



***FOREST PARTNERSHIP FRAMEWORK
IN THE UPPER CISOKAN PUMPED STORAGE PROJECT
AND ITS ADJACENT AREAS***



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GLOSSARY

Access road	: a road that provides access to UCPS
Action Plan	: a detailed plan outlining actions needed to reach one or more goals
Aggregation	: groups the data from multiple documents and operates in many ways on those grouped data in order to return one combined result
Agroforestry	: a land use management system in which trees or shrubs are grown around or among crops or pastureland
AMDAL	: <i>Analisis Mengenai Dampak Lingkungan</i> - Environmental Impact Analysis
ANDAL	: <i>Analisis Dampak Lingkungan</i> - Environmental Impact Assessment Report
Animal culverts	: Types of underpasses for wildlife to cross under moving traffic
APAR	: <i>Alat Pemadam Api Ringan</i> - Fire Extinguisher
Arboreal	: Defined as something having the evolutionary characteristics of animals which allow them to live or maneuver through trees
BBKSDA	: <i>Balai Besar Konservasi Sumber Daya Alam</i> - Nature Conservation Agency
BIA	: Biodiversity Important Area
BKPH	: <i>Bagian Kesatuan Pemangkuan Hutan</i> - Forest stakeholder unit
BMP	: Biodiversity Management Plan
Buffer zones	: Created to enhance the protection of areas under management for biodiversity importance. The buffer zone of a protected area maybe situated around the periphery of the region or may be a connecting zone within it that links two or more protected areas, therefore, increasing their dynamics and conservation productivity
BUMN	: <i>Badan Usaha Milik Negara</i> - Indonesian State-Owned Enterprises
CESS	: Center for Environment Sustainability Science
Core habitat	: Areas containing plant or animal species of concern at the state or federal levels, exemplary natural communities, or exceptional native diversity
Corridor	: Connections across the landscape that link up areas of habitat
CRST	: <i>Citra Resolusi Sangat Tinggi</i> - Very High Resolution Image
CRT	: <i>Citra Resolusi Tinggi</i> - High Resolution Image
CSR	: Corporate Social Responsibility
DAS	: <i>Daerah Aliran Sungai</i> - Watershed
Desk study	: a study that is carried out purely through research, rather than physical investigations, that is, it can be done sitting at a desk
Divre	: <i>Divisi Regional</i> – Regional Division

EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
ESDM	: <i>Energi dan Sumber Daya Mineral</i> - Energy and Mineral Resources
ESIA	: Environmental and Social Impact Assessment
ESMP	: Environmental and Social Management Plan
ESMMP	: Environmental and Social Mitigation Management Plan
ESS	: Environmental and Social Standard
FGD	: Focus Group Discussion
Firebreak	: a gap in vegetation or other combustible material that acts as a barrier to slow or stop the progress of a bushfire or wildfire
FPF	: Forest Partnership Framework
Gap analysis	: a process that compares actual performance or results with what was expected or desired
GCP	: Ground Control Points
GI	: <i>Gardu Induk</i> - Substation
GPS	: Global Positioning System
Habitat	: The natural environment of an organism, the type of place in which it is natural for it to live and grow
ICM	: Integrated Catchment Management
IMA	: Independent Monitoring Agency
Intercropping	: a multiple cropping practice that involves growing two or more crops in proximity
K3L	: <i>Keselamatan, Kesehatan Kerja & Lingkungan</i> - Health, Security, and Environment
KLHK	: <i>Kementrian Lingkungan Hidup dan Kehutanan</i> - Minister of Environment and Forestry
KPH	: <i>Kesatuan Pengelolaan Hutan</i> - Forest Management Unit
kV	: Kilovolts
Land clearing	: The process of removing trees, stumps, brush, stones and other obstacles from an area as required to increase the size of the crop producing land base of an existing farm or to provide land for a new farm operation
LARAP	: Land Acquisition and Resettlement Action Plan
LIPI	: <i>Lembaga Ilmu Pengetahuan Indonesia</i> - Indonesian Institute of Sciences
LMDH	: <i>Lembaga Masyarakat Desa Hutan</i> - Forest Village Community Institution
Lower Dam	: UCPS Dam located on the Cisokan River
LULC	: Land Use and Land Cover
MoU	: Memorandum of Understanding.
Monoculture	: The agricultural practice of growing a single crop, plant, or

	livestock species, variety, or breed in a field or farming system at a time
MW	: Megawatt
Nursery	: a place where plants are propagated and grown to a desired age.
Nocturnal	: an animal behavior characterized by being active during the night and sleeping during the day
Overlay	: a GIS operation that superimposes multiple data sets (representing different themes) together for the purpose of identifying relationships between them.
Perhutani	: <i>Perusahaan Hutan Negara Indonesia</i> - State-owned forestry company
PHBM	: <i>Pengelolaan Hutan Bersama Masyarakat</i> - Community Forest Management
PKS	: <i>Perjanjian Kerja Sama</i> - Cooperation agreement
PLN	: <i>Perusahaan Listrik Negara</i> - State Electricity Company
PLTA	: <i>Pembangkit Listrik Tenaga Air</i> - Hydroelectric Power Plant
PULIK	: <i>Pusat Unggulan Lingkungan dan Ilmu Keberlanjutan</i> - Center for Environment and Sustainability Science (CESS)
PRA	: Participatory Rural Appraisal
REEPS	: Rare, Endemic, Endangered, Protected Species
Resettlement	: The transfer of refugees from an asylum country to another State, that has agreed to admit them and ultimately grant them permanent residence
Revegetation	: the process of replanting and rebuilding the soil of disturbed land.
RKL	: <i>Rencana Pengelolaan Lingkungan</i> - Environment Management Plan
RKPH	: <i>Rencana Pengelolaan Kelestarian Hutan</i> - Forest Conservation Management Plan
RO	: <i>Rencana Operasi</i> – Operation Plan
RPL	: <i>Rencana Pemantauan Lingkungan</i> - Environmental Monitoring Plan
RT	: <i>Rukun Tetangga</i> - Neighborhood Association
Sale	: (Sundanese) Processed foods made from dried bananas
Sign survey	: Field survey of wildlife using secondary presence (traces, feces, food scraps)
SOP	: Standard Operating Procedures
Shotcreting	: a method of applying concrete projected at high velocity primarily on to a vertical or overhead surface.
SUTET	: <i>Saluran Udara Tegangan Ekstra Tinggi</i> - Extra High Voltage Air Duct
Switchyard	: a part of an electrical generation, transmission, and distribution system.

UCPS	: Upper Cisokan Pumped Storage
UIP	: <i>Unit Induk Pembangunan</i> - Master Development Unit
UPP	: <i>Unit Pelaksana Proyek</i> - Project Implementing Unit
Upper Dam	: UCPS Dam located on the Cirumamis River
Vegetation	: an assemblage of plant species and the ground cover they provide
WB	: World Bank
WTP	: <i>Warga Terdampak Proyek</i> - Project Affected Persons
WV	: World View
WZ	: Working Zone
WZ1	: Working Zone 1 (BIA)
WZ2	: Working Zone 2 (Corridor)
WZ3	: Working Zone 2 (Reservoir Buffer Zone)

1. INTRODUCTION

PT PLN (Persero) has prepared a Biodiversity Management Plan (BMP) to manage the direct and indirect impacts of the Upper Cisokan Pumped Storage (UCPS) project on biodiversity condition and maintenance within the project area of influence. The BMP itself is part of the Environmental and Social Management Plan of the UCPS. Integrated management of biodiversity in so-called Restoration Area covering 15 Biodiversity Important Areas (BIAs), six corridors, and Buffer zones is proposed. The BMP goals are:

- a. To protect and enhance the remnant forest communities (both the habitat and wildlife) to create a self-sustaining ecosystem.
- b. To protect and increase the populations of critically endangered and endangered species so that they are self-sustaining.
- c. To take into account the ongoing threats to biodiversity conservation from the community and rural development in the selection and implementation of conservation strategies.
- d. To create a common understanding amongst stakeholders and the community about the biodiversity values and threats.
- e. To provide controlled access for local people to sustainably use local bioresource in designated (particular) restoration area based on precautionary approach.

The establishment of restoration area will affect the livelihood of the local people due to access restriction. Therefore, to achieve the goals of the BMP without compromising the interests of the local people, a consensus should be carried out to set up a ‘middle ground’ in order to compromise biodiversity conservation and controlled access for local communities to support their livelihood. In this regard, it is necessary to formulate a partnership framework in forest management that involves a number of stakeholders, particularly local people. This framework outlines the key guiding principles, criteria and procedures which the Project will follow in such cases, to ensure that eligible affected persons are assisted in their efforts to restore or improve their livelihoods in a manner which maintains the environmental sustainability and territorial integrity of the Restoration Area. And, at the same time the affected people participate and engage in the implementation of biodiversity action plan.

Referring to Indonesian regulation on Decree of Forestry Ministry No. P-39/Menhut-II/2013 concerning local communities empowerment through forest partnership and Technical Guidelines issued by Perum Perhutani No. 682 of 2009 concerning managing forest natural

resources with community, called *PHBM*¹ (*Pengelolaan Hutan Bersama Masyarakat* - community based on forest management), and later to the Minister of Environment and Forestry Regulation No.39/MENLHK/SETJEN/KUM.1/6/ 2017, concerning social forestry in Perum Perhutani working area, the objectives and principles policies of the forest partnership in line with Process Framework ESS5. Local communities who live in and/or around forest, settled in or around forest area that their livelihood depend on forest resources, but their activities can affect to the forest ecosystem, can be affected by the implementation of BMP. Regarding this, PT PLN (Persero) in cooperation with Perum Perhutani have responsibility to mitigate social impact and prepare a forest partnership agreement with local community to improve social economy of the community.

Execution of this assignment in the field is under the management (coordination) of *KPH* (*KPH=Kesatuan Pengelolaan Hutan/FMU=Forest Management Unit*)². To be friendly with Indonesian term, “Forest Partnership Framework” (FPF) will be used instead of Process Framework. The purpose of Forest Partnership Framework is to establish a process of forming and maintaining partnership among relevant parties and establish strategy to prevent and mitigate adverse impacts caused by restrictions in access to natural resources in designated Restoration Area part of BMP. The framework will also guide the preparation of Forest Partnership Action Plan (FPAP) that involve restriction activities to use Zone 1, 2, and 3.

The FPF is designed for use at local, regional, and national levels of partnership, and also in different size partnership, from single partner to coalition. On the other hand, the FPF can be applied at different stage of the partnership process, from early to developed partnership. Some key principles are set up as the guidance to depict Forest Partnership Action Plan (FPAP) that should be executed by PT. PLN (persero) in coordination and collaboration with other parties.

The establishment of FPAP is important to reach mutual agreements on what communities can and cannot collect, grow or cultivate from the BIA, Corridors, and Reservoir Buffer Zones, as stipulated in Law 41 of 1999 concerning Forestry and consistent with the BMP as well the *PKS* (see Annex 1). This provides opportunities to develop improved methods to protect the important biodiversity resources that are the target of BMP/*PKS*, while fostering

¹ *PHBM* equal with FPAP (Forest Partnership Action Plan)

² Perum Perhutani is state enterprise as Permit Holder of forest utilization and KPH/FMU is implementing unit under supervising Perum Perhutani.

participation and sustainable resource use instead of prohibiting traditional forest uses. While the BMP is expected to be long term to achieve its intended objectives, the Forest Partnership Action Plans will be developed at least for two years and will be renewed as necessary and agreed by relevant stakeholders i.e., PLN, Perhutani, and the affected communities.

2. BIODIVERSITY MANAGEMENT PLAN AND POTENTIAL IMPACTS ON LIVELIHOODS

The BMP provides practical guidance for reducing threats to biodiversity, to manage identified risks, to engage with communities and stakeholders, to arrange relevant institute aims to collaboratively manage the restoration area, and to pro-actively support the development of knowledge in biodiversity conservation.

Based on the updated BMP Action Plan, there are five aspects that need to be considered and each aspect has several programs that need to be executed by PT. PLN (Persero) in collaboration with relevant stakeholders.

- a. The direct construction-related impacts will be mitigated and managed by:
 - Demarcating Biodiversity Important Areas (BIAs), Corridors and Buffer Zone Area as Restoration Area within and adjacent to the project footprint and minimizing the disturbances within these areas.
 - Protecting Restoration Area from poaching and illegal harvesting.
 - Reforesting disturbed areas within the project footprint and the Restoration Area.
 - Educating the community on the biodiversity conservation initiatives started with creating a common understanding amongst stakeholders and the community about the biodiversity values and threats.
- b. Reforestation and forest management will be performed by:
 - Revegetating Restoration Area with suitable plant species as recommended in BMP Action Plan
 - Ensuring adequate supply of plants, including appropriate varieties / species in nurseries managed by local people
 - Developing agroforestry system to opportunities for local income
 - Protecting the remaining wildlife habitats through habitat improvement and species enrichment, including improvement of ecological connectivity between forest patches

and other ecosystem functions

- Protecting the forested areas from encroachment and illegal logging and hunting or poaching.
 - Exploring mechanisms and designs to incorporate community benefits from forest management.
- c. Wildlife management will be carried out by:
- Ensuring endangered, critically endangered and other protected wildlife can survive and or increase their population sizes by reducing direct and indirect threats through prevention and mitigation of habitat destruction, preventing wildlife disturbance and deaths, and illegal hunting.
 - Avoiding (reducing) conflict between human and wildlife caused by common resource utilization (food resources) and local communities' livestock predation by wildlife.
- d. Stakeholder participation will be undertaken and managed by:
- Increasing knowledge, awareness and participation of local stakeholders in the Upper Cisokan management, including biodiversity conservation.
 - Improving coordination and cooperation within PT. PLN (Persero) and between PT. PLN (Persero), Perum Perhutani, local government, and the local communities related to Integrated Catchment management (ICM).
 - Harmonizing the activities of the various parties e.g. PT. PLN (Persero), Perum Perhutani, and Community) in the project area of influence to optimize the protection of wildlife and their habitats, and local communities' livelihood
 - Looking for supports from relevant parties aim to seek for funding and resources that can be allocated to finance Upper Cisokan management.
- e. Community engagement will be performed and managed by:
- Engaging local communities to ensure that they can participate fully in the Upper Cisokan management plans and obtain benefits from the development of the area.
 - Integrating the BMP into the Resettlement Planning and highlighting the potential opportunities for resettled areas to contribute to reforestation and to achieve a more successful and sustainable livelihood restoration program.
 - Ensuring that any livelihoods that are adversely affected by the BMP will be mitigated through the preparation of Forest Partnership Action Plan (FPAP) following the Forest Partnership Framework (FPF) and addressed under World Bank ESF, ESS5 – Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.

- Increasing communities' income generating activities that are appropriate with biodiversity conservation in the restoration area and Upper Cisokan management in general.
- Improving the sustainability of land use managed by the Perum Perhutani through sustainable land cultivation by local communities.

