ecosystem Restoration Periodic Forest Inventory (Ihbre) On Utilization License	Ministry of Environment and Forestry	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	for Timber Forest Products of Ecosystem Restoration (IUPHHK- Re) in Natural Forests in Production Forest								
7	Ministerial Decree of Forestry No.P.31/Menhut-II/2014 on Procedures for Granting and Extension of the work area of Utilization License Timber Forest Products in Natural Forests, Forest Timber Utilization License for Ecosystem Restoration or Business License for Utilization of Wood Forest Industrial Plant in Production Forest	Ministry of Forestry	Digital	1				JR • CR ()	
8	Ministerial Decree of Forestry No. P. 64/Menhut-II/2014 on Application of Silviculture in the Area of Business License for Utilization of Ecosystem Restoration Forest in Production Forest	Ministry of Forestry	Digital	1				JR • CR ()	
9	Ministerial Decree of Forestry No. P. 66/Menhut-II/2014 on Periodic Forest Inventory and Work Plan on Utilization License Timber Forest Ecosystem Restoration	Ministry Of Forestry	Digital	1				JR • CR ()	
10	Ministerial Decree of ForestryNo. P.76/Menhut-II/2014 on Determination of the Amount of Forest Utilization Permit Fee	Ministry of Forestry	Digital	1				JR • CR ()	
11	Recapitulation of Utilization License Timber Forest Ecosystem Restoration (IUPHHK- Re) Year 2017		Digital	1				JR • CR ()	
12	Law No. 41 of 1999 on Forestry	President of the Republic of Indonesia	Digital	1				JR • CR ()	
13	Law No. 19 of 2004 on the Stipulation of Government Regulation in Lieu of Law No. 1 of 2004 on the Amendment of Act No. 41 of 1999 on Forestry	President of the Republic of Indonesia	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
14	Law No. 32 of 2009 on the Protection and Environmental Management	President of the Republic of Indonesia	Digital	1				JR • CR ()	
15	Law No. 18 of 2013 on the Prevention and Eradication of Forest Destruction	President of the Republic of Indonesia	Digital	1				JR • CR ()	
16	Law No. 23 of 2014 on the Regional Government as Several times amended the latest by Law No. 9 of 2015 on the second amendment to Law No. 23 of 2014 on Local Government	President of the Republic of Indonesia	Digital	1				JR • CR ()	
17	Law No. 37 of 2014 on Soil and Water Conservation	President of the Republic of Indonesia	Digital	1				JR • CR ()	
18	Government Regulation in Lieu of Law No. 1 of 2004 on the Amendment of Act No. 41 of 1999 on Forestry	President of the Republic of Indonesia	Digital	1				JR • CR ()	
19	Government Regulation No. 27 of 2012 on Environmental Permits	President of the Republic of Indonesia	Digital	1				JR • CR ()	
20	Ministerial Decree of Environment and Forestry No. P.1/MENLHK-II/2015 on Amendment Ministerial Decree of Environment and Forestry No. P.97/Menhut-II/2014 on Delegation of Authority Provision of Licensing and Non licenses on the Environment and Forestry In Implementation of the framework of One Stop to the Head of the Investment Coordinating Board	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
21	Ministerial Decree of Environment No. 5 of 2012 on Types of Business Plan and/or Activity and Mandatory to conduct EIA	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
22	Ministerial Decree of the Environment No. 16 of 2012 on Guidelines for the Preparation document to Environment	Ministry of Environment and Forestry	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
23	Ministerial Decree of Environment No. 08 of 2013 on the Procedure of Assessment and Examination of Documents Environment and Environmental Permit Issuance	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
24	Ministerial Decree of Environment and Forestry No. P.7/MENLHK-II/2015 on Technical Guidelines for Licensing and Non Granting licenses on the Environment and Forestry in the Implementation of One Stop Services	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
25	Ministerial Decree of Environment and Forestry No. P.08/MENLHK-II/2015 on Second Revision of Ministerial Decree of Forestry No. P.36/ Menhut-II/2009 on Procedures for Licensing of sequestration and / or storage of carbon in Production Forest and Forest protected	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
26	Ministerial Decree of Environment and Forestry No. P.12/MENLHK-II/2015 on Industrial Plantation Forest Development	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
27	Ministerial Decree of Environment and Forestry No. P.13/MENLHK-II/2015 on Business License for Forest Product Primary Industry	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
28	Ministerial Decree of Environment and Forestry No. P.14/MENLHK-II/2015 on the Procedures for Granting Permit Silvopastura Area Utilization in Production Forest	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
29	Ministerial Decree of Environment and Forestry No. P.17/Menlhk/Setjen/Kum.1/2/2017 on Changes to Ministerial Decree of Environment and Forestry No. P.12/Menlhk-II/2015 on Industrial Forest Plantation	Ministry of Environment and Forestry	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	Development								
