

Scaling Agroforestry in Indonesia

Opportunities, challenges and solution pathways in scaling and mainstreaming agroforestry in Indonesia



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Abbreviations

APL	Area Penggunaan Lain or Non-state forest land		
BAPPENAS	Badan Perencanaan Pembangunan Nasional or Ministry of National Development		
	Planning (also known as Kementerian PPN)		
BAPPEDA	Badan Perencanaan Pembangunan Daerah or Development Planning Agency		
BAU	Business as Usual		
BPDAS	Balai Pengelolaan Daerah Aliran Sungai or Watershed Management Center		
BPDLH	Badan Pengelola Dana Lingkungan Hidup or Indonesian Environment Fund		
BPSKL	Balai Perhutanan Sosial dan Kemitraan Lingkungan or Social Forestry and		
	Environmental Partnership Centers (at Province Level)		
CBD	Convention on Biological Diversity		
СОР	Conference of the Parties		
DASRH	Direktorat Jenderal Pengelolaan DAS dan Rehabilitasi Hutan or Director General of		
	Watershed Management and Forest Restoration		
EU	European Union		
EUDR	EU Deforestation (-free) Regulation		
ENSO	El Nino–Southern Oscillation		
FGD	Focus Group Discussion		
FOLU	Forestry and Other Land Uses (Sector)		
GHG	Greenhouse Gas Emissions		
HCVA	High Conservation Value Area		
HCSA	High Carbon Stock Area		
IPLCs	Indigenous People and Local Communities		
INDC	Intended Nationally Determined Contribution		
MoEF	Minister/Ministry of Environment and Forestry		
NDC	Nationally Determined Contribution(s)		
PBN	Perkebunan Besar Negara or State-owned Plantation)		
PBS	Perkebunan Besar Swasta or Large-scale Private Company Plantation)		
PBPH	Perizinan berusaha pemanfaatan hutan or Forest utilization business license		
PHL	Direktorat Jenderal Pengelolaan Hutan Produksi Lestari or Director General of Sustainable Forest Management		
PIAPS	Peta Indikatif Area Perhutanan Sosial or Indicative Map of Social Forestry Area		
PSKL	Direktorat Jenderal Perhutanan Sosial dan Kemitraan Lingkungan or Director		
	General of Social Forestry and Environmental Partnership		
PI	Perseroan Terbatas or Limited Liability Company		
PR	Pertanian Rumah or Family farming		
КаСР	Remediation and Compensation Procedure		
KEDD+	Reducing emissions from deforestation and forest degradation+		
RSPO	Roundtable on Sustainable Palm Oil		
SDGs	Sustainable Development Goals		

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Executive summary

Scaling agroforestry in Indonesia: Opportunities, challenges and solution pathways

Introduction

Agroforestry is a land use system that combines tree, perennial, and annual crops. Throughout Indonesia it has been practiced for centuries. Agroforestry practices vary across regions and involve simple intercropping or complex integrated systems, including cash crop commodities like coffee, cocoa, and rubber. Agroforestry practices offer a myriad of benefits, such as livelihood resilience, food security, carbon sequestration and biodiversity conservation.

The Indonesian government supports agroforestry in several ways, such as through its social forestry programme, aiming to strengthen tenure rights of smallholders in forest areas. They also promote agroforestry as a tool to resolve boundary disputes in state forest areas, and installed a multi-business forestry policy programme, to encourage industrial-scale agroforestry. Other policy instruments may indirectly support agroforestry, such as the recent carbon trading guidelines and procedures, which open opportunities for funding of community agroforestry development. International regulations and agreements related to biodiversity and climate change may also promote agroforestry practices in Indonesia, for example through standardized certifications, regulations, and collaborative initiatives.

Despite existing support for agroforestry, in some areas farmers are abandoning their agroforestry practices in favour of monocultures, which are perceived as economically more attractive. There have been initiatives that successfully increased the economic viability of sustainable agroforestry, but the scaling of such practices has been slow. The Embassy of the Netherlands in Indonesia therefore commissioned a study to explore current challenges and opportunities related to scaling. The study took place between May and July 2023, and was based on a review of the literature, as well as interviews and focus group discussions with Indonesian and Dutch stakeholders connected to agroforestry. It focused on agroforestry production of a range of commodities, including coffee, cocoa, rubber, spices, and oil palm (although the production of oil palm in agroforestry is so far not widespread). Here we provide a summary of the study's main insights.

Challenges to scale agroforestry

Complexity and financial viability

Complex agroforestry practices can provide important environmental and social benefits, but they require specific knowledge and skills, and their economic feasibility in the first years after establishment is relatively low. This pushes some farmers to convert to monoculture plantations, especially for crops like oil palm. To make agroforestry more attractive to farmers, Indonesian respondents typically stressed the need for simple systems and short-term returns. Traditional agroforestry practices were often considered outdated. Dutch respondents typically stressed the environment and social benefits of complex systems and the need for financial support to make them more feasible, especially during the early years.