To achieve the above goals and aspects, necessary measures should be undertaken in 15 BIAs (Zone 1), 6 Corridors (Zone 2), and Buffer Zones (Zone 3). Revegetation and reforestation will be carried out as one of the main programs to create at least 3,800 ha of continuous forest habitat within the Upper Cisokan catchment which is known collectively as the 'Restoration Area'.

Potential Impacts on Livelihoods. Human use and development in the restoration areas will need to be restricted. Implementation of the BMP is expected to have impacts on 8 LMDH (forests user group) and 38 sub-villages. Detailed baseline data of the community surround UPCS forest area is presented in Biodiversity Management Plan document.

Restriction of access and use to BIA, Corridor and Buffer Zone potentially could be resulting in adverse impacts on the livelihoods of the communities surround the forest areas. In this context, restriction should be interpreted as controlled access, and not full prohibition. Corridors and Buffer Zones, linking the natural habitat together, will have a mix of natural habitat and non-timber forest produce use by Perum Perhutani and local communities. BIAs include mainly Perum Perhutani's forest lands however some enclaves of private and village lands were identified. The boundaries of BIAs may therefore need to be revised to exclude private land from BIAs such as in BIA 14, and as such, access restriction will not be imposed on the privately-owned land. Both corridors and buffer lands include a mixture of Perum Perhutani, village owned and privately owned lands. No changes in legal status of private land but forest land only in uses or management suggested in the BMP, and in the PKS³ with Perum Perhutani to be carefully discussed and documented in Forest Partnership Action Plan (FPAP). Any future changes in the legal status or regulations on the Perum Perhutani land must be discussed with the local communities themselves and be documented in the FPAP. Decision to shift profession and or to change cultivated commodities must be discussed among relevant parties (Perum Perhutani as the landowner and local communities as the affected people) to

³ PKS= *Perjanjian Kerjasama antara PT. PLN (Persero) dengan Perum Perhutani untuk pelaksanaan BMP* (Mutual agreement between PT. PLN (Persero) and Perum Perhutani to execute the BMP)

reach consensus.

Based on the assessment to date, the establishment of the Restoration Area has not impacted or at least very insignificant to the livelihood of the local people. In contrary, some activities conducted by a portion of the local people like land clearing for agriculture and or game hunting, have affected the integrity of the Restoration Area. Nevertheless, future implementation of the BMP with stricter monitoring and evaluation activities may result in more significant social impacts compared to the previous period.

3. SUITABILITY ANALYSIS FOR LAND MANAGEMENT THROUGH PROPOSED AGROFORESTRY MODELS IN UCPS AREA

The UCPS area has various land uses where direct or indirect use of natural resources happen within it. In the landscape of the UCPS area, there are Rare, Endemic, Endangered, and Protected Species (REEPS) wildlife activities, cultivation crops, forest resources extractions, and the UCPS project plan itself. This section provides summary of suitability analysis for land management through proposed agroforestry models in UCPS area. Detailed assessment is presented in Annex 1.

There are two approaches in the recommendations for the agroforestry model as land management in the UCPS area, namely the spatial approach and the economic approach. The spatial approach includes an analysis of the land status, land use types, and existing conditions to support the analysis of the community management model. Meanwhile, the economic approach is carried out by analyzing the types of agricultural commodities and the existing agricultural conditions in the UCPS area. Five agroforestry models for Working Zones 1, 2, and 3 in the UCPS area as presented in table 1. In addition to the analysis, security of land rights is important to encourage the community participation in the activities. This can be achieved to promotion of 'Pengelolaan Hutan Bersama Masyarakat (PHBM)'/Perhutanan Sosial (Social Forestry) in accordance with Permen KLHK No. 39/2017 concerning Social Forestry (Perhutanan Sosial) in Perum Perhutani's land, where affected (local) people are given the right to cultivate (manage) the land up to 35 years with periodical evaluation (once in every 5 years).

Table 1 Spatial and Economic Analysis of Agroforestry Models in UPCS Area

Model	Spatial Analysis	Economic Analysis	Suitable Location
1	<p>Model 1 is applied to land use with the dominant profile of forested land with extreme topography and the presence of REEPS. It is recommended that only forest and agroforestry species in the category of top-layer and middle plant annuals are planted in this model. Model 1 is an agroforestry model that aims to maintain forests while limited providing crops with economic value. The forest plants in this model function ecologically as a habitat for animals while agroforestry plants can provide economic and social benefits for communities living around the forest. The existence of forest plants maintains the ecological functions even improve soil quality and preserve the availability of habitat for biodiversity. Apart from forest plants, there are also non-timber and middle plants (annual garden plants) benefit as fruits providers. The existence of yields from the top layer and middle plants will provide a sustainable income. Thus, this model is a solution not only for the community in meeting their needs but also preserves the ecological function of plants in their cropping patterns.</p>	<p>The farmers will not have income in the first five years, because this model consists of forest, top layer, and understorey plants (annual) where all the plants have a long cycle. Cultivation activities in model 1 are very limited since this model is within the dominant profile of natural forest which is a habitat for REEPS animals. Cultivation activities in Model 1 must have alternative land cultivations to earn income during the interval waiting for these types of crops to start generating economic value. In this model, the farmers should have at least a cultivated area above 0.25 ha (strata 1) to have a good profit, but this also rarely happens because no one cultivates in natural forests, except for illegal activities.</p>	<p>Pasir laja, Babakan Bandung, Lembur Sawah, Cangkuang, Cibungbulang, Gowek, Japarana, Curug walet, Bantar, Cibayawak, Cigembong, Cigintung.</p>
2	<p>Applied to land use with a dominant profile of agroforestry. Forest plants, agroforestry plants with the categories of the top layer, middle (annual and seasonal), and understorey (only in the first 5-6 years) are recommended to fill this model. Model 2 consists of forest plant species, non-timber plants, garden plants (annual and seasonal), and secondary crops. This model is more varied than Model 1 so that the harvesting time is greater than in Model 1. Each agroforestry crop resulting in a time difference in obtaining income from</p>	<p>With the dominant profile of agroforestry, the value of profits is obtained from all agricultural patterns, but these benefits will be maximum only until the first five years. Thereafter these profits will be reduced by the loss of profits from the understorey. The understorey planted in Model 2 is carried out to fill in the gaps while waiting for long-cycle plants (top layer and middle plants) to enter productive periods. Optimal cultivated land in this model is in the area of strata 2 (0.16-0.25 ha).</p>	<p>Langkob, Cikaret, Cimarel, Pasir taman, Cibima, Cimanggu, Lembur Panjang, Cipedes, Cipateungteung, Pasir Gagak, Batu Nunggul, Ciawitali, Panenggang.</p>

Model	Spatial Analysis	Economic Analysis	Suitable Location
	agroforestry products. This is similar to Widiarti and Prajadinata (2008) who stated that agroforestry patterns provide varied income, such as routine, daily, weekly, monthly, seasonal, and annual. In turn, agroforestry provides sustainable results for the farmers.		
3	Applied to land use with the dominant profile of the upland field. It is recommended to plant forest and agroforestry plant species with the categories of top layer, middle (annual and seasonal), and understorey plant. Model 3 is similar to Model 2, but in this model, the understorey crops can be carried out with a sustainable cycle.	Get source of income from all agricultural patterns, but in this model, it is possible to cultivate understorey crops sustainably. Although the existing dominant profile in this model is the upland field, the farmers are directed to still be able to plant forest and plantations on strata 2 (0.16-0.25 ha).	Cinomer, Cijulang, Cijawati, Cikaret
4	Applied to land use with the dominant profile of other land use areas (APL) such as settlements, private gardens, and rice fields where REEPS wildlife still encountered. Forest plants and agroforestry crops with the categories of the top layer, middle (annual and seasonal), and understorey are recommended to plant in this area.	The value of the benefits is obtained from the agricultural pattern of agroforestry plants. The dominant existing features of these two models are other land use areas such as settlements, private gardens, and rice fields. To get optimal results, in this model the farmers should do the cultivation with strata 2 (0.16-0.25 ha).	Cimarel, Cilengkong, Cipadali, Cilimus, Bantar kalong, Jolok, Gunung Batu
5	Applied to land use with the dominant profile of other land use areas (APL) such as settlements, private gardens, rice fields, and lemongrass crops where none REEPS wildlife encountered. Forest plants and agroforestry crops with the categories of the top layer, middle (annual and seasonal), and understorey are recommended to plant in this area.	The value of the benefits is obtained from the agricultural pattern of agroforestry plants. The dominant existing features of these two models are other land use areas such as settlements, private gardens, and rice fields. To get optimal results, in this model the farmers should do the cultivation with strata 2 (0.16-0.25 ha).	Cilawang, Pasir Eurih, Cipadali, Babakan, Cisitu

Referring to the explanation of the agricultural economic model 1-5, land cultivators in Cisokan generally cannot rely solely on income from cultivating land in working zones 1, 2, and 3. They need to have alternative to support their main income, namely non-timber forest products (NTFPs) as presented in **Appendix 2 section B**.

It is also acknowledged that not all community surround the forest area are farmers although they may utilize some products from the forest. For this type of community, development of non-farming livelihoods might be considered such as production of dried banana or roasted coffee to add value to agricultural products; development of nurseries and small scale local bioresource-based production system; provision of financial assistance scheme for bioresource-based home industries; development of training aimed to improve off-farm skills of the affected people; synergizing with the existing cooperatives that have been formed previously.

4. KEY PRINCIPLES OF FOREST PARTNERSHIP FRAMEWORK

The following principles will guide Forest Partnership Action Plan and relations with communities living in and near the area.

- a. Forestry Partnership should be built based on mutual benefits among involved parties (organisations): The management of the Restoration Area is not only for the sake of protecting the critically endangered and endangered wildlife. The livelihood of the affected people should also be considered.
- b. Prevention of new settlements inside Restoration Area: The Project will initiate actions to prevent new human settlements inside Restoration Area. Furthermore, the Project will take care to ensure that activities supported through the project do not create incentives for the creation of new settlements in the 3,800ha Restoration Area.
- c. Biodiversity conservation and sustainable development: FP Action Plan will be developed aims to harmonize the needs of local human populations with the preservation of natural resources consistent with the BMP and the PKS.

- d. Precautious granted access and limited extraction of bioresource in restoration area: The establishment of Restoration Area is not aimed to fully prohibited the local communities to get access to total resources. However, precautions access should be considered based on the characteristic of the BIAs, corridors, and Buffer Zones.
- e. Tree-based vegetation system is the ultimate goal of Restoration Area: The management of the Restoration Area is aimed to compromise biodiversity conservation and income-generating activities for local communities. Vegetation cover should be designed and directed towards tree-based system that can fulfil the objectives of maintaining and improving wildlife habitats and providing sustainable people's income-generating activities.
- f. Information and communication: The FP Action Plan will emphasize dissemination of clear, true and timely information to beneficiaries (including government and non-governmental organizations and the general public) as to the Project objectives, scope and benefits. The FP Action Plan will strongly emphasize the provision of detailed information regarding the rights and obligations of the direct project beneficiaries, in a manner that is accessible and enables any questions, doubts or issues to be raised and resolved as quickly and efficiently as possible.
- g. Participation, Engagement, and Empowerment: Broad public participation by those communities living in and near the Restoration Area will be strongly emphasized in the formulation, updating, execution, monitoring and evaluation of Forest Partnership Action Plan. Through open public meetings, documented by written minutes available to the public at village offices, the existing LMDH - user groups on forest land as the affected communities will be involved in identifying any adverse impacts, assessing of the significance of impacts, and establishing the criteria for eligibility for any mitigating or compensating measures necessary. Local communities will be engaged in various programs and activities related to the implementation of BMP Action Plan. Their engagement is aimed to improve their incomes and to raise awareness to take responsibility in the maintenance of biodiversity condition in the Restoration Area. For this, community empowerment should be considered through

capacity building.

- h. Incentive and disincentive mechanism and Design. In order for Restoration Area management to be carried out in effective and efficient ways, incentive and disincentive mechanism should be developed so that individuals as well as communities recognize their rights and obligations related to the resource uses in the Restoration Area.
- i. Environmental education. Environmental education will be strongly emphasized so as to promote awareness and sound behavior among local communities concerning the importance of natural resource conservation. The education will also be related to sustainable use of local resources as capitals to develop rural production system.
- j. Respect to legal land rights within protected areas. Existing legal but undocumented property titles (village and private owned land without title or land certificate) within the Restoration Area will be respected.
- k. No involuntary resettlement. To effectively implement the project, no involuntary physical displacement or relocation of people would be required, and none will take place as a part of the Biodiversity Management component of the project.
- l. Transparency. The dissemination and validation of management plan formulation, execution, monitoring and evaluation will be done in a fully transparent manner, such that all protected area community sectors are aware of the process. This process will be managed so as to guarantee that established criteria and procedures are applied transparently and equitably for all. Nevertheless, particular policies within PT PLN (Persero), Perum Perhutani, and other institutions that disallow financial-related matters to be opened to public should be taken into account.
- m. Responsibility. PT PLN and Perum Perhutani are overall responsible for the FPAP planning and implementation. Detailed implementation arrangement will be defined in each of the FP Action Plans with clear roles and responsibilities for all institutions involved, including national and local governmental entities, social organizations and communities and must be consistent with the BMP and the PKS. The FPAPs are mutual agreements

between the affected communities, LMDH, Perum Perhutani, PT PLN (Persero), and other relevant parties. The agreement covers i) the proposed action plan, ii) implementation of the action plan and ii) monitoring and evaluation of the implementation of FPAP and carryinhg out corrective action if necessary.

- n. Respect for cultural of local communities such as respect the local wisdoms within the Restoration Area.

Key principles of ESS5 above are also covered by the same principles of Forest Partnership in Indonesia and the process must comply with following principles:

- a. Agreement: all inputs, processes and outputs of Forest Partnership Action Plan are built based on agreements between parties and are binding.
- b. Equality: parties in partnership have equal legal position in decision-making.
- c. Mutual benefit: parties in partnership try to develop business that do not harm or cause losses.
- d. Specific locals: Forest Partnership Action Plan is built and developed by considering local community's culture and characteristics, including respect to local wisdoms.
- e. Trust: Forest Partnership Action Plan is built based on trust among parties.
- f. Transparency: inputs, processes and outputs of Forest Partnership Action Plan is openly conducted by all parties, while still respecting each parties' interests.
- g. Participation: involvement of all parties in an active manner, thus all decision taken will have strong legitimation.

5. FOREST PARTNERSHIP ACTION PLAN

As a minimum requirement under the Forest Partnership Framework, action plans must focus on livelihood restoration of the local communities and alternative mitigation measures consistent with or derived from the *PKS* and *BMP*. The contemplated design is to develop an FPAP for each of the 15 BIAs. However, this needs to be confirmed during implementation through intensive consultations with the stakeholders. Each FP Action Plan will describe the activities that may involve

enforcing existing rules, developing new restrictions on natural resource use, and will also describe the process by which potentially affected persons have participated in design of each FP Action Plan, identify eligibility criteria, and identify those eligible for any measures proposed. FP Action Plan will describe how those measures to assist affected persons were identified. The document will describe how communities have identified and chosen potential mitigating measures to be provided to those adversely affected, and how community members have decided among the options available to them.