30	Decree of Director General of Sustainable Production Forest Management No. P.21/PHPL/SET/Kum.0/12/2016 on guidelines for monitoring and evaluation of successful ecosystem restoration in production forest	Director General of Sustainable Production Forest Management	Digital	1				JR・CR ()	
31	Regulation of The Minister of Environment and Forestry of The Republic Of Indonesia Number P.40/Menlhk/Setjen/Kum.1/ 6/2017 On Government Facilities on Industrial Plant Forest Businesses in the Framework of Protection and Ecosystem Management	Ministry of Environment and Forestry	Digital	1				JR・CR ()	
32	Gerunggang (<i>Cratoxylum arborencens</i> Blume.) and Terentang (<i>Camptosperma coriaceum</i> Jack.), Trees for Peatland	Kementerian Kehutanan, Badan Penelitian dan Pengembangan Hutan, Pusat Penelitian dan Pengembangan Peningkatan Produktivitas Hutan	Digital	1				JR・CR ()	
33	平成 27 年度地球温暖化問題等対策調査事業（途上国における森林の減少・劣化の防止等への我が国企業の貢献可視化に向けた実現可能性調査事業）報告書	経済産業省	Digital	1				JR・CR ()	
34	Short Communication: Selected medicinal plants in East and North Kalimantan (Indonesia) against <i>Propionibacterium acnes</i>	Enos Tangke Arung, et al.	Digital	1				JR・CR ()	
Agriculture (AG)									
1	Ministerial Decree of Agriculture No. 26/Permentan/HK.140/04/2015 on Conditions, Procedures and	Ministry of Agriculture	Digital	1				JR・CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	Standard Operating Procedures Technical Recommendation Permit Granting in farming								
2	Ministerial Decree of Agriculture No. 70/Permentan/PD.200/6/2014 on Guidance on Licensing Horticulture Cultivation	Ministry of Agriculture	Digital	1				JR • CR ()	
3	Ministerial Decree of Agriculture No. 98/Permentan/OT.140/9/2013 on Guidance on Licensing for Plantation Business	Ministry of Agriculture	Digital	1				JR • CR ()	
4	Ministerial Decree of Agriculture No. 29/Permentan/OT.140/5/2016 on Amendment of Ministerial Decree of Agriculture No. 98/Permentan/OT.140/9/2013 on Guidance on Licensing for Plantation Business	Ministry of Agriculture	Digital	1				JR • CR ()	
5	Decision of Minister of Agriculture No. 1312/Kpts/KP.340/12/2014 on Delegation of Authority granting business licenses in the Field of Agriculture in the Context of Investment to the Head of the Investment Coordinating Board	Ministry of Agriculture	Digital	1				JR • CR ()	
6	Decision of Minister of Agriculture No. 511/Kpts/PD.310/9/2006 on Kinds of Plants Fostered by the Directorate General of Plantation, Directorate General of Food Crops, and Directorate General of Horticulture	Ministry of Agriculture	Digital	1				JR • CR ()	
7	Decision of Minister of Agriculture No. 3599/Kpts/KP.310/10/2009 on Amendment on Annex I in Decision of Minister of Agriculture No. 511/Kpts/PD.310/9/2006 About Kinds of Plants Fostered by the Directorate General of Plantation, Directorate General of Food Crops, and Directorate General Horticulture	Ministry of Agriculture	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
8	Government Regulation No. 18 of 2010 on the Crop Cultivation	Government of Indonesia	Digital	1				JR • CR ()	
9	Law No. 39 of 2014 on Gardening	Government of Indonesia	Digital	1				JR • CR ()	
10	Law No. 13 of 2010 on Horticulture	Government of Indonesia	Digital	1				JR • CR ()	
11	Law No. 12 of 1992 on Plant Cultivation System	Government of Indonesia	Digital	1				JR • CR ()	
12	Law No. 18 of 2009 on Animal Husbandry and Animal Health	Government of Indonesia	Digital	1				JR • CR ()	
13	Law No. 41 of 2014 on the Amendment of Law No. 18 of 2009 on Animal Husbandry and Animal Health	Government of Indonesia	Digital	1				JR • CR ()	
14	Law No. 41 of 2009 on the Protection of Agricultural Land Sustainable Food	Government of Indonesia	Digital	1				JR • CR ()	
15	Decision of Minister Of Agriculture No. 511/Kpts/Pd.310/9/2006 on Commodity Type Plants Fostered by Directorate General of Plantation, Directorate General of Crops and Horticulture	Ministry of Agriculture	Digital	1				JR • CR ()	
16	Ministerial Decree of Agriculture No. 07/Permentan/Ot.140/2/2012 on Technical Guidelines of Criteria and Requirements for Area, Land and Agricultural Land Reserve for Sustainable Food Agriculture	Ministry of Agriculture	Digital	1				JR • CR ()	
17	Ministerial Decree of Agriculture No. 14/Permentan/Pl.110/2/2009 on Guidelines for Utilization of Peat Land for Palm Oil	Ministry of Agriculture	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
18	Guide for Applicant Geographical Indications (GI)	EU-Indonesian Trade Cooperation Facility	Digital	1				JR • CR ()	
19	Description of New Superior Variety of Rice	Badan Penelitian dan Pengembangan Pertanian, Kementerian Pertanian	Digital	1				JR • CR ()	
20	Sago Palm (<i>Metroxylon sagu</i> Rottb.) Planting on Big Scale	Badan Penelitian dan Pengembangan, Kehutanan dan Perkebunan	Digital	1				JR • CR ()	
21	Potential of Sago Plant (<i>Metroxylon</i> sp.) to Support Food Security in Indonesia	Parama Tirta W.W.K, Novita Indrianti, Riyanti Ekafitri	Digital	1				JR • CR ()	