Unharmonized laws, policies and insufficient government support

Tenure security remains a challenge for many agroforestry farmers, and there is a lack of coordination of policies. Good agricultural practices get insufficient attention within the context of social forestry,

and there is insufficient support for building capacity of farmers. Dutch respondents also stressed that certain regulatory requirements, like those related to the EU Deforestation-Free Regulation (EUDR), might be difficult for smallholder farmers to meet, which could lead to their exclusion from some markets.

Lack of knowledge and innovation

Historically, farmers have been facing barriers due to limited access to quality planting materials and technical information. There is a pressing need for research in agroforestry to devise innovative techniques to enhance productivity and resilience. Such knowledge would need to be developed by combining local and scientific knowledge systems, leading to innovations. This also requires an understanding of local environmental contexts and dynamics, and there is a need for comprehensive training for farmers, extension agents, and policy makers to understand and implement agroforestry practices effectively.

Business, offtake and market deployment challenges

Weak market linkages and limited access to market information have been barriers for smallholders. Fluctuating commodity prices, such as for rubber, have led farmers to shift to other sources of income. Also, commodities produced in agroforestry systems often do not benefit from economies of scale compared to monoculture systems, and marketing diverse products from agroforestry can be challenging. Connecting products with off-takers and establishing profitable logistics remains a hurdle. Also, many farmers lack capacity to formulate good business plans. Although certification can be beneficial, there is a risk for exclusion for smallholders to meet (standardized) requirements.

Lack of Incentives for agroforestry development

Through the Social Forestry Programme, the government has made efforts to incentivize agroforestry, including through formalizing tenure, offering technical help, and strengthening the market. However, market incentives for agroforestry commodities are still insufficient. Some promising models exist, like the Remediation and Compensation Procedure (<u>RaCP</u>). However, these are either under-regulated or not implemented comprehensively. While there are projects by large companies promoting agroforestry practices, there is no specific market premium for commodities exclusively from agroforestry systems, and the additional benefits of these systems remain undervalued.

Lack of access to finance

Financial institutions consider investments in small-scale agroforestry activities risky, leading to exorbitant interest rates on loans. Existing financial mechanisms, with their standard criteria and lack of understanding of agroforestry, fail to meet the needs of farmers venturing into diversified production systems like agroforestry. Moreover, many agroforestry units remain unregistered and unrecognized, making them ineligible for formal financial support.

Solution pathways

To analyse ways in which the above-mentioned challenges can be overcome, we zoomed in on five initiatives that have had a positive impact on the farmers involved, the environment, and society at large (see Box 1). Based on these 'flagship' initiatives, we then identified the following eight solution pathways. By combining these pathways, we believe agroforestry can be effectively scaled.

Government Level:

Develop a national strategy on agroforestry through a collaborative multi-stakeholder approach

- Foster multi-stakeholder partnerships for integrated agroforestry development.
- Concentrate on empowering the entire value chain.
- Encourage actors and companies to cooperate in sourcing regions, ensuring diverse production and marketing.
- Establish trust and formalize collaborations.

Enhanced policies and governance

- Emphasize good agroforestry practices within the framework of social forestry.
- Allocate sufficient national governmental budgets to agroforestry.
- Advocate for an integrated policy (mainly forestry and agriculture) and governance approach towards agroforestry.
- Explore carbon trading and payment for environmental services as an avenue to increase the economic feasibility of agroforestry, ensuring streamlined implementation for smallholder farmers.
- Promote and mainstream the policy of community-based agroforestry enterprise.

Market Level:

Business and market mobilization

- Connect producers to buyers in new or niche markets.
- Actors and companies working together in sourcing areas can explore the offtake of multiple products and opportunities to create local demand.
- Encourage farmer collaborations to bolster scale and capability.
- Reward agroforestry practices economically for their socio-environmental contributions, emphasizing climate-resilient production.
- Develop the market scheme of rewards and incentives to good practices of community-based agroforestry.

Innovative finance mobilization

- Champion the creation and endorsement of novel financial mechanisms.
- Identify already existing promising capital sources and financial mechanisms and inform agroforestry practices about their existence.
- Support agroforestry practices in shaping viable business plans, ensuring they fulfil financial criteria for funding access, including legal considerations.
- Initiate specific credit schemes to promote and mainstream community-based agroforestry business.

University and Research Organisation Level and others:

Knowledge and research mobilization

- Promote research and innovation in agroforestry to develop new techniques and innovations.
- Prioritize the collection of reliable data on agroforestry systems.
- Promote and mainstream flagship agroforestry practices to a wider audience.
- Improve data and mapping of agroforestry practices that align with local agroclimatology (region) as a baseline for future improvement.

- Develop pilot project of sustainable and entrepreneurship community-based agroforestry in each region.

Optimized agroforestry design based on local knowledge and practices

- Root agroforestry system development in local knowledge and practices.
- Strive for a balance between localized variations and standardized services for scalability.
- Improving entrepreneurship of community-based agroforestry.