In order to implement Forest partnership AP properly, necessary steps should be considered such as follows:

- a. Conduct participatory assessment: identification and characterization of parties that will be involved, baseline on existing livelihoods and potential impacts on the livelihoods resulted from the BMP implementation; drafting and making consensus on mission, tasks, and management objectives, defining short-, mid-, and long-term outputs, goals, and measurable indicators (if necessary), means of communication (tools and frequency), conceptualization of mutual benefits that will be obtained, assessment of risk and legal issues and potential conflict of interest (including alternative solution of conflict).
- b. Establishment of organizational structure: Identification of relevant stakeholder, available and necessary resources, working unit and individuals in charge of the implementation of Forest partnership AP, identification of limitation and constraints.
- c. Stakeholder consultation: organizing formal meetings and FGDs aimed to make agreement on level and type of collaboration (including type of resources every party should make available), determine shared mission (division of resources) tasks (distribution of duties), and strategies among parties involved with regard to the implementation of Forest Partnership AP, agreement on level and type of participation expected from the local communities and or individuals, making sure that the partnership-based collaboration has no other purpose than that agreed by all parties, agreement on timeframe of Forest Partnership AP implementation, discussion with local communities on proposed action plan and feedback

- d. Development and agreed on actions: detailing agreed actions of Forest Partnership AP, technicalities, and schedule (when and where to begin the action plan)
- e. Implementation: testing the action plan in real situation, observing the short-, mid-, and long-term response on action implementation
- f. Monitoring and Evaluation: periodic monitoring of short-, mid-, and long-term outputs and goals and measurable indicators, conflicts, evaluation of parties involved include impacts on livelihoods, evaluation of level and type of collaboration, evaluation of division of resources and distribution of tasks, evaluation of planning process of Forest partnership AP execution, evaluation of management effectiveness, report findings and recommendation for future improvement.

6. ELIGIBILITY CRITERIA

To guarantee the implementation of Forest Partnership Action Plan(s), some criteria must be determined to make sure individuals or groups that will be allowed to get access to the Restoration Area are those the inhabitants of the 38 sub-villages. The key principle of precautionary granted access and limited use of resources in Restoration Area must be strongly considered in deciding the eligibility criteria. Basically, access will be given to the inhabitants of 38 sub-villages who, prior to the establishment of the Restoration Area, they already have utilized the existing resources as their only or part of the source of income and or daily needs. Highest priority of access will be given in the first place to individual(s) that uses local resources located in the Restoration Area as their only source of income or daily needs. Based on the Ground Check and consultation with local residents and other stakeholders the FPAP will specify the cut off-date on a case-by-case basis of each BIA, Corridor, and Buffer Zone in the Restoration Area. To assist this process, FPAP will incorporate within its design the functioning of local, community-based committees (groups, organizations, boards). It is important to reach agreement on what communities can and cannot collect, grow or cultivate from the BIA, Corridors and Reservoir's Buffer Zones and who will be affected from these activities.

As a general principle, the cut-off-date must be the date by which time

essentially every head of household could reasonably be expected to know of the official existence and on-the-ground location of the Restoration area, and therefore could be a different date for each Restoration Area based on its particular circumstances. In some cases, the cut-off date might be the finishing date of census that will normally be part of land tenure-socioeconomic study of FPAP and will be followed by the installation of boundary markers of Restoration Area agreed by PT. PLN (Persero), Perum Perhutani, and local residents. Dissemination of Restoration Area to community in 38 sub-villages must be carried out before the cut-off date is determined. Information whether the 38 sub-villages have already been informed about the Restoration Area should be available for FPAP. Persons who illegally occupy or begin exploiting the natural resources of Restoration Area after the cut-off-date would not be eligible for measures to offset this new resource use / encroachment but would still be eligible for offsets for restrictions that was determined before the new encroachment and as agreed in the FPAP.

On the other hand, individual or group that takes good responsibility in the management of Restoration Area will be entitled to obtain necessary assistance in the use of resources in the Restoration Area as long as it in line with the management plan of each BIA, Corridor, and Buffer Zone. Besides the cut-off date, all decisions concerning the eligibility of occupants or neighbors of Restoration Area for special consideration regarding livelihood issues would be consulted with stakeholders and recorded in Forest Partnership Action Plan.

7. INSTITUTIONAL ARRANGEMENTS

Implementation of the Forest Partnership Framework (FPF) is led and under the responsibility of PT. PLN (Persero) as UCPS project owner and along with Perum Perhutani as Permit Holder of forest utilization. The process of forest partnership action plan (FPAP) will involve a number of agencies/actors, such as PT. PLN (Persero), Perum Perhutani, KPH Bandung Selatan and Cianjur, districts (West Bandung and Cianjur Districts), village administrations, and the 8 affected LMDH (forest user groups), as well as wider communities within 38 sub-villages and NGOs. Since the implementation of FPF to some extent needs the support of

scientific-base information to execute programs in sustainable natural resource management, the involvement/engagement of higher education and or research institutions should be considered. Its involvement is needed, for example, in conducting analysis concerning land and tree suitability in agroforestry development and in assisting local communities to establish small-scale bioresource-base production systems.

As part of the ICM / ESMP team, a BMP Facilitation Team will be formed which will specifically implement the BMPAP. The BMP facilitation Team is under the coordination of the ICM / ESMP Facilitation Team, but related to biodiversity management, the BMP Facilitation Team will carry it out independently. In the management of socio-economic aspects related to or part of the BMP, the activities will be coordinated / integrated with the social management activities of the ICM / ESMP.

The BMP Facilitation Team consists of three main stakeholders who are directly related to biodiversity management. The stakeholders are PT PLN (Persero) / PT PLN (Persero) UPP Cisokan, Perum Perhutani, and local community who are members of a number of Forest Farmers Groups (*Kelompok Tani Hutan*, KTH) or *Lembaga Masyarakat Desa Hutan* (LMDH) which have long been involved in the Collaborative Forest Management program (*Pengelolaan Hutan Bersama Masyarakat*, PHBM). Through the BMP Facilitation Team, PT PLN (Persero) / PT PLN (Persero) - UPP Cisokan provides financial supports for the program formulated by the BMP Facilitation Team. In addition to stakeholders who are directly related, other stakeholders will also be involved to support the implementation of BMPAP, namely the Sub-district Government Offices, Village Governments, University's Research Institutions, and NGOs.

In accordance with the Minister of Environment and Forestry Regulation No. 39/2017, the community involvement program in forest management through the PHBM program is declared to remain valid but needs to be harmonized with this Ministerial regulation. In this regard, the BMP Facilitation Team is expected to be able to assist in adjusting and improving the performance of Collaborative Forest Management (PHBM) in accordance with the Ministerial regulation and the

recommendations generated from the BMP Review study.

Further formulation of the institutional arrangement for implementing FPF, including the rights and obligations of each stakeholder, will be further formulated before the updated BMPAP and FPAP is implemented.

8. GRIEVANCE REDRESS MECHANISM

The affected communities have right to deliver all grievances or complaints, written or oral and will be processed by the Grievance Unit established under the project. All grievances will be processed and followed up in accordance with the project grievance redress mechanism summarized in the diagram below:

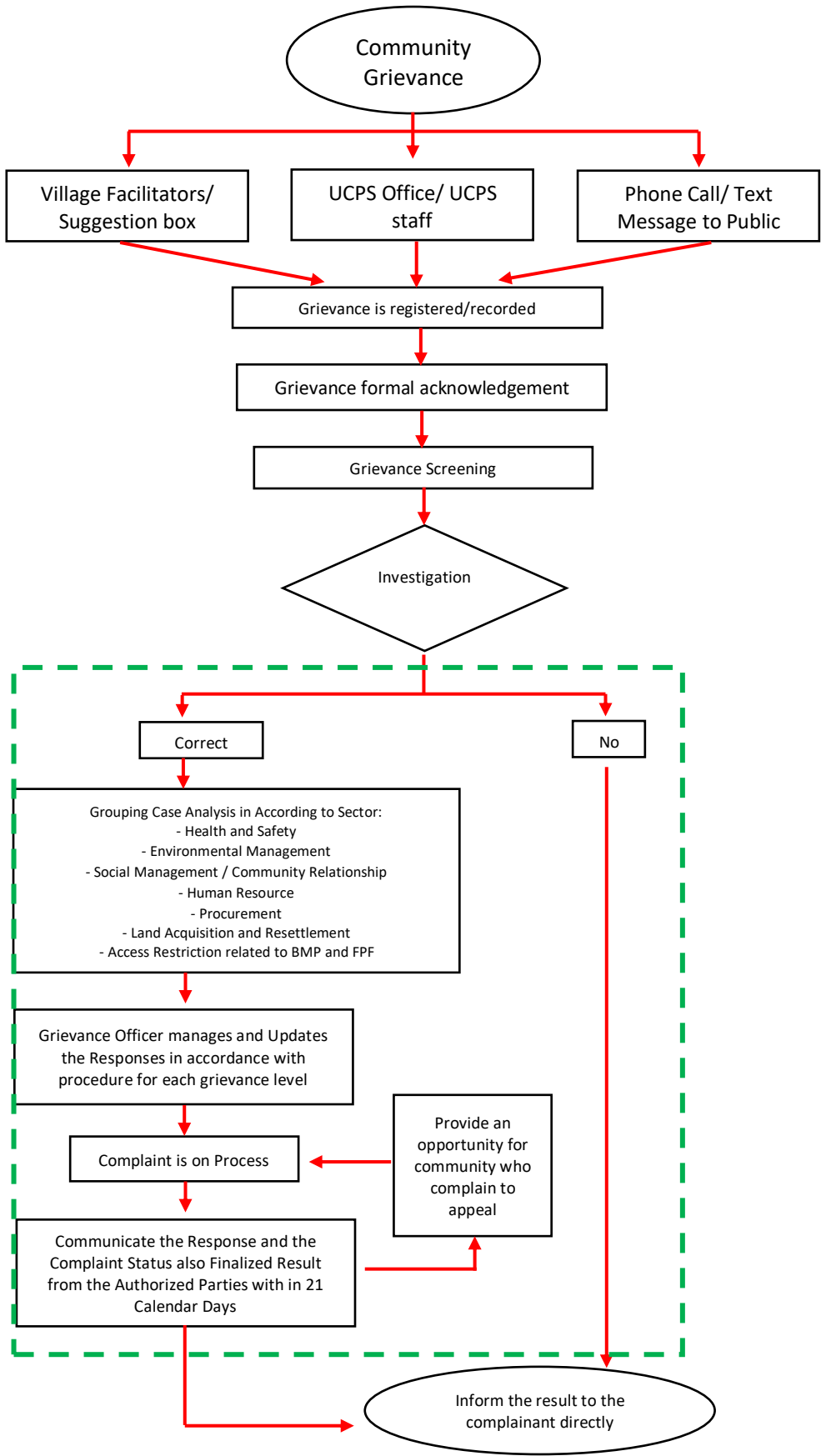


Figure 1 Grievance Redress Mechanism Flow

9. MONITORING AND EVALUATION

During the implementation of the FP Action Plan and BMP Action Plan, Master Development Unit of Jawa Bagian Tengah 1 will be responsible for Monitoring and Evaluation. Consultant will be hired to monitor all actions undertaken as prescribed and evaluate the impact of the FPAP. Monitoring will be carried out twice, i.e. in the middle and the end of plan implementation, to ascertain whether the activities are progressing as envisaged and provides feedback on how to keep the plan on schedule and at the same time maintain its quality. The monitoring should include arrangements for participatory monitoring of the FPAP activities as they relate to (beneficial and adverse) impacts on local communities within the Restoration Area, and for monitoring the effectiveness of measures taken to improve (or at minimum restore) incomes and living standards. Monitoring indicators will be required and adapted by participants and baseline values defined in each FPAP.

Evaluation will emphasize the impact of plan implementation in terms of achieving its intended objectives and resulted outputs (effectivity and efficiency dimensions). This focuses more on results than the processes, therefore, evaluation will be carried out at the end of each plan implementation. Evaluation will also cover matter concerning how to maintain and or improve the performance of the organization/institution in charge of the entire plan implementation.

10. FINANCING

The activities of FPAP and its implementation mentioned above are covered mainly under PT PLN (Persero) budget and or other available sources such as Perum Perhutani, Ministry of Environment and Forestry, Anggaran Pendapatan dan Belanja Daerah I (West Java Province's Revenue and Expenditures Budget) and Anggaran Pendapatan dan Belanja Daerah II (Cianjur and West Bandung Districts' Revenue and Expenditures Budget), and communities' owned budget (*swadaya masyarakat*). Schemes in the forms of subsidies, aids, and grant should be more considered than (soft) loan to develop local economy through small-scale income-

generating activities (e.g. agroforestry, local community's nurseries, bioresource-base production system like sugar palm-base production system). This will be confirmed during implementation. Budget estimation to implement Forest Partnership AP and the BMP will be confirmed during implementation.

11. CONSULTATION AND DISCLOSURE

This framework was prepared involving series of discussion and consultations with various stakeholders including PT.PLN, Perum Perhutani, government of subdistricts and villages surrounding the forest area, police and military representatives as part of Subdistrict Consultative Council (*Muspika*), representatives of Forest Village Community Institution, and community members. Summary of the consultations is presented in Appendix 4. Overall, relevant stakeholders expressing their support to maintain the biodiversity and forest area through implementation of this framework. The potentially affected communities are willing to participate noting the importance of the issues however detailed arrangement for implementation will need to be further discussed.

This document has been disclosed at PT PLN Website and more consultations will be conducted with relevant stakeholders particularly to finalize the detailed arrangement for implementation. Once agreed, the final version will be disclosed at the World Bank website (English version) and PT PLN (Persero) web sites (English and Indonesian versions).

Forest Partnership Action Plans will be provided in Indonesian and English versions. The Forest Partnership Action Plans will be disclosed at PT. PLN (Persero) and Perum Perhutani websites.

APPENDIX 1

Suitability Analysis Based on Forest Status, Proposed Restoration Area, Land uses, and Rare, Endemic, Endangered, and Protected Species (REEPS) Distribution

The analysis on the suitability of land use with a spatial approach has been provided in **Chapter 7.2 of the BMP Review**. The spatial analysis method used was overlaying of several maps, namely: Perum Perhutani's land class map (BMP Study 2014 Report), Map of Working Zones 1 and 2 (BMP Study 2014 and BMP Study 2017 Reports), and Working Zone 3 (BMP Review Study 2020), Map of Wildlife Encountered 2017-2020, and Map of Village and Cultivated Land (LARAP 2015 Report and BMP Review Study 2020). The output of the spatial analysis is the clustering grid as shown in Figure 2.