22	Regulation of The Minister of Agriculture of The Republic of Indonesia Number 98/Permentan/OT.140/9/2013 concerning Guidelines for Plantation Permit	Ministry of Agriculture	Digital	1				JR • CR ()	
23	Coffee-based Agroforestry as an Alternative to Improve Local Livelihoods in Peat Landscapes of Sumatra	Muhammad Sofiyuddin, Janudianto, Jasnari, and Noviana Khususiyah	Digital	1				JR • CR ()	
24	Assessment of Profitability of Land Use Systems in Tanjung Jabung Barat District, Jambi Province, Indonesia	Muhammad Sofiyuddin, Arief Rahmanulloh, S. Suyanto	Digital	1				JR • CR ()	
25	Sustainable Water and Carbon Management For Coastal Rice Farming Peatland In Indonesia	Akihiko Hirayama, <i>at al.</i>	Digital	1				JR • CR ()	
26	Water and Carbon Management For Mitigation In Degraded Tropical Peatland Rice Scheme	Akihiko Hirayama, <i>at al.</i>	Digital	1				JR • CR ()	
Investment (IV)									

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
1	Law on Investment (Law No. 25 of 2007)	President of the Republic of Indonesia	Digital	1				JR • CR ()	
2	Presidential Decree No. 44 of 2016 on Lists of Business Fields that are Closed to and Business Fields that are Open with Conditions to Investment	President of the Republic of Indonesia	Digital	1				JR • CR ()	
3	Ministerial Decree of Finance No. 159/PMK.010/2015 on Provision for Corporate Income Tax Reduction Facility	Ministry of Finance	Digital	1				JR • CR ()	
4	Decree of Head of Investment Coordinating Board No. 18 of 2015 on Amendments to the Decree of Head of Investment Coordinating Board No. 8 of 2015 on the procedure for requesting income tax facilities for investments in certain business sectors and/or in a particular area	BKPM	Digital	1				JR • CR ()	
5	Decree of Head of Investment Coordinating Board No 19 of 2015 on the Amendment of Decree of Head of Investment Coordinating Board No. 13 of 2015 on the procedure for requesting the provision of facilities for corporate income tax reduction	BKPM	Digital	1				JR • CR ()	
6	Decree of Head of Investment Coordinating Board No. 14 of 2015 on Guidelines and Procedures Permit Investment Principles	BKPM	Digital	1				JR • CR ()	
7	Decree of Head of Investment Coordinating Board No. 15 of 2015 on Guidelines and Procedures for Licensing and Non licensing Investment	BKPM	Digital	1				JR • CR ()	
8	Decree of Head of Investment Coordinating Board No. 6 of 2016 on Amendment of Decree of Head of Investment Coordinating Board No. 14 of 2015 on Guidelines and Procedures Permit Investment Principles	BKPM	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
9	Presidential Decree No. 39 of 2014 on the List of Business Fields Closed and Business Sectors Opened with Reservation in the Investment Sector	President of the Republic of Indonesia	Digital	1				JR • CR ()	
10	Law on Trade (Law No. 7 of 2014)	President of the Republic of Indonesia	Digital	1				JR • CR ()	
11	Decree of Head of Investment Coordinating Board No. 13 of 2015 on Application Procedures For Facilities Income Tax Reduction For Agency	BKPM	Digital	1				JR • CR ()	
12	Launch of Program for Green Economic Growth Phase II of Government of Indonesia and GGGI	BKPM	Digital	1				JR • CR ()	
13	Fiscal Facilities in order to Investment	Badan Koordinasi Penanaman Modal (BKPM)	Digital	1				JR • CR ()	
14	Private Role in Development Ecosystem Restoration in Indonesia	Utilization Planning Directorate and Business Areas Directorate General of Forest Utilization	Digital	1				JR • CR ()	
15	Ministerial Decree of Finance No. 76/PMK.011/2012 on Amendment to Ministerial Decree of Finance No. 176/PMK.011/2009 on Exemption from Import Duty on Import of Machinery as well as Goods and Materials for Development or Industrial Development in the Framework of Investment	Ministry of Finance	Digital	1				JR • CR ()	
16	Governmental Regulation No. 9 of 2016 on Amendment of Governmental Regulation No. 18 of 2015 on Income Tax Facility for Investment in Specific Business and/or Specific Regions	President of the Republic of Indonesia	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
17	Government Regulation No. 18 of 2015 on the Income Tax Facility for Investment in Specific Business and/or in Specific Locations	President of the Republic of Indonesia	Digital	1				JR • CR ()	
18	Ministerial Decree of Finance No. 144/PMK.011/2012 on Facilitation of Income Tax for Investment in Specific Business Sector and/or in Specific Locations	Ministry of Finance	Digital	1				JR • CR ()	
19	Ministerial Decree of Finance No. 89/PMK.010/2015 on Procedures for Provision of Income Tax Facilities for Investment in Specific Business Fields and / or in Specific Regions and Transfer of Assets and Sanctions for Domestic Agency Taxpayers Income Tax Facilities	Ministry of Finance	Digital	1				JR • CR ()	
20	Ministerial Decree of Finance No. 159/PMK.010/2015 on Giving Facilities of Income Tax Development	Ministry of Finance	Digital	1				JR • CR ()	