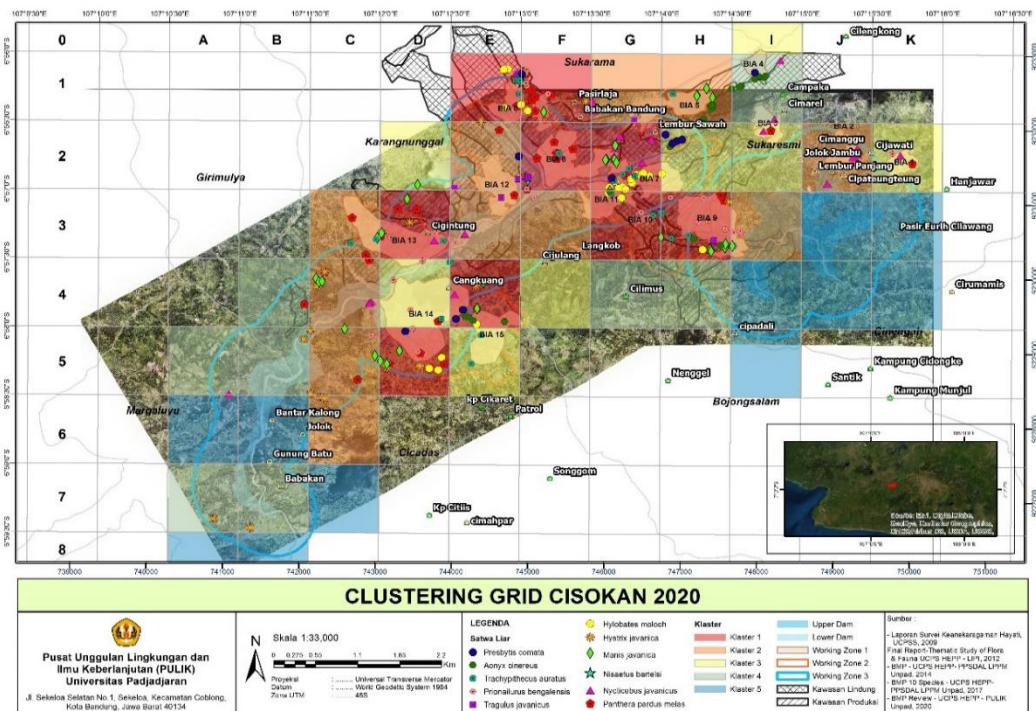


Figure 2 Clustering Grid in the UCPS Area

After clustering the area using an analytical grid, an analysis of agroforestry modelling is carried out in each cluster. There are five agroforestry management models with various economic scenarios. Each model is as shown in **Table 3.1** while the detailed

scenarios are presented in **Appendix 2 section C**.

Proposed Agroforestry Model for Livelihood Restoration of the Local Communities

It is inevitable that the conversion of forest covers into agriculture causes many problems such as soil fertility decreased, erosion, biodiversity loss, floods, drought, and even global environment changes. As time goes by, these problems get worse by the increasing number of forest areas that are converted into cultivated lands. Agroforestry is a collective term for land-use systems and technology implemented on a land unit by combining woody plants (trees, shrubs, palms, bamboo, etc.) with crops and/or animals (livestock) and/or fish. It can be carried out at the same time or take turns to establish ecological and economic interactions among the various existing components.

Analysis of Agricultural Development in the UCPS Area

The development of an agricultural commodity in an area must consider the efficiency of farming. In other words, minimal costs must be pursued with a certain level of production so that it will be more profitable for farmers. In fact, only the products efficiently produced can compete in the era of free-market globalization, both in the domestic and international markets. This efficient farming can only be achieved by applying appropriate technology.

Before being distributed to users, a model to be developed must be evaluated for its technical and financial feasibility because the model can be effective if it meets the following criteria: (1) easy-to-do technically, (2) financially (even economically) profitable, (3) socially and culturally accepted by the community, and (4) does not harm the environment. Thus, financial or economic feasibility is one of prerequisites for a model to be adopted by farmers.

The UCPS area has various land uses where direct or indirect use of natural resources happen within it. In the landscape of the UCPS area, there are REEPS wildlife activities, cultivation crops, forest resources extractions, and the UCPS project plan itself.

There are two approaches in the recommendations for the agroforestry model as land management in the UCPS area, namely the spatial approach and the economic

approach. The spatial approach includes an analysis of the land status, land use types, and existing conditions to support the analysis of the community management model. Meanwhile, the economic approach is carried out by analyzing the types of agricultural commodities and the existing agricultural conditions in the UCPS area. The results of the spatial analysis approach are as shown in Figure 2 and Table 2.

Analysis of Agricultural Economic Models in the UCPS Area

a. Variations of Commodities Planted by Farmers in the UCPS Area and its Surroundings

Based on the results of the BMP study (2014 and 2017), LARAP (2015), IMA (2015) & FGD Study BMP Review (2020), there were forest plants and agroforestry plants recommended in the UCPS area. The forest plants species were obtained from the BMP study report (2014 and 2017). It was native species that commonly found in natural forest and not categorized as economic plants. Their function was as revegetation plants and served as habitat and feeding preference for existing wildlife, especially REEPS animals.

Meanwhile, the agroforestry plants were obtained from LARAP study (2015), IMA (2015), and the results of the Focus Group Discussion BMP Review (2020) with the key informants of the community. The agroforestry plants were the species recommended for economic value crops. It was categorized into top-layer plants (timber and non-timber), middle crops (annual and seasonal), and understorey (*palawija*/secondary plants).

b. Proposed Agroforestry Models in the UCPS Area

Agroforestry is developed to provide benefits to humans or improve community well-being. It is expected to be able to help optimize the yield of land use sustainably to ensure and improve people's lives while increasing the carrying capacity of human ecology, especially in rural areas. Using primary and secondary data, further analysis of the agricultural economic scenario of agroforestry in West Java was carried out adopted from Diniyati's work (2013) on albizia (*Falcataria molluccana*). This approach was performed considering that albizia was one of the main commodity crops in Cisokan.

The simulation analysis model of the tree-based agroforestry farming system is a community forest model that combines mixtures of woody species (albizia) with other species (horticulture and secondary crops) on a land and time units (one cycle). The simulation was developed for modeling the agroforestry system in the UCPS area following the recommendations in the **BMP Review sub-section 7.2** and **sub-section 3.1 above**. Based on these simulations, the agroforestry system in the UCPS area was divided into three working zones with a pattern approach to plant species consisting of forest plants (timbers), top-layer plants (timbers and non-timbers), middle plants (annual and seasonal), and understory as shown in **Appendix 2 section E**.

One of the land-based business is community forest in accordance with the Minister of Forestry Decree No. 49/kpts-II/1997 dated January 20, 1997. Community forest is a forest owned by the people, with a minimum area of 0.25 ha with canopy cover of wood and/or other types of plants > 50%, and/or in first-year crops with plants at least 500 individuals per hectare.

Table 2 Recommended Agroforestry Model in the UCPS Area

Model	Dominant Profile	Grid Cluster	Agricultural Pattern				
			Forest Plant ¹	Agroforestry			Understorey Palawija ⁵
				Top-layer Plant ²	Annual ³	Seasona ⁴	
Model 1	Production forest	Red	+	+	+		
Model 2	Agroforestry	Orange	+	+	+	+	+ (5-6 first years)
Model 3	Upland field	Yellow	+	+	+	+	+
Model 4	APL	Green		+	+	+	+
Model 5	APL	Blue		+	+	+	+

Remark: ¹: Native forest species, used as feeding and habitat preference for wildlife; ²: Trees, timber or non-timber; ³: Long-cycle garden plants; ⁴: Short-cycle garden plants (one planting cycle); ⁵: Other species besides food plant species to meet the food needs.

Model 1 is applied to land use with the dominant profile of forested land with extreme topography and the presence of REEPS. It is recommended that only forest and agroforestry species in the category of top-layer and middle plant annuals are planted in this model. Model 1 is an agroforestry model that aims to maintain forests while limited providing crops with economic value. The forest plants in this model function ecologically as a habitat for animals while agroforestry plants can provide economic and social benefits for communities living around the forest. The existence of forest plants maintains the ecological functions even improve soil quality and preserve the availability of habitat for biodiversity. Apart from forest plants, there are also non-timber and middle plants (annual garden plants) benefit as fruits providers. The existence of yields from the top layer and middle plants will provide a sustainable income. Thus, this model is a solution not only for the community in meeting their needs but also preserves the ecological function of plants in their cropping patterns.

Model 2 is applied to land use with a dominant profile of agroforestry. Forest plants, agroforestry plants with the categories of the top layer, middle (annual and seasonal), and understorey (only in the first 5-6 years) are recommended to fill this model. Model 2 consists of forest plant species, non-timber plants, garden plants (annual and seasonal), and secondary crops. This model is more varied than Model 1 so that the harvesting time is greater than in Model 1. Each agroforestry crop resulting in a time difference in obtaining income from agroforestry products. This is similar to Widiarti and Prajadinata

(2008) who stated that agroforestry patterns provide varied income, such as routine, daily, weekly, monthly, seasonal, and annual. In turn, agroforestry provides sustainable results for the farmers.

Model 3 is applied to land use with the dominant profile of the upland field. It is recommended to plant forest and agroforestry plant species with the categories of top layer, middle (annual and seasonal), and understorey plant. Model 3 is similar to Model 2, but in this model, the understorey crops can be carried out with a sustainable cycle.

Model 4 is applied to land use with the dominant profile of other land use areas (APL) such as settlements, private gardens, and rice fields where REEPS wildlife still encountered. Forest plants and agroforestry crops with the categories of the top layer, middle (annual and seasonal), and understorey are recommended to plant in this area.

Model 5 is applied to land use with the dominant profile of other land use areas (APL) such as settlements, private gardens, rice fields, and lemongrass crops where none REEPS wildlife encountered. Forest plants and agroforestry crops with the categories of the top layer, middle (annual and seasonal), and understorey are recommended to plant in this area.

c. The Economy of Agroforestry Models in the UCPS Area

An economic approach is carried out for each model as adopted from Diniyati's study (2013). The agricultural economy approach is based on the Net Present Value (NPV) (Gray, et al., 2007), which is based on the pattern (vegetation stratification) and strata (land cultivation area category) approach. Then, it calculates the income and expenses (investment & operational) to obtain an estimated profit. Investment costs consist of land rental costs, tax payments, and equipment costs. Operational costs consisting of costs for land cultivation, purchase of seeds, stakes, planting, fertilization, maintenance, and harvesting. Income from agroforestry community forest enterprises is the sum of all income products as shown in **Appendix 3 section A**.

Referring to the explanation of the agricultural economic model 1-5, land cultivators in Cisokan generally cannot rely solely on income from cultivating land in working zones 1, 2, and 3. They need to have alternative to support their main income,

namely non-timber forest products (NTFPs) as presented in **Appendix 3 section B**.

Based on the categorization of models, from Model 2 to Model 5 are the most relevant models to be applied by the farmers in Cisokan. Accessibility for Model 1 will be very limited because it is a natural forest which is the habitat for REEPS animals and the farmers cannot get economic results from forest plants. What is favored in the existing models is to provide the top layer and middle plants since both plants have a long-life cycle. Thus, it will be able to maintain the sustainability of cultivated results.

The ideal plant species used as the top layer and middle plants are MPTS (Multi Purposes Trees Species) plants. MPTS is a plant that has a function other than timber, for example, fruit or other plant parts can be used. Meanwhile, forestry plants (timber plants) are plants that are only used for wood. MPTS species are more likely to have conservative traits because they are rarely cut down by the community. Examples of MPTS plants are mango (*Mangifera indica*) and durian (*Durio zibethinus*). Meanwhile, the examples of timber plants are albizia (*Falcataria molluccana*) and sobsi (*Maeopsis emnii*). In the implementation of cropping patterns, it is better to combine MPTS and forestry plants so that the income can vary. The scenarios of the percentage of plant composition that can be taken by the farmers in utilizing their land along with the estimated yields that can be obtained within 10 years are presented in Table 3 and Table 4.

Table 3 *Pattern of Timbers : MPTS : Other Plants (20 : 80 : 0)*

Year	Land Area (maks 2 ha)									
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
0	Upland field (100%)									
1	20% (20:80)		Upland field (80%)							
2	40% (Timber:MPTS = 20:80)			Upland field (60%)						
3	60% (Timber:MPTS = 20:80)					Upland field (40%)				
4	80% (Timber:MPTS = 20:80)								Upland field (20%)	
5	100% (Timber:MPTS = 20:80)									
6	Produced		Yet to produce							
7	Produced (Timber:MPTS = 20:80)			Yet to produce						
8	Produced (Timber:MPTS = 20:80)					Yet to produce				
9	Produced (Timber:MPTS = 20:80)								Yet to produce	
10	Produced (Timber:MPTS = 20:80)									

Table 4 *Pattern of Timbers: MPTS : Other Plants (50 : 50 : 0)*

Year	Land Area (Max. 2 ha)									
	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
0	Upland field (100%)									
1	20% (50:50)		Upland field (80%)							
2	40% (Timber:MPTS = 20:20)			Upland field (60%)						
3	60% (Timber:MPTS = 20:20)					Upland field (40%)				
4	80% (Timber:MPTS = 20:20)								Upland field (20%)	
5	100% (Timber:MPTS = 20:20)									
6	Produced		Yet to produce							
7	Produced (Timber:MPTS = 50:50)			Yet to produce						
8	Produced (Timber:MPTS = 50:50)					Yet to produce				
9	Produced (Timber:MPTS = 50:50)								Yet to produce	
10	Produced (Timber:MPTS = 50:50)									

As shown in Table 3 and Table 4, there are some measures to convert the land pattern used for the upland fields into timber and MPTS plants so that the land use can be sustainable. This process takes at least five years with a conversion rate of 20% per year.

What distinguishes the patterns in Table 3 and Table 4 are the results that can be obtained after five years. In general, the timber can be harvested in the sixth year, while MPTS can only be produced in 10 years. The percentage of timber with MPTS in the (20:80) and (50:50) patterns will affect the yield time that can be obtained by the farmers.

The 20:50 pattern can provide early economic benefits depending on the timing of harvesting of timber. However, after harvesting those wood, vacant land must be immediately replanted with new seeds. In contrast, in the 50:50 pattern, the farmers have to wait longer to generate maximum economic benefits, but the MPTS cycle can continue to produce other functions for the next few years without having to be replanted.

In the practical terms of the two planting patterns above, the types of NTFPs such as honey or palm sugar are additional values, not included in the standard calculation (not all land farmers cultivate them). If it is included in the "standard" calculation, there will be a great variety of formulas.

Appendix 2

A. Type of Woody/Forestry/Timber Plants

Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
1	Albasiah	<i>Albizia procera</i> Benth.	Leguminosae	T		✓
2	Albizia	<i>Paraserianthes falcataria</i>	Fabaceae	T	✓	
3	Anggrung	<i>Trema orientalis</i> Blume	Ulmaceae	T		✓
4	Aren	<i>Arenga pinnata</i> Merr.	Arecaceae	F		✓
5	Bayur	<i>Pterospermum javanicum</i> Jungh.	Sterculiaceae	T		✓
6	Benda	<i>Artocarpus elasticus</i>	Moraceae	T	✓	
7	Berenuk	<i>Crescentia cujete</i> L.	Bignoniaceae	T	✓	
8	Beringin	<i>Ficus benjamina</i> L.	Moraceae	T	✓	
9	Bingbin	<i>Pinanga coronate</i> Blume	Arecaceae			✓
10	Bintinu	<i>Melochia umbellata</i>	Malvaceae	T	✓	
11	Bisoro	<i>Ficus hispida</i> Linn.	Moraceae		✓	✓
12	Bisoro	<i>Ficus hispida</i>	Moraceae	T	✓	
13	Budengan/ Ki oray	<i>Diospyros javanica</i> Bakh	Ebenaceae	T		✓
14	Bungur	<i>Lagestroemia speciosa</i> Pers	Lythraceae			✓
15	Cangcaratan	<i>Neonauclea calycina</i> Merryll	Rubiaceae	T	✓	✓
16	Durian	<i>Durio zibethinus</i> Murr.	Bombaceae	F		✓
17	Embacang	<i>Mangifera foetida</i> Blume	Anacardiaceae			✓
18	Gowok	<i>Syzygium polycephalum</i> (Miq.)	Myrtaceae	F		✓
19	Hamerang	<i>Ficus padana</i>	Moraceae	T	✓	
20	Hanjuang	<i>Cordyline</i> sp	Asparagaceae	H	✓	
21	Jajambuan	<i>Syzygium pycnanthum</i> Merr. & Perry	Myrtaceae	F		✓
22	Jambu air	<i>Syzygium aqueum</i> Alston	Myrtaceae	F		✓

Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
23	Jambu biji	<i>Psidium guajava</i> L	Myrtaceae	F		✓
24	Jati	<i>Tectona grandis</i>	Lamiaceae	T	✓	
25	Jengkol	<i>Pithecellobium jiringa</i> (Jack). Prain.	Leguminosae	F		✓
26	Jeruk besar	<i>Citrus grandis</i> Hassk	Rutaceae	F		✓
27	Jeruk manis	<i>Citrus</i> sp	Rutaceae	F		✓
28	Johar	<i>Senna siamea</i>	Fabaceae	T	✓	
29	Kaliandra	<i>Calliandra</i> spp	Leguminosae			✓
30	Kaliandra	<i>Calliandra haematocephala</i>	Fabaceae	Semak	✓	
31	Kanyere	<i>Bridelia stipularis</i>	Phyllantaceae	T	✓	
32	Kapuk	<i>Ceiba pentandra</i> Gaertn.	Bombaceae			✓
33	Kelapa	<i>Cocos nucifera</i> Linn	Arecaceae	F		✓
34	Kemiri	<i>Aleurites moluccana</i> Willd.	Euphorbiaceae			✓
35	Ki Julang	<i>Villebrune rubescens</i> Blume	Urticaceae			✓
36	Ki Krasak	<i>Ficus superba</i> Miq	Moraceae			✓
37	Ki Bayur	<i>Pterospermum javanicum</i>	Malvaceae	T	✓	
38	Ki Bungur	<i>Lagerstroemia indica</i>	Lythraceae	T	✓	
39	Ki Hiang	<i>Albizia procera</i>	Fabaceae	T	✓	
40	Ki hujan	<i>Samanea saman</i>	Fabaceae	T	✓	
41	Kiseureuh	<i>Piper aduncum</i>	Piperaceae	T	✓	
42	Kondang	<i>Ficus variegata</i> Blume	Moraceae		✓	✓
43	Kopi	<i>Coffea</i> spp	Rubiaceae	F		✓
44	Kopo	<i>Syzygium malaccense</i>	Myrtaceae	T	✓	
45	Kuweni	<i>Mangifera odorata</i> Griff.	Anacardiaceae	F		✓
46	Lame	<i>Alstonia scholaris</i> R.Br.	Apocynaceae	T	✓	✓
47	Loa	<i>Ficus glomerata</i> Hort ex Miq.	Moraceae			✓

Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
48	Mahoni	<i>Swietenia macrophylla</i> King	Meliaceae	T		✓
49	Mahoni	<i>Switenia mahagony</i>	Meliaceae	T	✓	
50	Malanding/ Petai cina	<i>Leucaena leucocephala</i>	Fabaceae	T	✓	
51	Mangga	<i>Mangifera indica</i> Blume	Anacardiaceae	F		✓
52	Manii	<i>Meisopsis eminii</i> (L.) Blume	Ulmaceae	T		✓
53	Mara	<i>Macaranga tanarius</i>	Euphorbiaceae	T	✓	
54	Menteng	<i>Baccaurea racemosa</i> Muel. Arg	Euphorbiaceae			✓
55	Mindi	<i>Melia azedarach</i> Blanco	Meliaceae	T	✓	✓
56	Nangka	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	F		✓
57	Petai	<i>Parkia speciosa</i> Hassk.	Leguminosae	F		✓
58	Petai cina	<i>Leucaena leucocephala</i> Lam	Mimosaceae	F		✓
59	Pinus	<i>Pinus merkusii</i> Jungh. & de Vriese	Pinaceae	T	✓	✓
60	Pisitan	<i>Aglaia dokoo</i> Grift	Meliaceae			✓
61	Puspa	<i>Schima walichii</i> Choisy	Theaceae			✓
62	Rambai	<i>Glochidion philipinensis</i> Willd.	Euphorbiaceae			✓
63	Rambutan	<i>Nephelium lappaceum</i> L.	Sapindaceae	F		✓
64	Salak	<i>Salacca edulis</i> Reinw.	Arecaceae	F		✓
65	Salam	<i>Syzygium polyanthum</i> Miq.	Myrtaceae			✓
66	Saninten/Kuliwang	<i>Castanopsis javanica</i> A.DC.	Fagaceae			✓
67	Sirsak	<i>Annona muricata</i> Linn.	Anonaceae	F		✓
68	Sobsis	<i>Maesopsis eminii</i>	Rhamnaceae	T	✓	
69	Suren	<i>Toona sureni</i>	Meliaceae	T	✓	
70	Teureup	<i>Artocarpus elastica</i> Roxb.	Moraceae	T	✓	✓
71	Timon	<i>Timonius timon</i> (Spreng.) Merryll.	Rubiaceae			✓
72	Tisuk	<i>Hibiscus macrophyllus</i> Roxb.	Malvaceae	T	✓	✓

Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
73	Walik angin	<i>Leucosycke capitelata</i> Wedd	Urticaceae			✓
74	Wangkal Jengjen	<i>Parasrianthes falcataria</i> (L.) I. Nielsen.	Leguminosae			✓
75	Waru	<i>Hibiscus tiliaceus</i> Linn.	Malvaceae			✓

B. Type of Non-timber Plants

Non-Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
1	Albasiah	<i>Albizzia procera</i> Benth.	Fabaceae			✓
2	Alpuket	<i>Persea americana</i> Mill.	Lauraceae	F	✓	✓
3	Aren Palm sugar	<i>Arenga pinnata</i>	Arecaceae	F	✓	
4	Asem	<i>Tamarindus indica</i>	Fabaceae	F	✓	
5	Awi gombang	<i>Gigantochloa verticillata</i> Munro	Poaceae			✓
6	Awi tali	<i>Bambusa apus</i> Schult.f.	Poaceae			✓
7	Balingbing	<i>Averrhoa carambola</i> Linn.	Oxalidaceae	F		✓
8	Bambu	<i>Bambusa</i> sp.	Poaceae			✓
9	Bawang	<i>Allium cepa</i> Banks. Ex Schult.f.	Liliaceae	Tubers		✓
10	Breadnut	<i>Hibiscus</i> sp	Malvaceae		✓	
11	Buni	<i>Antidesma bunius</i> Spreng	Euphorbiaceae			✓
12	Cacabean	<i>Solanum blumei</i> Nees ex Blume	Solanaceae	F		✓
13	Campolah	<i>Pouteria campechiana</i>	Sapotaceae	F		✓
14	Cardamom	<i>Amomum</i> sp	Zingiberaceae		✓	
15	Castor/ Jarak	<i>Ricinus communis</i>	Euphorbiaceae		✓	
16	Cau	<i>Musa paradisiaca</i> L.	Musaceae	F	✓	✓
17	Cengek	<i>Solanum lycopersicum</i> Blanco	Solanaceae	F		✓
18	Cengkeh	<i>Eugenia aromaticum</i> (L.) Merrill & Perry	Musaceae			✓
19	Cengkih Cloves	<i>Syzigium aromaticum</i>	Myrtaceae		✓	
20	Ceremai	<i>Phyllanthus javanicus</i>	Phyllanthaceae	F	✓	
21	Coklat Cacao	<i>Theobroma cacao</i>	Malvaceae	F	✓	
22	Comrang/Honje	<i>Etilingera elatior</i>	Zingiberaceae		✓	
23	Cotton	<i>Gossypium</i> sp	Malvaceae		✓	

Non-Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
24	Dadap	<i>Erythrina variegata</i> Linn.	Fabaceae			✓
25	Danas	<i>Ananas comosus</i> (L.) Merr.	Bromeliaceae	F		✓
26	Delima	<i>Punica granatum</i>	Punicaceae	F	✓	
27	Dukuh	<i>Lansium domesticum</i> Correa	Malvaceae	F	✓	✓
28	Durian	<i>Durio zibethinus</i>	Malvaceae	F	✓	
29	Ganyong	<i>Canna</i> sp.	Cannaceae			✓
30	Gedang	<i>Carica papaya</i> L.	Caricaceae	F		✓
31	Haur	<i>Bambusa vulgaris</i> Nees..	Poaceae			✓
32	Huni	<i>Antidesma bunius</i> Sperng	Euphorbiaceae	F	✓	
33	Jambe	<i>Areca catechu</i>	Arecaceae		✓	
34	Jambu air	<i>Syzygium aqueum</i> Alston	Musaceae	F	✓	✓
35	Jambu batu	<i>Psidium guajava</i> L.	Musaceae	F		✓
36	Jambu biji/Bangkok guava	<i>Psidium guajava</i>	Myrtaceae	F	✓	
37	Jambu bol	<i>Syzygium malaccense</i> (L.) Merrill.& Persl.	Musaceae	F	✓	✓
38	Jambu Monyet	<i>Anacardium occidentale</i>	Anacardiaceae	F	✓	
39	Jati	<i>Tectona grandis</i> Linn.f.	Verbenaceae	T		✓
40	Jengjen	<i>Paraserianthes falcataria</i> (L.)I. Nielsen	Fabaceae	T		✓
41	Jengkol	<i>Pithecellobium jiringa</i> (Jack)Prain	Fabaceae	F	✓	✓
42	Jeruk	<i>Citrus</i> sp	Rutaceae	F	✓	
43	Jeruk Bali	<i>Citrus grandis</i> Hassk.	Rutaceae	F	✓	✓
44	Jeruk garut	<i>Citrus</i> sp	Rutaceae	F	✓	
45	Jeruk nipis	<i>Citrus aurantifolia</i>	Rutaceae	F	✓	
46	Kacang panjang	<i>Vigna sinensis</i> Endl. Ex Hassk.	Fabaceae	V		✓
47	Kacapi	<i>Sandoricum koetjape</i>	Meliaceae	F	✓	
48	Kadongdong	<i>Spondias dulcis</i> Forst.f.	Anacardiaceae	F		✓

Non-Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
49	Kadu	<i>Durio zibethinus</i> Murr.	Bombacaceae	F		✓
50	Kalapa	<i>Cocos nucifera</i> Linn.	Arecaceae	F		✓
51	Kangkung	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	V		✓
52	Kapuk	<i>Ceiba petandra</i> Gaertn.	Bombacaceae		✓	✓
53	Karet Rubber	<i>Hevea brasiliensis</i>	Euphorbiaceae		✓	
54	Kawini	<i>Mangifera odorata</i> Griff.	Anacardiaceae	F		✓
55	Kawung	<i>Arenga pinnata</i> Merr.	Arecaceae	F		✓
56	Kedondong	<i>Spondias pinnata</i>	Anacardiaceae		✓	
57	Kelewek	<i>Pangium edule</i> Reinw.	Flacourtiaceae			✓
58	Kokosan	<i>Lansium domesticum</i>	Meliaceae		✓	
59	Kopi	<i>Coffea arabica</i> Benth.	Rubiaceae	F		✓
60	Kopi Coffee	<i>Coffea</i> sp	Rubiaceae	F	✓	
61	Kumis kucing	<i>Orthosiphon stamineus</i> Benth	Labiatae			✓
62	Kunir	<i>Curcuma domestica</i> Valetton	Zingiberaceae	Tubers		✓
63	Kupa	<i>Eugenia polycephalum</i> (Miq.) Merrill & Perry.	Musaceae		✓	✓
64	Kweni mango	<i>Mangifera × odorata</i>	Anacardiaceae	F	✓	
65	Lada/Pedas	<i>Piper nigrum</i>	Piperaceae		✓	
66	Laja	<i>Alpinia galanga</i> Willd.	Zingiberaceae			✓
67	Lenca	<i>Solanum nigrum</i> Acerb. Ex Dun.	Solanaceae	V		✓
68	Lengkeng	<i>Dimocarpus longan</i>	Sapindaceae	F	✓	
69	Lengsar	<i>Pometia pinnata</i> Forst.	Sapindaceae			✓
70	Limus	<i>Mangifera foetida</i> Blume	Anacardiaceae	F	✓	✓
71	Mahoni	<i>Swietenia mahagoni</i> Jacq.	Malvaceae	T		✓
72	Malanding	<i>Leucaena glauca</i> Benth.	Fabaceae	V		✓
73	Manalika	<i>Annona muricata</i> L.	Annonaceae	F		✓

Non-Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
74	Mangga	<i>Mangifera indica</i> Blume	Anacardiaceae	F	✓	✓
75	Manggis	<i>Garcinia mangostana</i>	Clusiaceae	F	✓	
76	Manii	<i>Maesopsis eminii</i> Engl.	Rhamnaceae	T		✓
77	Melinjo	<i>Gnetum gnemon</i>	Gnetaceae		✓	
78	Mengkudu	<i>Morinda citrifolia</i>	Rubiaceae	F	✓	
79	Menteng	<i>Baccaurea racemosa</i> Muell. Arg.	Euphorbiaceae			✓
80	Menteng	<i>Baccaurea racemosa</i> Muel. Arg	Euphorbiaceae			✓
81	Mindi	<i>Melia azedarach</i> Blanco	Malvaceae			✓
82	Muncang	<i>Aleurites moluccana</i> Willd.	Euphorbiaceae			✓
83	Nanas	<i>Ananas comosus</i>	Bromeliaceae	F	✓	
84	Nangka	<i>Artocarpus heterophylla</i> Lam.	Moraceae	F	✓	✓
85	Nona	<i>Annona</i> sp	Annonaceae	F	✓	
86	Papaya	<i>Carica papaya</i>	Caricaceae	F	✓	
87	Pare	<i>Oryza sativa</i> Hochst. Ex Steud.	Poaceae	Paddy		✓
88	Pare IR	<i>Oryza sativa</i> (L.) var IR 46	Poaceae	Paddy		✓
89	Pare ketan	<i>Oryza sativa</i> (L.) var glutinosa	Poaceae	Paddy		✓
90	Pecan	<i>Carya illinoensis</i>	Juglandaceae		✓	
91	Petai Cina Chinese Petai	<i>Leucaena leucocephala</i>	Fabaceae	F	✓	
92	Petai	<i>Parkia speciosa</i>	Fabaceae	F	✓	
93	Petir	<i>Parkia roxburghii</i> G. Don.	Fabaceae			✓
94	Peundeuy	<i>Parkia javanica</i>	Fabaceae		✓	
95	Picung	<i>Pangium edule</i>	Achariaceae		✓	
96	Pinus	<i>Pinus merkusii</i> Jungh. & deVriese	Pinaceae	T		✓
97	Pisitan	<i>Lansium domesticum</i>	Sapindaceae		✓	
98	Porang	<i>Amorphophallus muelleri</i>	Araceae			✓