21	Ministerial Decree of Finance No. 176/PMK.011/2009 on Exemption from Import Duty on Import of Machinery as well as Goods and Materials for Development or Industrial Development in the Framework of Investment	Ministry of Finance	Digital	1				JR • CR ()	
22	Decree of Head of Investment Coordinating Board No. 8 of 2015 on Application Procedures of Income Tax Facilities for Capital Investment in Certain Business Fields and/or Certain Regions	BKPM	Digital	1				JR • CR ()	
23	Decree of Head of Investment Coordinating Board No. 10 of 2016 on the Implementation and Guidelines of Implementation of Deconcentration in Control of Implementation of Capital Investment by 2017	BKPM	Digital	1				JR • CR ()	
24	Decree of Head of Investment Coordinating Board No. 16 of 2015 on Guidelines and Procedures for Investment Facility Services	BKPM	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
25	Decree of Head of Investment Coordinating Board No. 17 of 2015 on Guidelines and Procedures for Controlling the Implementation of Investment	BKPM	Digital	1				JR・CR ()	
26	Presidential Decree No. 36 of 2010 on Lists of Business Fields that are Closed to and Business Fields that are Open with Conditions to Investment	President of the Republic of Indonesia	Digital	1				JR・CR ()	
27	Presidential Decree No. 77 Of 2007 On Amendment To Presidential Regulation Number 77 Year 2007 Regarding List Of Business Fields Closed And Open Business Fields With Requirements In The Field Of Investment	President of the Republic of Indonesia	Digital	1				JR・CR ()	
28	DNI Seminar (2nd) For Japanese Companies on Presidential Regulation Number 44 of 2016 concerning List of Business Fields Closed to Investment and Business Fields Open, with Condition, to Investment	BKPM	Digital	1				JR・CR ()	
29	JICA 投資セミナー「インドネシアの投資環境の現状」	BKPM Japan Desk JICA Expert	Digital	1				JR・CR ()	
30	Presidential Decree of the Republic of Indonesia Number 77 of 2007 concerning the List of Closed Business Fields and Opened Business Fields with Conditions in the Field of Investment	Government of Indonesia	Digital	1				JR・CR ()	
31	Government Regulation of the Republic of Indonesia Number 20 of 1994 concerning Share Ownership in Companies Established in the Framework of Foreign Investment	Government of Indonesia	Digital	1				JR・CR ()	
32	Regulation of the Minister of Finance of the Republic of Indonesia Number 112 / Pmk.05 / 2015 Concerning Tariff of Service of Public Service Agency of Forest Development Financing Center at Ministry of	Ministry of Finance	Digital	1				JR・CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	Environment and Forestry								
33	Revolving Fund for Financing Forestry Business	BLU PUA ST P2H Kementerian LHK	Digital	1				JR • CR ()	
34	Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number: P.59 / Menlhk-Setjen / 2015 on Procedures for Distribution and Revolving Revolving for Forest and Land Rehabilitation Activities	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
35	The Green Bond Principles 2017	ICMA	Digital	1				JR • CR ()	
36	The Social Bond Principles 2017	ICMA	Digital	1				JR • CR ()	
37	The Sustainability Bond Guidelines 2017	ICMA	Digital	1				JR • CR ()	
38	グリーンボンドガイドライン 2017 年版	環境省	Digital	1				JR • CR ()	
39	Regulation of the Minister of Finance of the Republic of Indonesia Number 104/Pmk.010/2016 concerning Taxation, Customs and Excise Tax on Special Economic Zone	Ministry of Finance	Digital	1				JR • CR ()	
40	Law of the Republic of Indonesia Number 39 Year 2009 regarding Special Economic Zones	Government of Indonesia	Digital	1				JR • CR ()	
41	Government Regulation of the Republic of Indonesia Number 96 of 2015 concerning the Facility and Easiness in Special Economic Zone	Government of Indonesia	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
42	Peraturan Pemerintah Republik Indonesia Nomor 46 Tahun 2013 tentang Pajak Penghasilan atas Penghasilan dari Usaha yang Diterima atau Diperole Wajib Pajak yang Memiliki Peredana Bruto Tertentu	Government of Indonesia	Digital	1				JR • CR ()	
43	Towards a Sustainable Financial System in Indonesia.	UNEP	Digital	1				JR • CR ()	
44	Delivering Green Growth for a Prosperous Indonesia A Roadmap for Policy, Planning and Investment	Government of Indonesia	Digital	1				JR • CR ()	
45	Peraturan Otoritas Jasa Keuangan Nomor 51/POJK.03/2017 tentang Penerapan Keuangan Berkelanjutan bagi Lembaga Jasa Keuangan, Emiten dan Perusahaan Publik	Government of Indonesia	Digital	1				JR • CR ()	
46	G20 Green Finance Synthesis Report	G20 Green Finance Study Group	Digital	1				JR • CR ()	
47	Definition of Green Finance	Nannette Lindenberg, German Development Institute	Digital	1				JR • CR ()	
48	Green Finance Progress Report	UN Environment	Digital	1				JR • CR ()	
49	Green Bonds Policy: Highlights from Q1-Q2 2017	Climate Bonds Initiative	Digital	1				JR • CR ()	
50	Bonds and Climate Change: The State of the Market in 2016	Climate Bonds Initiative	Digital	1				JR • CR ()	
Livelihood (LH)									