Non-Timber Plants						
No	Vernacular	Scientific	Family	Category	LARAP	BMP
99	Rambutan	<i>Nephelium lappaceum</i> L.	Sapindaceae	F	✓	✓
100	Salak	<i>Salacca edulis</i> Reinw.	Arecaceae	F	✓	✓
101	Salam	<i>Syzygium polyanthum</i> Miq.	Musaceae		✓	✓
102	Sampeu	<i>Manihot esculenta</i> Crantz	Euphorbiaceae	Tubers		✓
103	Sawo	<i>Manilkara zapota</i>	Sapotaceae	F	✓	
104	Serai	<i>Cymbopogon citratus</i>	Poaceae			✓
105	Sinyo nakal	<i>Duranta erecta</i> Linn.	Verbenaceae			✓
106	Sirsak	<i>Annona muricata</i>	Annonaceae	F	✓	
107	Sukun	<i>Artocarpus altilis</i> (Parkinson) Fosberg.	Moraceae	F	✓	✓
108	Suren	<i>Toona sinensis</i> M. Roem	Malvaceae	T		✓
109	Tales	<i>Colocasia esculenta</i> Schott.	Araceae			✓
110	Tangkalak	<i>Bellucia axinanthera</i>	Melastomaceae		✓	
111	Tangkil	<i>Gnetum gnemon</i> Linn.	Gnetaceae	V		✓
112	Teh Tea	<i>Camellia sinensis</i>	Theaceae		✓	
113	Terong	<i>Solanum melongena</i> Linn.	Solanaceae	V		✓
114	Tisuk	<i>Hibiscus macrophyllus</i> Roxb.	Malvaceae			✓
115	Vanili	<i>Vanilla albida</i> Blume	Orchidaceae			✓
116	Wera	<i>Hibiscus</i> sp	Malvaceae			✓

C. Clustering Grids and Recommended Agroforestry Models in the UCPS Area

No	Grid	Area Status	Working Zone	REEPS	Land Use	Agroforestry Model
1	A5	APL	3	NC	Hamlet, rice fields, talun	Model 4
2	A6	APL	3		Hamlet, rice fields, talun	Model 5
3	A7	APL	3	HJ	Hamlet, rice fields, talun	Model 4
4	A8	APL	3		Rice fields, lemongrass crops	Model 5
5	B4	APL, P	3	PP	Pine, rice fields	Model 4
6	B5	APL, P	3	HJ	Pine, rice fields, talun	Model 4
7	B6	APL	3		Hamlet, rice fields, talun	Model 5
8	B7	APL	3	HJ	Hamlet, rice fields, talun	Model 4
9	B8	APL	3		Rice fields, lemongrass crops	Model 5
10	C3	APL, P	1,2,3	MJ, PP, TA	Production forest, talun, palawija crops	Model 2
11	C4	APL, P	3	HJ, MJ, NJ, PP	Pine, natural forest, rice fields	Model 2
12	C5	APL	3	HJ, MJ, PB, PP	Pine, rice fields, talun	Model 2
13	C6	APL	3	HJ	Hamlet, rice fields, talun	Model 2
14	C7	APL	3		Rice fields, talun	Model 5
15	D2	APL, P, L	2,3	MJ	Production forest, upland field, rice fields, fragmented natural forest	Model 3
16	D3	APL, P	1,2,3	HJ, MJ, NJ, PB, PP, TA	Production forest, upland field, rice fields	Model 1
17	D4	APL, P	1,2,3	PB, PP, TA	Hamlet, rice fields, talun	Model 3
18	D5	APL	1,2,3	HM, HJ, MJ, PB, PC, PP	Lemongrass crops, natural forest, pine	Model 1
19	E1	APL, L	1,2,3	HJ, HM, MJ, PP, TA, TJ	Natural forest, production forest, talun, coffee, galangal	Model 1
20	E2	APL, P, L	1,2,3	HJ, PC, PP, TJ	Production forest, upland field	Model 2
21	E3	APL, P, L	1,2,3	NJ, PB, PP, TJ	Production forest, rice fields	Model 2

No	Grid	Area Status	Working Zone	REEPS	Land Use	Agroforestry Model
22	E4	APL, L	1,2,3	A, HJ, HM, MJ, NJ, PC, PP	Production forest, talun, rice fields	Model 1
23	E5	APL	1,2,3	TA	Lemongrass crops, natural forest, pine	Model 3
24	F1	APL, P, L	1,2,3	HJ, HM, MJ, NJ, PB, PC, PP	Production forest, talun, coffee, galangal	Model 1
25	F2	APL, P, L	1,2,3	HJ, MJ, PB, PP, TA, TJ	Talun, upland field	Model 1
26	F3	APL, L	1,2,3	PB	Talun, rice fields	Model 2
27	F4	APL	1,2,3		Pine, lemongrass crops	Model 3
28	G1	APL, P, L	1,3	NJ, TJ	Pine, coffee, palawija crops	Model 2
29	G2	APL, P, L	1,2,3	HM, HJ, MJ, NJ, PC, PP, TA	Hamlet, rice fields, upland field, agroforestry	Model 1
30	G3	APL, P, L	1,2,3	A, HM, MJ, PB, TA, TJ	Upland field, natural forest, palawija crops	Model 1
31	G4	APL, P	2		Pine, lemongrass crops	Model 4
32	H1	APL, P, L	1,3	A, MJ, TA	Pine, talun	Model 2
33	H2	APL, P, L	1,2,3	A, HM, PC, PP	Production forest, talun	Model 3
34	H3	AP, P, L	1,2,3	A, HM, HJ, MJ, PB, PP, TA, TJ	Natural forest, upland field, agroforestry	Model 1
35	H4	APL, P	2,3		Pine, lemongrass crops	Model 4
36	I0	APL, P, L	1		Pine, talun	Model 3
37	I1	APL, P, L	1	A, NJ, PC	Pine, talun	Model 4
38	I2	APL, P	1,3	NJ, PP	Production forest, talun	Model 3
39	I3	APL, P	1,2,3	HJ, MJ, PB	Production forest, lemongrass crops, pine	Model 2
40	I4	APL, P	3		Pine, lemongrass crops	Model 5
41	I5	APL	3		Rice fields, lemongrass crops	Model 5
42	J2	APL	3	NJ	Pine, palawija crops	Model 2
43	J3	APL	3		Pine, lemongrass crops	Model 5
44	J4	APL	3		Pine, lemongrass crops	Model 5

No	Grid	Area Status	Working Zone	REEPS	Land Use	Agroforestry Model
45	K2	APL	3	NJ, PB, PP	Pine, palawija crops	Model 3
46	K3	APL	3		Pine, lemongrass crops	Model 5
47	K4	APL	3		Rice fields, talun	Model 5

Remark: APL= other land use, P= production area, L= production area served as protection

Working Zone: 1= BIA; 2= Corridor; 3= Buffer zone

REEPS: A= *Aonyx cinereal*; HM=*Hylobates moloch*; HJ=*Histryx javanica*; MJ=*Manis javanica*; NJ=*Nycticebus javanicus*; PP=*Panthera pardus melas*; PB=*Prionailirus bengalensis*; PC=*Presbytis comate*; TA=*Trachypitecus auratus*; TJ=*Tragulus javanicus*

D. Recommended Plant Species based on the BMP (2014, dan 2017), LARAP (2015), IMA (2015), and FGD BMP Review (2020)

Forest Plants ¹	Agroforestry			
	Higher Plants ²	Middle Plants (Tanaman Kebun)		Understorey
		Annual ³	Seasonal ⁴	Palawija ⁵
Baros, Beunying, Calik angin, Cangcaratan, Dahu, Hamerang, Hantap, Huru, Jirak, Kareumbi, Ki Cau, Kiara, Kiara Beas, Kibanen, Kibeusi, Kihampelas, Kimokla, Kisampang, Kisireum, Kitambaga, Kopo, Kuray, Leles, Leungsir, Manglid, Mara, Nangsi, Palahlar, Pasang, Pisitan Monyet, Puspa, Ramogiling, Rasamala, Sampora, Sempur, Tangkalak, Teureup	(<i>Non-timber</i>) Avocado, Star fruit, Clove, Pomegranate, Duku, Durian, Water apple, Guava, Jengkol, Kedondong, Coconut, Kapok, Candlenut, Kondang, Kweni mango, Longan, Bachang mango, Mango, Mangosteen, Melinjo, Menteng, Jack fruit, Rambutan, Salam, Sawo, Soursop, Breadfruit	Palm sugar, Orange, Cocoa, Coffee	Red pepper, <i>Honje</i> , Ginger, <i>Kapulaga</i> , Turmeric, Galangal, Pineapple, Papaya, Lemongrass	Maize, Peanuts, <i>Kacang tunggak</i> , Cucumber, <i>Oyong</i> , Cassava, Taro
	(<i>Timber</i>) Albizia, Kihiang, Teak, big leaf and small leaf Mahogany, Mindi, Pine, Sobsi, Red ceddar, Tisuk			

Remark: ¹: Native forest species, used as feeding and habitat preference for wildlife; ²: Trees, timber or non-timber; ³: Long-cycle garden plants; ⁴: Short-cycle garden plants (one planting cycle); ⁵: Other species besides food plant species to meet the food needs

E. Agroforestry Patterns in the UCPS Area 2020

No	Pattern	Species Group				
		Forest Plant ¹	Top-layer Plant ²	Agroforestry		Understorey
				Annual ³	Seasonal ⁴	
1	Forest, Top layer, Middle plants	<i>Nangsi</i> , Chestnut, <i>Kareumbi</i>	Albizia, Palm sugar, <i>Sobsi</i>	Coffee		
2	Forest, Top layer, Middle, Understorey plants	<i>Nangsi</i> , Chestnut, <i>Mara</i>	Albizia, Palm sugar	Coffee	Banana, Lemongrass, Pineapple	Taro, Cassava
3	Top layer, Middle, Understorey plants	-	Albizia, Coconut, <i>Sobsi</i>	-	Banana, Lemongrass, Pineapple	Peanuts, Cassava

Remark: ¹: Native forest species, used as feeding and habitat preference for wildlife; ²: Trees, timber or non-timber; ³: Long-cycle garden plants; ⁴: Short-cycle garden plants (one planting cycle); ⁵: Other species besides food plant species to meet the food needs

APPENDIX 3

A. Agroforestry System Income for a Cycle (Modified from Diniyati, 2013)

Model	Pattern	Strata (Area)	Land Area	Income	Cost	Benefit
1	Forest plants, Top layer, Middle (annual)	1	0,26 ha - 0,50 ha	IDR 5.425.426	IDR 3.164.000	IDR 2.261.426
		2	0,16 ha - 0,25 ha	IDR 3.318.000	IDR 2.742.500	IDR 575.500
		3	0,01 ha - 0,15 ha	IDR 1.224.089	IDR 1.835.000	- IDR 610.911
2	Forest plants, Top layer, Middle (annual and seasonal), Understorey	1	0,26 ha - 0,50 ha	IDR 5.263.455*	IDR 4.100.150	IDR 1.163.305*
		2	0,16 ha - 0,25 ha	IDR 4.658.242*	IDR 3.280.600	IDR 1.377.642*
		3	0,01 ha - 0,15 ha	IDR 3.150.818*	IDR 2.038.000	IDR 1.112.818*
3	Forest plants, Top layer, Middle (annual and seasonal), Understorey	1	0,26 ha - 0,50 ha	IDR 5.263.455	IDR 4.100.150	IDR 1.163.305
		2	0,16 ha - 0,25 ha	IDR 4.658.242	IDR 3.280.600	IDR 1.377.642
		3	0,01 ha - 0,15 ha	IDR 3.150.818	IDR 2.038.000	IDR 1.112.818
4 and 5	Forest plants, Top layer, Middle (annual and seasonal), Understorey	1	0,26 ha - 0,50 ha	IDR 4.393.577	IDR 2.364.000	IDR 2.029.577
		2	0,16 ha - 0,25 ha	IDR 4.730.670	IDR 1.678.750	IDR 3.051.920
		3	0,01 ha - 0,15 ha	IDR 1.744.203	IDR 1.256.367	IDR 487.836

Remark : (*): Benefit value only in the first of five-six years
 Strata 1: (0,26 ha – 0,50 ha); Strata 2: (0,16 ha – 0,25 ha); Strata 3: (0,01 ha – 0,15 ha)

B. The Estimation of Non-Timber Forest Products (NTFPs) in the UCPS Area

No	Name	Extraction Frequency		Production Volume		Market Price		Parts Used	Utility
		day/week /month		kg/unit (piece/ bottle/ bundle)					
1	Orchids (<i>Orchida sp.</i>)	6	month	5	pcs	1 species	IDR 25,000	Whole plant	Decorative plants and cosmetics
2	Palm sugar (<i>Arenga pinata</i>)	1	week	30	bottle	a bottle	IDR 10,000	Water, stem, fiber, root	Crafts, houseboats, cosmetics, medicines
3	Firewood							Wood	Cooking
4	Honey (<i>Apis cerana/ Apis dorsata</i>)	6	month	5	bottle	a bottle	IDR 100,000	Honey	Consumption
5	Ferns (<i>Asplenium nidus</i>)	12	month	10	bundle	a bundle	IDR 10,000	Stem	Decorative plants and medicinal
6	Rattan (<i>Daemonorops sp.</i>)	6	month	1	bundle	a bundle	IDR 100,000	Stem	Building material and crafts

C. Total Cost (Nominal) of Sengon Farm Forestry Business for a Cycle

Pattern	Strata/ Level	Land Area	Description	Total Income (Rp/Cycle)
1	1	0,26 ha – 0,50 ha	Timber (albizzia)	Rp 893.557
			Gardens	Rp 125.000
			Fruits	Rp 225.000
			Understorey (Cardamom)	Rp 3.150.000
			Total	Rp 4.393.557
	2	0,16 ha – 0,25 ha	Timber (albizzia)	Rp 730.670
			Gardens	-
			Fruits	-
			Understorey (Cardamom)	Rp 4.000.000
	Total	Rp 4.730.670		
	3	0,01 ha – 0,15 ha	Timber (albizzia)	Rp 1.044.203
			Fruit gardens	-
Gardens			-	
Fruits			-	
Understorey (Cardamom)			Rp 700.000	
Total	Rp 1.744.203			
2	1	0,26 ha – 0,50 ha	Timber (albizzia)	Rp 1.424.319
			Gardens	Rp 145.000
			Fruits	Rp 430.000
			Understorey (Cardamom)	Rp 4.000.000
			Food crops (Cassava)	Rp 580.000
	Total	Rp 6.579.319		
	2	0,16 ha – 0,25 ha	Timber (albizzia)	Rp 2.735.303
			Gardens	Rp 322.500
			Fruits	Rp 7.500
			Understorey (Cardamom)	Rp 2.190.000
			Food crops (Cassava)	Rp 500.000
	Total	Rp 5.822.803		
3	0,01 ha – 0,15 ha	Timber (albizzia)	Rp 1.488.522	
		Gardens	Rp 50.000	
		Fruits	-	
		Understorey (Cardamom)	Rp 2.400.000	
		Food crops (Cassava)	-	
Total	Rp 3.938.522			