1	Agroforestry on peatlands: combining productive and protective functions as part of	World Agroforestry Centre Southeast Asia Regional	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	restoration: World Agroforestry Centre (ICRAF) Policy Brief No. 70	Program in collaboration with the ASEAN Working Group on Social Forestry							
2	Agroforestry Techniques On Peatland In Sabaru Village, Palangkaraya	Yanarita, Johanna M. Rotinsulu	Digital	1				JR • CR ()	
3	Ministerial Decree of Environment and Forestry No. P.83/Menlhk/Setjen/Kum.1/10/2016 on Social Forestry	Ministry of Environment and Forestry	Digital	1				JR • CR ()	
4	Decree of the Director General of Social Forestry and Environment Partnership No. P.11/PSKL/SET/PSL.0/11/2016 on Guidelines for Verification of Village Forest Application	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
5	Decree of the Director General of Social Forestry and Environment Partnership No. P.12/PSKL/SET/PSL.0/11/2016 on Guidelines for Verification of Permit Application of Commercial Utilization of Community Forest (UPHKm)	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
6	Decree of the Director General of Social Forestry and Environment Partnership No. P.13/PSKL/SET/PSL.0/11/2016 on Guidelines for Verification of Permit Application of Utilization Timber Forest Product in The People Plantation Forest (IUPHHk-Htr)	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
7	Decree of the Director General of Social Forestry and Environment Partnership No. P.14/PSKL/SET/PSL.0/11/2016 on Guideline of Facilitation, Formation and Rules for Accelerating the Working Group of Social Forestry (POKJA PPS)	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
8	Decree of the Director General of Social Forestry and Environment Partnership No. P.15/PSKL/SET/PSL.0/11	Director General of Social Forestry and	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	/2016 on Guideline for Social Forestry Online Service	Environmental Partnership							
9	Decree of the Director General of Social Forestry and Environment Partnership No. P.16/PSKL/SET/PSL. 0/11/2016 on Guideline for Village Forest Management Plan, Management Plan of Business Plan of Community Forestry utilization and Work Plan of Business License of Timber Product of People Plantation Forest	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
10	Decree of the Director General of Social Forestry and Environment Partnership No. P.17/PSKL/SET/PSL. 0/11/2016 on Guideline on Forest Community Activities	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
11	Decree of the Director General of Social Forestry and Environment Partnership No. P.16/PSKL/SET/PSL. 0/11/2016 on Guideline for Cooperation Agreement Draft Preparation	Director General of Social Forestry and Environmental Partnership	Digital	1				JR • CR ()	
12	Ministerial Decree of Marine and Fisheries No. PER.18/MEN/2012 on Guidelines for Preparing the Plan of Development Planning Minapolitan Area	Ministry of Marine and Fishery	Digital	1				JR • CR ()	
13	Ministerial Decree of Marine and Fisheries No. 35/KEPMEN-KP/2013 on Stipulation of Minapolitan Region	Ministry of Marine and Fishery	Digital	1				JR • CR ()	
14	Decision of the Director General of Aquaculture No. 111A/KEP-DJPB/2015 on Location of Integrated Minapolitan Area Based Aquaculture Production Center 2016	Director General of Aquaculture, Ministry of Marine and Fishery	Digital	1				JR • CR ()	
15	Scaling Up of Innovative Rice-Fish Farming in Indonesia and Its Dissemination in Indonesian Rice-Fish	Directorate General of Aquaculture, Ministry of Marine Affairs and Fisheries	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
16	Law No. 41 of 2014 on Amendment to Law No. 18 of 2009 on Animal Livestock and Health	Government of Indonesia	Digital	1				JR • CR ()	
17	Law No. 18 of 2009 on Animal Husbandry and Animal Health	Government of Indonesia	Digital	1				JR • CR ()	
18	Government Regulation No. 48 of 2011 on Genetic Resources of Animals and Livestocking	Government of Indonesia	Digital	1				JR • CR ()	
19	Decree of the Director General of Fishery No. 30/PER-DJPB/2016 on Technical Guidelines for Minapadi Cultivation Activity in 2016	Directorate General of Fishery, Ministry of Marine Affairs and Fisheries	Digital	1				JR • CR ()	
20	Assessment of Profitability of Land Use Systems in Tanjung Jabung Barat District, Jambi Province, Indonesia	Muhammad Sofiyuddin, Arief Rahmanulloh, S. Suyanto	Digital	1				JR • CR ()	
21	Morphological Characterization and Identification of Coffee liberica Callus of Somatic Embryogenesis Propagation	Fitria Ardiyani	Digital	1				JR • CR ()	
22	Minapadi	Directorate General of Aquaculture, Directorate of Production, Ministry of Aquaculture	Digital	1				JR • CR ()	
23	Decree of the Minister of Agriculture of the Republic of Indonesia Number 360/Kpts/PK.040/6/2015 on Release of Alabimaster-1 Agrinak Duck	Ministry of Agriculture	Digital	1				JR • CR ()	
24	Decree of the Minister of Agriculture No. 2834/Kpts/LB.430/8/2012 on the Establishment of Kerinci Duck	Ministry of Agriculture	Digital	1				JR • CR ()	
25	Decree of the Minister of Agriculture of the Republic of Indonesia Number 274/Kpts/SR.120/2/2014 on the	Ministry of Agriculture	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
	Release of Chicken Kub-1								
26	Cultivation of Alfalfa Medicago Sativa	Direktorat Pakan Ternak, Ditjen Peternakan dan Keswan	Digital	1				JR • CR ()	
27	Indigofera Cultivation As Feed Source	Direktorat Pakan, Direktorat Jenderal Peternakan dan Kesehatan Hewan	Digital	1				JR • CR ()	
28	Setaka Grass Cultivation	Direktorat Pakan Ternak, Ditjen Peternakan dan Keswan	Digital	1				JR • CR ()	
29	Development of HPT in Swamp Land	Direktorat Pakan Ternak, Ditjen Peternakan dan Keswan	Digital	1				JR • CR ()	
30	Coffee: History, Botany, Production Process, Processing, Downstream Products, and Partnership Systems	Gadjah Mada University Press	Digital	1				JR • CR ()	
31	Regulation of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia No. PER.12/MEN/2010 on Minapolitan	Minister of Marine Affairs and Fisheries	Digital	1				JR • CR ()	
32	Swamp Jelutung	World Agroforestry Centre (ICRAF)	Digital	1				JR • CR ()	
33	Paludiculture Prospect of Indonesia Peat Ecosystem	Forda Press	Digital	1				JR • CR ()	
34	Benefits Of Sagu Plant (Metroxylon Sp) In Food Supplying And In Environmental Quality Control	Bambang Hariyanto, BPPT	Digital	1				JR • CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
35	サゴでん粉をめぐる現状と将来	Masanori Okazaki, ALIC	Digital	1				JR・CR ()	
36	Pt. Saripati Semudun Jaya (Pt Spsj) & The Sago Opportunity	Pt. Saripati Semudun Jaya	Digital	1				JR・CR ()	
Climate Change (CC)									
1	Indonesia's greenhouse gas abatement cost curve	Enos Tangke Arung, et al	Digital	1				JR・CR ()	
2	Updating Indonesia's Greenhouse Gas Abatement Cost Curve	Dewan Nasional Perubahan Iklim, Indonesia	Digital	1				JR・CR ()	
3	Update of Indonesia's GHG Abatement Cost Curve: LULUCF and Peat	National Council on Climate Change	Digital	1				JR・CR ()	
4	PEAT-CO2: Assessment of CO2 emissions from drained peatlands in SE Asia (Delft Hydraulics report Q3943)	Farhan Helmy International Workshop on Forest Carbon Emission	Digital	1				JR・CR ()	
5	An Assessment of opportunities for reducing emissions from all land uses – Vietnam preparing for REDD. Final National Report. ASB Partnership for the Tropical Forest Margins	Hooijer, A., Silvius, M., Wösten, H. and Page, S.	Digital	1				JR・CR ()	
6	FY 2015 Feasibility Study for the Joint Crediting Mechanism for Reduced Emissions from Deforestation and forest Degradation-Plus in Developing Countries (Feasibility Study on the REDD+ Project with minimizing forest disturbances by enhanced diversity and competitiveness of wood products including wood chips)	Hoang Minh Ha Ph.D, et al.	Digital	1				JR・CR ()	

No.	The Name of Collected Reference	Publisher	Form	Type				Classification: JR: Public, CR () Private with a limited time	Note by JICA library
				Collected documents	Expert- making documents	JICA's documents	Others		
7	Feasibility Study on Sustainable Peatland Management in Indonesia under NAMAs - Peatland mitigation in coastal lowlands -	Kanematsu Corporation Japan NUS	Digital	1				JR • CR ()	
8	Viet Nam's Submission on Reference Levels for REDD+ Results Based Payments under the UNFCCC	Shimizu Corporation Supported by Global Centre Foundation, Japan, Ministry of Environment, Japan	Digital	1				JR • CR ()	
9	Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change	IPCC	Digital	1				JR • CR ()	
Others (OT)									
1	Law No. 18 of 2009 on Animal Husbandry and Animal Health	Government of Indonesia	Digital	1				JR • CR ()	
2	Menteri Kelautan dan Perikanan Republik Indonesia Nomor PER.18/MEN/2012 tentang Pedoman Penyusunan Rencana Induk Pengembangan Kawasan Minapolitan	Government of Indonesia	Digital	1				JR • CR ()	
3	Menteri Kelautan dan Perikanan Republik Indonesia Nomor 35/KEPMEN-KP/2013 tentang Penetapan Kawasan Minapolitan	Government of Indonesia	Digital	1				JR • CR ()	
4	Roadmap Keuangan Berkelanjutan di Indonesia 2015-2019	OJK	Digital	1				JR • CR ()	

7 List of Interviewees

No	Name	Organization	Position	Topics
1	Hendrian Sufrika	BLH, Meranti regency	Staff	Survey on candidate location of SESAME in Meranti
2	Fitriansah Putra	BLH, Meranti regency	Staff	Survey on candidate location of SESAME in Meranti
3	Erfauzi	BPBD, Meranti regency	Controlling and Readiness section/ Kasi Pencegahan dan Kesiap Siagaan	Survey on candidate location of SESAME in Meranti
4	Sufir Edi	BPBD, Meranti regency	Secretary	Survey on candidate location of SESAME in Meranti
5	Samsi	Tenan village, Tebing Tinggi Barat sub-district	Village head (Kepala Desa)	Survey on candidate location of SESAME in Meranti
6	Ruslan	Alai village, Tebing Tinggi Barat sub-district	Village head (Kepala Desa)	Survey on candidate location of SESAME in Meranti
7	Kukuh Riyanto	Alai village, Tebing Tinggi Barat sub-district	Kasubbid Penatausahaan	Survey on candidate location of SESAME in Meranti
8	Rahmat	BAPPEDA, Meranti regency		Survey on candidate location of SESAME in Meranti
9	Mukhtarom Bakhru	BAPPEDA, Meranti regency	Staff	Survey on candidate location of SESAME in Meranti