Pattern	Strata/ Level	Land Area	Description	Total Income (Rp/Cycle)	
			Timber (albizzia)	Rp	4.630.608
			Fruits	Rp	3.120.000
	1	0,26 ha – 0,50 ha	Understorey (Cardamom)		-
			Total	Rp	7.750.608
			Timber (albizzia)	Rp	1.800.000
			Fruits	Rp	540.000
3	2	0,16 ha – 0,25 ha	Understorey (Cardamom)	Rp	2.400.000
			Total	Rp	4.740.000
			Timber (albizzia)	Rp	236.199
			Fruits	Rp	312.500
	3	0,01 ha – 0,15 ha	Understorey (Cardamom)	Rp	1.200.000
			Total	Rp	1.748.699

D. Cashflow of Sengon Farm Forestry Business in Ciomas Village, Panjalu District, Ciamis Regency

Pattern	Strata/ Level	Description	Project of Year						Total
			0	1	2	3	4	5	
1	1	Investment costs	Rp 716.000	Rp 16.000	Rp 16.000	Rp 16.000	Rp 16.000	Rp 16.000	Rp 796.000
		Operational costs	Rp 770.500	Rp 327.000	Rp 340.500	Rp 65.000	Rp 30.000	Rp 35.000	Rp 1.568.000
		Total costs	Rp 1.486.500	Rp 343.000	Rp 356.500	Rp 81.000	Rp 46.000	Rp 51.000	Rp 2.364.000
		Incomes	Rp 50.000	Rp 100.000	Rp 200.000	Rp 400.000	Rp 800.000	Rp 2.843.557	Rp 4.393.557
		Discounted cost	Rp 1.486.500	Rp 313.242	Rp 297.325	Rp 61.694	Rp 31.996	Rp 32.397	Rp 2.223.154
		Discounted Benefit	Rp 500.000	Rp 91.324	Rp 166.802	Rp 304.662	Rp 556.459	Rp 1.806.306	Rp 2.975.553
		NPV (i=9,5%)	Rp -1.436.500	Rp -221.918	-Rp 131	Rp 242.968	Rp 524.463	Rp 1.773.909	Rp 752.399
		BCR							1,34
		IRR							19%
		1	2	Investment costs	Rp 354.750	Rp 4.000	Rp 4.000	Rp 4.000	Rp 4.000
Operational costs	Rp 570.000			Rp 344.000	Rp 50.000	Rp 50.000	Rp 50.000	Rp 240.000	Rp 1.304.000
Total costs	Rp 924.750			Rp 348.000	Rp 54.000	Rp 54.000	Rp 54.000	Rp 244.000	Rp 1.678.750
Incomes	Rp -			Rp -	Rp -	Rp -	Rp -	Rp 4.730.670	Rp 4.731
Discounted cost	Rp 924.750			Rp 317.808	Rp 45.037	Rp 41.129	Rp 37.561	Rp 154.996	Rp 1.521.281
Discounted Benefit	Rp -			Rp -	Rp -	Rp -	Rp -	Rp 3.005.053	Rp 3.005.053
NPV (i=9,5%)	Rp -924.750			Rp -317.808	Rp -45.037	Rp -41.129	Rp -37.561	Rp 2.850.057	Rp 1.483.772
BCR									1,98
IRR									29%
1	3			Investment costs	Rp 265.700	Rp 5.000	Rp 5.000	Rp 5.000	Rp 5.000
		Operational costs	Rp 343.667	Rp 225.500	Rp 164.000	Rp 45.000	Rp 65.000	Rp 122.500	Rp 965.667
		Total costs	Rp 609.367	Rp 230.500	Rp 169.000	Rp 50.000	Rp 70.000	Rp 127.500	Rp 1.256.367

Pattern	Strata/ Level	Description	Project of Year						Total
			0	1	2	3	4	5	
		Incomes	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 1.744.203	Rp 1.744.203
		Discounted cost	Rp 609.367	Rp 210.502	Rp 140.948	Rp 38.083	Rp 48.690	Rp 80.992	Rp 1.128.581
		Discounted Benefit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 1.107.966	Rp 1.107.966
		NPV (i=9,5%)	Rp -609.367	Rp -210.502	Rp -140.948	Rp -38.083	Rp -48.690	Rp 1.026.974	Rp 2.061.522
		BCR							0,98
		IRR							-
		Investment costs	Rp 1.159.400	Rp 13.000	Rp 13.000	Rp 13.000	Rp 13.000	Rp 13.000	Rp 1.224.400
		Operational costs	Rp 1.541.250	Rp 568.000	Rp 399.000	Rp 87.500	Rp 65.000	Rp 215.000	Rp 2.875.750
		Total costs	Rp 2.700.650	Rp 581.000	Rp 412.000	Rp 100.500	Rp 78.000	Rp 228.000	Rp 4.100.150
		Incomes	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 6.579.319	Rp 6.579.319
2	1	Discounted cost	Rp 2.700.650	Rp 530.594	Rp 343.613	Rp 76.546	Rp 54.255	Rp 144.832	Rp 3.850.489
		Discounted Benefit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 4.179.366	Rp 4.179.366
		NPV (i=9,5%)	Rp -2.700.650	Rp -530.594	Rp -343.613	Rp -76.546	Rp -54.255	Rp 4.034.534	Rp 328.877
		BCR							1,09
		IRR							12%
		Investment costs	Rp 728.500	Rp 4.000	Rp 4.000	Rp 4.000	Rp 4.000	Rp 4.000	Rp 748.500
		Operational costs	Rp 1.268.350	Rp 262.500	Rp 296.250	Rp 223.750	Rp 151.250	Rp 330.000	Rp 2.532.100
		Total costs	Rp 1.996.850	Rp 266.500	Rp 300.250	Rp 227.750	Rp 155.250	Rp 334.000	Rp 3.280.600
		Incomes	Rp -	Rp 100.000	Rp 100.000	Rp 100.000	Rp 100.000	Rp 5.422.803	Rp 5.822.803
2	2	Discounted cost	Rp 1.996.850	Rp 243.379	Rp 250.412	Rp 173.467	Rp 107.988	Rp 212.166	Rp 2.984.261
		Discounted Benefit	Rp -	Rp 91.324	Rp 83.401	Rp 76.165	Rp 69.557	Rp 3.444.714	Rp 3.765.162
		NPV (i=9,5%)	Rp -1.996.850	Rp -152.055	Rp -167.011	Rp -97.301	Rp -38.430	Rp 3.232.548	Rp 780.901
		BCR							1,26

Pattern	Strata/ Level	Description	Project of Year						Total
			0	1	2	3	4	5	
		IRR							16%
		Investment costs	Rp 164.500	Rp 4.500	Rp 4.500	Rp 4.500	Rp 4.500	Rp 4.500	Rp 187.000
		Operational costs	Rp 931.000	Rp 280.000	Rp 360.000	Rp 180.000	Rp -	Rp 100.000	Rp 1.851.000
		Total costs	Rp 1.095.500	Rp 284.500	Rp 364.500	Rp 184.500	Rp 4.500	Rp 104.500	Rp 2.038.000
		Incomes	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 3.938.522	Rp 3.938.522
2	3	Discounted cost	Rp 1.095.500	Rp 259.817	Rp 303.997	Rp 140.525	Rp 3.130	Rp 66.381	Rp 1.869.351
		Discounted Benefit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 2.501.858	Rp 2.501.858
		NPV (i=9,5%)	Rp -1.095.500	Rp -259.817	Rp -303.997	Rp 14.052	Rp -3.130	Rp 2.435.477	Rp 632.507
		BCR							1,34
		IRR							11%
		Investment costs	Rp 619.000	Rp 4.000	Rp 4.000	Rp 4.000	Rp 4.000	Rp 4.000	Rp 639.000
		Operational costs	Rp 1.235.000	Rp 290.000	Rp 320.000	Rp 280.000	Rp 220.000	Rp 180.000	Rp 2.525.000
		Total costs	Rp 1.854.000	Rp 294.000	Rp 324.000	Rp 284.000	Rp 224.000	Rp 184.000	Rp 3.164.000
		Incomes	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 7.750.608	Rp 7.750.608
3	1	Discounted cost	Rp 1.854.000	Rp 268.493	Rp 270.220	Rp 216.310	Rp 155.809	Rp 116.882	Rp 2.881.713
		Discounted Benefit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 4.923.401	Rp 4.923.401
		NPV (i=9,5%)	Rp -1.854.000	Rp -268.493	-Rp 270.220	Rp -216.310	Rp -155.809	Rp 4.806.519	Rp 2.041.688
		BCR							1,71
		IRR							25%
		Investment costs	Rp 517	Rp 6.000	Rp 6.000	Rp 6.000	Rp 6.000	Rp 6.000	Rp 546.500
		Operational costs	Rp 1.146.500	Rp 348.500	Rp 288.500	Rp 137.500	Rp 87.500	Rp 187.500	Rp 2.196.000
3	2	Total costs	Rp 1.663.000	Rp 354.500	Rp 294.500	Rp 143.500	Rp 93.500	Rp 193.500	Rp 2.742.500
		Incomes	Rp -	Rp -	Rp -	Rp 540.000	Rp -	Rp 4.200.000	Rp 4.740.000
		Discounted cost	Rp 1.663.000	Rp 323.744	Rp 254.616	Rp 109.297	Rp 65.036	Rp 122.917	Rp 2.529.611

Pattern	Strata/ Level	Description	Project of Year						Total	
			0	1	2	3	4	5		
3	3	Discounted Benefit	Rp -	Rp -	Rp -	Rp 411.293	Rp -	Rp 2.667.956	Rp 3.079.249	
		NPV (i=9,5%)	Rp -1.663.000	Rp -323.744	Rp -245.616	Rp 301.996	Rp -65.036	Rp 2.545.040	Rp 549.639	
		BCR							1,22	
		IRR							15%	
		Investment costs	Rp 263	Rp 4.250	Rp 4.250	Rp 4.250	Rp 4.250	Rp 4.250	Rp 4.250	Rp 284
		Operational costs	Rp 926	Rp 210	Rp 183	Rp 63	Rp 60	Rp 110	Rp 1.551.250	
		Total costs	Rp 1.188.750	Rp 214	Rp 187	Rp 67	Rp 64	Rp 114	Rp 1.835.000	
		Incomes	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 1.748.699	Rp 1.748.699	
		Discounted cost	Rp 1.188.750	Rp 196	Rp 156	Rp 51	Rp 45	Rp 73	Rp 1.708.269	
		Discounted Benefit	Rp -	Rp -	Rp -	Rp -	Rp -	Rp 112	Rp 1.110.822	
		NPV (i=9,5%)	Rp 1.188.750	Rp -196	Rp -156	Rp -51	Rp -45	Rp 1.038.247	-Rp 597	
		BCR							0.65	
		IRR							-	

E. Profile of Recommended Plant Commodities in Cisokan

No	Plant species/ Vernacular	Category	Harvested Part	Planting Period to The First Harvest	Harvest Frequency in a Year	Yield per Individual (kg)	Productive Age	Selling price per kg		Remark
								Low	High	
1	2	3	4	5	6	7	8	10		11
1	Durian	TA	Fruit	8-10 years	1 time	30-38 pcs	20 years	Rp 35.000	Rp 42.000	
2	Jengkol	TA	Fruit	4-5 years	2 times	100-150 kg	30 years	Rp 12.000	Rp 14.400	
3	Mangga	TA	Fruit	5-6 years	3 times	2-30 pcs	20 years	Rp 15.000	Rp 18.000	
4	Muncang/ Kemiri	TA	Grain	3,5 years	2-3 times	35-50 kg	20 years	Rp 3.000	Rp 3.600	
5	Alpuket	TA	Fruit	10-15 years	2 times	30-70 kg	30 years	Rp 28.000	Rp 33.600	
6	a. Aren	TA	Fruit	5-6 years	4 times	50-100	8-10 years	Rp 8.000	Rp 9.600	
	b. Aren	TA	Sap	5-6 years	4 times	5 liters	8-10 years	Rp 10.000	Rp 12.000	
	c. Aren	TA	Fiber	5-6 years	Year-round	Year-round	8-10 years	Rp 3.000	Rp 5.000	
7	Balingbing	TA	Fruit	3-5 years	3 times	5-20 kg	20 years	Rp 10.000	Rp 12.000	
8	Cengkeh	TA	Flower	6 years	1 time	20-30 kg	30 years	Rp 90.000	Rp 120.000	
9	Delima	TA	Fruit	3-4 years	2 times	1-5 kg	20 years	Rp 30.000	Rp 60.000	
10	Dukuh	TA	Fruit	12 years	2-3 times	10-20 kg	25 years	Rp 30.000	Rp 35.000	
11	jambu air	TA	Fruit	2,5-4 years	2-3 times	10-20 kg	30 years	Rp 10.000	Rp 12.000	
12	Jambu batu	TA	Fruit	2-3 years	4-5 times	10-20 kg	30 years	Rp 2.500	Rp 4.500	
13	Kadongdong	TA	Fruit	12-18 months						
14	Kalapa	TA	Fruit	6-8 years				Rp 6.000	Rp 8.000	
15	Kapuk	TA	Fruit							
16	Kondang	TA	Fruit	5-6 years	3-4 times					
17	Kuweni	TA	Fruit	5-6 years	3-4 times	2-30 pcs	20 years			
18	Lengkeng	TA	Fruit	5-6 years					Rp 35.000	
19	Limus	TA	Fruit	5-6 years	3-4 times	2-30 pcs	20 years	Rp 14.500	Rp 20.000	
20	Menteng	TA	Fruit							