10	Irzal Fakhroz	BAPPEDA, Meranti regency	Staff	Survey on candidate location of SESAME in Meranti
11	Iskandari	Kecamatan Tebing Tinggi Timor	Kasi PMD	Survey on candidate location of SESAME in Meranti
12	Lukman	Lukun village, Tebing Tinggi Timor sub-district	Village head (Kepala Desa)	Survey on candidate location of SESAME in Meranti
13	Khairul Azhar	Lukun village, Tebing Tinggi Timor sub-district	Secretaris desa	Survey on candidate location of SESAME in Meranti
14	Amran	Lukun village, Tebing Tinggi Timor sub-district	Ketua BRG desa Lukun	Survey on candidate location of SESAME in Meranti
15	Hanung Harimba Rachman	BKPM (Indonesian Investment Coordinating Agency)	Director of Planning for Agribusiness and Natural Resources	Survey on investment
16	Hani Sitti Nuroniah	Agency of Research Development and Innovation	Researcher of Forest Research and Development Center	Survey on possible tree species into peatland
17	Rina Bogidarmanti, M.Si	Agency of Research Development and Innovation	Researcher of Forest Research and Development Center	Survey on possible tree species into peatland

No	Name	Organization	Position	Topics
18	Hesti Lestari Tata	Agency of Research Development and Innovation	Researcher of Forest Research and Development Center	Survey on possible tree species into peatland
19	Darwo	Agency of Research Development and Innovation	Researcher of Forest Research and Development Center	Survey on possible tree species into peatland
20	Silvi	Directorate Environmental Services Business and Non-Timber Forest Product from Production Forest	Section Head of Ecosystem Restoration, Sub Directorate of Ecosystem Restoration and Area utilization	Survey on possible tree species into peatland
21	Karsono	Directorate Environmental Services Business and Non-Timber Forest Product from Production Forest	Staff, Ecosystem Restoration, Sub Directorate of Ecosystem Restoration and Area utilization	Survey on possible tree species into peatland
22	Sultana Marpaing	Directorate Environmental Services Business and Non-Timber Forest Product from Production Forest	Staff, Ecosystem Restoration, Sub Directorate of Ecosystem Restoration and Area utilization	Survey on possible NTFP into peatland
23	Veronica	Directorate Environmental Services Business and Non-Timber Forest Product from Production Forest	Staff, Ecosystem Restoration, Sub Directorate of Ecosystem Restoration and Area utilization	Survey on possible NTFP into peatland
24	Ibrahim MM	Directorate of Production Business	Head of Sub Directorate of Workplan of Plantation on Production Forest Business	Survey on plantation
25	Anastasia Maria Listianingsih	Directorate Environmental Services Business and Non-Timber Forest Product in Production Forest	Head of Sub Directorate of Assessment of Business Performance	Survey on possible NTFP into peatland
26	Tony Rianto	Directorate Environmental Services Business and Non-Timber Forest Product in Production Forest	Staff, Sub Directorate of Assessment of Business Performance	Survey on possible NTFP into peatland
27	Wahyu Utami T.	Directorate of Peat Degradation Control, Directorate General of Pollution and Environmental Degradation Control	Head Section of Prevention and Monitoring	Survey on regulation on peatland restoration
28	Mr. Farid Bahar	APINDO	Adviser for APINDO/ Adviser for Minister of Agriculture (former DG of Food Crop, Ministry of Agriculture)	Survey on possible investor to peatland restoration
29	Yulinda	Directorate General of Social Forestry and Environment Partnership	Head of Sub-directorate of Partnership Preparation, Directorate of Social Forestry and Area Preparation	Survey on social forestry system

No	Name	Organization	Position	Topics
30	Gento Widayanto	Directorate General of Estate, Min of Agriculture	Sub-directorate of Business disruption, Climate Change Effect and Fire Control (Subdit gangguan Usaha, Dampak Perubahan Iklim dan Pencegahan Kebakaran (GUDPIPK))	Possible agriculture crops
31	Rudyan Kopot	Indonesian Chamber of Commerce and Industry (KADIN)	Chairman of Permanent Committee on Plantation	Survey on possible investor to peatland restoration
32	Irwanda Hamdani S.	Indonesian Chamber of Commerce and Industry (KADIN)	Deputy Head of Permanent Committee Information Technology and Communication for Agribusiness	Survey on possible investor to peatland restoration
33	Eddy Martono	Indonesian Chamber of Commerce and Industry (KADIN)		Survey on possible investor to peatland restoration
34	Widiyanto	Indonesian Chamber of Commerce and Industry (KADIN)		Survey on possible investor to peatland restoration
35	Utama Kajo	Indonesian Chamber of Commerce and Industry (KADIN)	Food and Agriculture Development	Sago Development on peat land
36	Ir. Fauziah M Hasani	Directorate of Animal Breeding and Production	Head of Animal Resource Management Subdivision	Survey on livestock to peatland
37	Ir. Elia Diany	Directorate of Animal Breeding and Production	Head of Animal Resource Utilization Scheme	Survey on livestock to peatland
38	Ian Sofyan	Directorate of Animal Breeding and Production	Functional Staff	Survey on livestock to peatland
39	Chalid Talib	Center for Animal research and Development	Animal Genetic and management researcher	Survey on livestock to peatland
40	<u>Wisri Puastuti</u>	Center for Animal research and Development	Ruminative Nutrition Researcher	Survey on livestock to peatland
41	Fahmuddin Agus	Indonesian Soil Research Institute	Soil Management and Conservation Specialist	Agriculture plant for peat land
42	Any Mulyani	Center of Agriculture Land Resource Research		Agriculture plant for peat land
43	Tri Astuti Andayani	DG of Livestock and Animal Health service, Min of Agric	Head of Feed Stuff, Directorate of Animal Feed,	Survey on livestock to peatland
44	Friska	DG of Livestock and Animal Health service, Min of Agric	staff of Forage Division	Survey on livestock to peatland
45	Noor Sanjoyo	DG of Food Crop Min of Agriculture	Head of Section in Directorate of Cereal	Paddy for peatland
46	Darma	Min of MAF	Head of Public Relation of DG of Aqua Culture	Fish culture for peatland
47	Desie Yudhia	Min of MAF	Head of Environmental Rehabilitation, Directorate	Fish culture development policy

No	Name	Organization	Position	Topics
			of Regional Development and Fish Health DG of Aqua Culture	
48	Nasrul	Min of MAF	Technical Guidance on Fish Culture	Fish culture for peatland
49	Norio Yamazaki (山崎紀雄)	BKPM (Indonesian Investment Coordinating Agency)	Investment Promotion Policy Adviser (JICA)	Survey on investment
50	Amane Kameda (亀田 周)	Japan external Trade Organization (JETRO)	Senior Director	Survey on possible Japanese investors
51	Rahidi	Dinas LHK Riau Province	Head of Section of Extension and Community Empowerment	Meranti Survey coordination
52	Muhamad	Dinas LHK Riau Province	Restoration staff	Meranti Survey coordination
53	Fajri	Dinas LHK Riau Province	Restoration staff	Meranti Survey coordination
54	Ady Prayitno	University of Riau	Pusat Studi Bencana	Meranti Survey coordination
55	Sigit Sutikno	University of Riau	Pusat Studi Bencana	Meranti Survey coordination
56	Febriady	Dinas LHK Meranti District	Secretary of Dinas	Meranti Survey coordination
57	Hendrian	Dinas LHK Meranti District	Staff	Meranti Survey coordination
58	Muhtarom	Bappedda Meranti District	Staff	Meranti Survey coordination
59	Sarifudin	Sub District of Tebing Tinggi Timur Office	Secretary	Surey for site installation
60	Khaidir	Sendanu Darul Ihsan Village	Village head	Surey for site installation
61	M. Yasir	Sendanu Darul Ihsan Village	Village secretary	Surey for site installation
62	Hernandi Jamal	Sungai Tohor Village	Village secretary	Surey for site installation
63	Khairul Azhar	Lukun Village	Village secretary	Surey for site installation
64	Nao Tanaka (田中 直)	Asian People's Exchange (APEX)	Executive Director	Survey on bioenergy
65	Stuart Rowland	SystemIQ	Associates	Survey on investment scheme
66	Ronja Wolf	SystemIQ	Associates	Survey on investment scheme
67	Heri Susanto	Coordination Ministry on Economy	Deputy Assistant for Investment and Finance Institution Deputy of Macro Economy and Finance Coordination/ Deputy 1	Survey on investment scheme
68	Eni Widiyanti	Coordination Ministry on Economy	Head of Banking Division, Deputy of Macro Economy and Finance Coordination	Survey on investment scheme

No	Name	Organization	Position	Topics
69	Daru Darmojo	Ministry of Environment and Forestry	Head of General Financing Division, Center of Environment and Forestry Financing	Survey on investment facility
70	Karman	Ministry of Environment and Forestry	Head of Forestry Financing Analysis Division Center of Environment and Forestry Financing,	Survey on investment facility
71	Dendy	Investment Coordination Board (BKPM)	Director of Facility	Survey on investment facility
72	Ocki Chrisnadiyah	DG of Taxes, Ministry of Finance	Sub Directorate of Corporate Income Tax Regulation, Directorate of Taxes Regulation II	Survey on investment facility
73	Rizky Mukhlisin	DG of Taxes, Ministry of Finance	Sub Directorate of Corporate Income Tax Regulation, Directorate of Taxes Regulation II	Survey on investment facility
74	Tetsuo Takatsugu	Nikko Securities Indonesia	Vice President Director	Survey on financial scheme to peatland restoration
75	Tenorio Triananda	Nikko Securities Indonesia	Senior Manager, Fund Management	Survey on financial scheme to peatland restoration
76	Ismal Novel	Nikko Securities Indonesia	Technical Adviser, International Investment Banking	Survey on financial scheme to peatland restoration
77	Emil Akbar	SMBC Indonesia	Assistant Vice President of Corporate Banking Department I	Survey on financial scheme to peatland restoration
78	Ms. Liza Rahayu	SMBC Indonesia	Assistant Vice President of Corporate Banking Department I	Survey on financial scheme to peatland restoration
79	Yu Toshida	JETRO Jakarta Office	Senior Director	Survey on possible investment to peatland restoration
80	Naoto Akune	YL Forest Co., Ltd./ PT. Yamamoto Asri	President Director	Investment seminar in Jakarta
81	Noriko Asayama	Iluka Collage Co., Ltd.	CEO	Investment seminar in Jakarta
82	Suryanti	PT. Sinar Pangan Indonesia	Director	Investment seminar in Jakarta