No	Plant species/ Vernacular	Category	Harvested Part	Planting Period to The First Harvest	Harvest Frequency in a Year	Yield per Individual (kg)	Productive Age	Selling price per kg		Remark
								Low	High	
1	2	3	4	5	6	7	8	10		11
21	Manggis	TA	Fruit					Rp 10.000	Rp 22.500	
22	Nangka	TA	Fruit	5-8 years	1 times		15-20 years		Rp 35.000	
23	Rambutan	TA	Fruit		1 times				Rp 10.000	
24	Sawo	TA	Fruit		1-2 times				Rp 13.000	
25	Sirsak	TA	Fruit						Rp 13.000	
26	Sukun	TA	Fruit		2-3 times			Rp 6.000	Rp 8.000	
27	Tangkil	TA	Fruit	5-6 years		80- 100kg/tree		Rp 20.000	Rp 27.000	
28	Salam	TA	Leaf				Year-round		Rp 11.000	
29	Albasiah; Ki hiang	TA	Stem	4-5 years	1,000 (after entering 4-5 years become 700)			Rp 350.000	Rp 450.000	
30	Budengan/ Ki oray	TA	Stem	5-7 years			20 years			Rp 6,000,000 – Rp 10,000,000 /m ³
31	Cangcaratan	TA	Stem	4-5 years				Rp 200.000		
32	Jati	TA	Stem	5 -7 years	1300 (after entering 5 years become 5 years)		20 years			5 individuals = 1 m3; Rp 500,000/ stem diameter 14 cm
33	Mahoni berdaun kecil	TA	Stem	4-5 years				Rp 800.000	Rp 1.200.000	
34	Mahoni berdaun besar	TA	Stem	10 years		15-20 m3 per years	30-60 years			Rp 400,000- Rp600,000 m3 diameter 16-19 cm


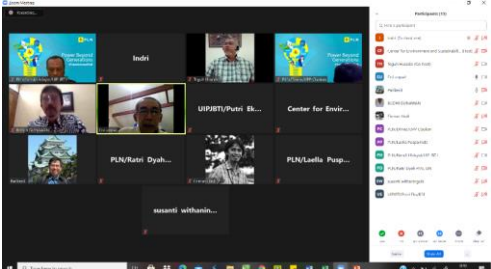
No	Plant species/ Vernacular	Category	Harvested Part	Planting Period to The First Harvest	Harvest Frequency in a Year	Yield per Individual (kg)	Productive Age	Selling price per kg		Remark
								Low	High	
1	2	3	4	5	6	7	8	10		11
35	Manii/Sobsis	TA	Stem	4-5 years	1.000					Rp1,2 - Rp 1,4 million/m ³
36	Mindi	TA	Stem	3 years				Rp 700.000	Rp, 1,000,000	3 years aged 400 stems / ha; 6 years 200 stems
37	Pinus	TA	Sap	10 years	200			Rp 5.000	Rp 10.000	1680-4880 kg / ha/ year; yield per individual 4,2-6,4 kg / year
38	Suren	TA	Stem	12 years						3000000 / m ³ diameter 20 cm;5,800,000 / ton
39	Tisuk	TA	Stem	5-10 years	200			Rp 300.000		
40	Anggrung/ kuray	TH	Stem	5-7 years				Rp 400.000		
41	Salak	TTT	Fruit					Rp 16.000	Rp 20.000	
42	Kapulaga	TTS	Rhizome	1,5-2 years	Year-round	15kg/ years	Year-round	Rp 170.000	Rp 260.000	
43	Lengkuas/ Laja	TTS	Rhizome	3 months	4 times	250 gr	Once harvested, regrow	Rp 20.000	Rp 24.000	
44	a. Jahe gajah	TTS	Rhizome	8-12 months	0,6 - 1 times	250 gr	Once harvested, regrow	Rp 10.000	Rp 12.000	
	b. Jahe emprit	TTS	Rhizome	8-12 months	0,6 - 1 times	150-250 gr	Once harvested, regrow	Rp 5.000	Rp 6.000	

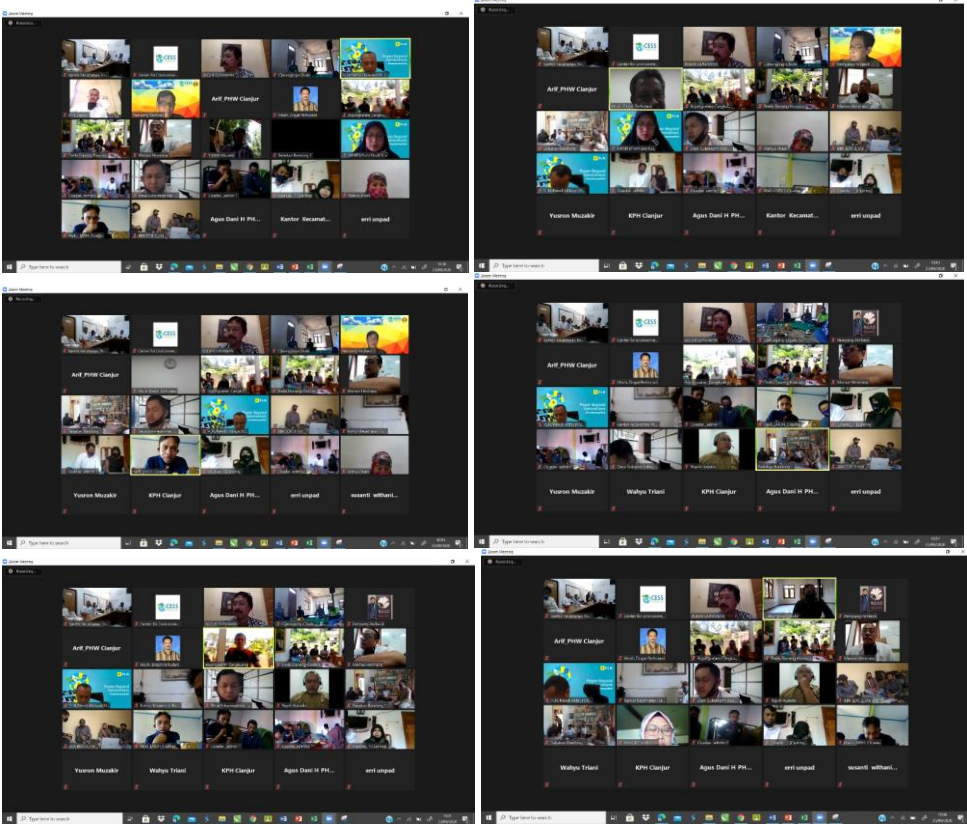
No	Plant species/ Vernacular	Category	Harvested Part	Planting Period to The First Harvest	Harvest Frequency in a Year	Yield per Individual (kg)	Productive Age	Selling price per kg		Remark
								Low	High	
1	2	3	4	5	6	7	8	10		11
	c. Jahe merah	TTS	Rhizome	8-12 months	0,6 - 1 times	150-250 gr	Once harvested, regrow	Rp 25.000	Rp 30.000	
45	Kunyit	TTS	Rhizome	8-12 months	0,6 - 1 times	0,7 kg	Once harvested, regrow	Rp 10.000	Rp 12.000	
46	Honje/ Kecombrang	TTS	Flower	9-16 months	Year-round	50-150 gr	4-6 weeks	Rp 50.000	Rp 60.000	
47	Cabai Rawit	TTS	Fruit	3 months	15-18 times	400-700 gr	6-12 months	Rp 28.000	Rp 33.600	
48	Cabai Keriting Hijau	TTS	Fruit	3 months	15-18 times	400-700 gr	6-12 months	Rp 20.000	Rp 24.000	
49	Cabai Keriting Merah	TTS	Fruit	3 months	15-18 times	400-700 gr	6-12 months	Rp 12.000	Rp 14.400	
50	Cabai Hijau	TTS	Fruit	3 months	15-18 times	400-700 gr	6-12 months	Rp 20.000	Rp 24.000	
51	Cabai Merah	TTS	Fruit	3 months	15-18 times	400-700 gr	6-12 months	Rp 15.000	Rp 18.000	
52	Serai	TTS	Stem	8-10 months	Year-round	1-2 kg	Year-round	Rp 25.000	Rp 30.000	
53	Jeruk	TTT	Fruit	3 years	2-3 times	50-60 kg	7 years	Rp 12.500	Rp 15.000	
54	Kopi (ceri)	TTT	Fruit	2,5-3 years	2-3 times	2,4 kg	9 years	Rp 6.000	Rp 8.000	
55	Pepaya	TTT	Fruit	8-12 months	1 time	10-20 pcs	1 time	Rp 13.000	Rp 22.000	

APPENDIX 4 Summary of Stakeholder’s Consultation during BMP review and Development of FPF

No	Date	Activities/ Topics	Participants	Dokumentasi
1	8-23 July 2020	Interviews/ discussions with community surround the forest area on socio-economic condition, getting feedback and inputs from the community regarding implementation of biodiversity management plan. The discussions were held at each of the sub-villages.	Representatives of community in 38 sub-villages around the project.	

No	Date	Activities/ Topics	Participants	Dokumentasi
2	29 June 2020	Discussion on BMP implementation from 2015-2019	Unpad & PLN Unit Induk Pembangunan Jawa Bagian Tengah I	
3	2 Juli 2020	Discussion on BMP implementation from 2015-2019	Unpad & UPP Ciangkong (UPP Kit JBT I : Unit Pelaksana Proyek Pembangkit Jawa Bagian Tengah 1)	
4	22 Juli 2020	Dicsussion on BMP review and FPF	Unpad & Perum Perhutani: 1. Department of Development of Social Forestry 2. Community Facilitators 3. Forest Management Unit of Bandung Selatan representing Wetern area 4. Forest Management Unit of Bandung Selatan (Forest Resources Management and Social Forestry)	

No	Date	Activities/ Topics	Participants	Dokumentasi
			5. Forest Management Unit of Cianjur (Forest Resources Management and Social Forestry) 6. Forest Management Unit of Cianjur (Social Management Division). 7. Wakil PHW Bandung Bagian Perencanaan. Dibawah Departemen dan Perencanaan Bisnis. 8. PHW Bandung Bagian Perencanaan	
4	4 Sept 2020	Presentation of the BMP review and FPF to PLN.	Unpad & PLN UIP JBT I: Unit Induk Pembangunan Jawa Bagian Tengah I	
5	8 Sept 2020	Presentation of the BMP review and FPF to PLN.	Unpad, PLN Unit Induk Pembangunan Jawa Bagian Tengah I, Perhutani (forest management unit, BKSDA)	

No	Date	Activities/ Topics	Participants	Dokumentasi
6	23 Sept 2020	Discussion on management of restoration area surround the project	<p>Unpad, PLN Unit Induk Pembangunan Jawa Bagian Tengah I, UIP, PLN Unit Pelaksana Proyek Pembangkit Jawa Bagian Tengah 1), Representatives of subdistrict government, representatives of villages government, representatives of community from 38 sub-villages.</p> <p>Perhutani: 1. Perhutani Divre Jabar) 2. PHW III Bandung Selatan) 3. KPH Cianjur 4. PHW Cianjur 5. KPH Bandung Selatan 6. PHW Bandungi</p>	 <p>The 'Dokumentasi' column contains six screenshots of a Zoom meeting. Each screenshot shows a grid of approximately 15-20 participants in a virtual meeting. The participants' names at the bottom of the grid include: Arif Pritwi Cianjur, Yusron Muzakir, KPH Cianjur, Agus Dani H. PH..., erri unpad, Wajaya Triand, and second william... The screenshots capture different moments during the discussion.</p>

Minutes of Focus Group Discussion 23 September 2020

Participant: Unpad, PLN UIP, PLN UPP, Perhutani, Sekcam Rongga, Kabid Kec. Rongga (4), Kades Cinengah, Kades Cibedug, Kades Cicadas, Kades Sukaresmi, Polsek Gn. Halu, Koramil, Polhut, LMDH (Gentrawarna, Wana Mekar Harapan, Putra Setia Maju), warga Cicadas, warga Cibule, warga Babakan Bandung, warga Ciawitali, warga Cangkuang, warga Ciawitali.

Location: Online & Offline (Unpad, PLN UIP, PLN UPP, Perhutani, Kec. Rongga, Kec Sukaresmi, Cicadas, Cangkuang, Babakan Bandung, Cibule)

Feedback/ inputs from the participants are captured below

Participants	Concern/Feedback
Perum Perhutani	<ul style="list-style-type: none"> - There are areas inside and outside of jurisdiction of Perum Perhutani. There is a need for intensive coordinaton with PLN to manage the biodiversity issues in the area. -Socialization and education to the community on biodiversity management plan with support from Forest Village Community Institution (LMDH) -Farmers surround the BIA should be moved to other locations and change the pattern from annual crops to agroforestry. This can be followed up with LMDH and need intensive discussion with the farmers.
Chief of LMDH Cicadas Village	<ul style="list-style-type: none"> -The affected communities will try to change the livelihood, change the commodities, and change the location to maintain the forest. -Need more information and education on types of suitable plants in the area, facilitatin team to help the farmers, and to market the products.
Chief of LMDH Putra Setia Maju from Sukaresmi Village	<ul style="list-style-type: none"> -Have a plan to change the habit of slash and burn -Community will try to change the commodities (from paddy to coffee, inspired by other farming group) -Need information on suitable types of coffee and other commodities in the area
Representative from Cangkuang Subvillage- Bojongsalam Village	<ul style="list-style-type: none"> -The village is located next to the reservoir and forest area -Majority of people utilize forest area compared to private land -People will try to change the commodity such as orange, mango, durian, etc but need education, training, capital, and seedlings.
LMDH of Karangnunggal	<ul style="list-style-type: none"> -Need information on suitable commodities in the area -Willing to participate in the program with expectation to improve the farming produce and commodity value.
Head of Sukaresmi Village	<ul style="list-style-type: none"> -Requesting access to utilize the project area -Need information on access to capital -Proposed two subvillages of Cimarel and Pasirlaja to be developed as tourism areas to improve the livelihood of the community
LMDH Putra Setia Maju, Sukaresmi Village	<ul style="list-style-type: none"> -Agree on the collaboration planning between PLN, Perhutani, and the community as sharecroppers -Need trainings to be able to manage the forest area -Need support in forms of seedlings and capital

	- Proposing development of tourism potential in the area
Subdistrict secretary of Rongga	- Appreciate the idea from the LMDH to improve food security of the affected communities by utilizing Perhutani area. - Propose to improve the service of cooperatives - Demand for PLN to fulfill the outstanding issues related to LARAP
Chief of Cicadas Village	- Request for an access to the settlement area - Demand PLN to complete the outstanding deliverables related to LARAP
Perhutani	- The community is ready to replace/ change their commodities, and change their farming location. However this requires further assessment. - Chief of LMDH can coordinate with Forest Management Unit on Social forestry issues. - Related to capital, LMDH that has obtained decree from the ministry will be easier to access financial loan. - There is a need for a clear legal basis for cooperation.
Perhutani (PHW) 3 Bandung Selatan	- Support the planning through forest area management planning - If the program continues, forest area management planning that has been legalized needs to be revised by the ministry
Forest Management Unit Cianjur	- Zone 1 and 2 area which are part of the forest area, the legal aspect is clear. - For Zone 3, we need direction from management on way forward. - In Cianjur area, there are 28 LMDH of which 11 have been legalized. Some others are in the process. - There is a need to have a clarity on the status of the area whether it is protected or limited production to understand the appropriate management.
Perhutani (PHW Cianjur)	- In perhutani, there is a mandate to develop 10 years planning to be legalized by MoEF. - There is a need to mark the Zone 1, 2, and 3 area in the field so we know the difference in its management, and we can guide the implementation.