Civil Society Level:

Awareness, outreach, and capacity building

- Improve the capacity of smallholder farmers on aspects related to community-based agroforestry business.
- Establish extension services to increase the capacity of community-based agroforestry practices and management.
- Replicate and scale the existing infrastructures and successful models like farmer field schools, local NGO presence, and farmer networks.
- Engage in capacity building, not just for direct stakeholders, but also for those indirectly associated with the agroforestry value chain, such as financial institutions and extension workers.
- Increase awareness about the impacts and (potential) benefits of agroforestry at all levels.

Knowledge sharing (collective learning)

- Cultivate communities of practice to disseminate lessons and best practices, enhancing the understanding of agroforestry production systems.
- Create, maintain, and support platforms (organized by specific topics) to share knowledge and experiences.

Box 1. Flagship initiatives included in the study showing (elements)

(Elements) of Flagship projects demonstrate success factors and best practices in overcoming obstacles while harvesting significant benefits

- Flagship 1. Managing Agroforestry Transition in Simpang Dua (West Kalimantan)
- Flagship 2. The Gula Gula Food Forests in West Sumatra: Agroforestry products and carbon credits
- Flagship 3. Empowering Robusta Farmers for Coffee Garden Rejuvenation and Enterprise Development to Strengthen and Diversify incomes (EMPOWER) in Indonesia
- Flagship 4. SukkhaCitta: Ethical produced fashion from smallholder cotton and dyes
- Flagship 5: Public-Private Partnership Towards HCV Area Protection in Ketapang District, West Kalimantan Provinces.

The role of different stakeholders

Within the value chain, and through the enabling environment, a range of stakeholders are involved in the development and promotion of agroforestry, they all have a role to play in realizing the solution pathways (see Table 1).

Farmer organizations hold the potential to address scale-related challenges, including marketing, access to knowledge, and financial support for replanting. Empowering them can enhance the adoption and

success of agroforestry systems. At the same time, private companies would need to explore opportunities for agroforestry adoption, including the offtake of main and niche products. Collaborative efforts in sourcing areas can stimulate local demand and reward social and environmental services. Social enterprises can help bridge the gap between smallholder farmers and larger customers by connecting them and ensuring risk sharing. They can also contribute to developing incentive mechanisms for trading and fostering an agroforestry carbon market and payment for environmental services.

Local and national policy makers must focus on coordinated cross-sector efforts, particularly between forestry and agriculture sectors. This requires collaborating across ministries, exploring options for policy alignment, and explicitly addressing governance and land tenure issues to facilitate agroforestry adoption.

Local NGOs are well-positioned for on-the-ground capacity building and long-term engagement with smallholder farmers, including awareness raising and evidence collection, while research institutions can play a role in studying crop interactions, climate impacts, and marketing within agroforestry systems. Consultancy firms and service providers assist in modelling agroforestry systems, assessing feasibility, and providing knowledge brokering services.

Financial institutions can provide critical funding during the initial years of agroforestry development. Developing innovative finance mechanisms and understanding agroforestry systems are key to accelerating the impact and scaling of agroforestry. Finally, multi-lateral organizations can facilitate knowledge exchange, research, capacity building, policy advising, and awareness raising. They provide a platform for collaboration and coordination among various stakeholders.

So far, each stakeholder has played a role in partnerships for developing agroforestry, but often in an isolated manner and by using limited and segmented resources. It is therefore key to build strategic partnerships that are truly collaborative, and with all stakeholders involved.

Solution pathway	Farmer (organizations)	Market	NGOs	Govern -ment	Knowledge organizations & service providers	Financial institutions	Multi-lateral organizations / others
Developing a national strategy on agroforestry through a multi stakeholder approach	*	**	*	***	*	*	**
Enhancing policies and governance (alignment).			*	***	*		*
Mobilizing business and markets	*	***	*	**	*	***	*
Mobilizing (access to) innovative finance		***	*	**	*	***	**
Mobilize knowledge and research	**	**	**	**	***	*	**
Optimized agroforestry design based on local knowledge and practices	**	*	**	*	***	*	**
Creating awareness, outreach, and capacity building	**	**	***	**	**	*	**
Knowledge sharing (Collective learning)	**	**	***	**	**	*	**

 Table 1. The role of different stakeholders in the solution pathways

* Less involved; ** Medium involved; *** Most involved

Role for the Embassy of the Netherlands

In alliance with other Netherlands-based entities—corporates, knowledge institutes, and NGOs—the Dutch Embassy can be a catalyst in accelerating the growth of sustainable and profitable agroforestry in Indonesia. Some roles they can adopt include:

- 1. Financial mobilization and fundraising: Utilize Embassy funding to attract private investments, fund specific projects or processes, e.g., on collective learning.
- 2. Stakeholder collaboration: The sustainable growth of smallholder agroforestry necessitates cohesive collaboration among stakeholders. The Dutch Embassy can be instrumental in fostering such partnerships, ensuring key players—including government agencies and policymakers—collectively address existing challenges.
- 3. Inter-embassy cooperation: Partner with embassies from other countries in Indonesia to enhance impact through shared expertise and strategies.
- 4. Diplomacy and government relations: Strengthen ties with pivotal Indonesian governmental entities, particularly the Ministries of Forestry and Environment and the Ministry of Agriculture.
- 5. Championing frontrunners: Amplify and amalgamate efforts of organizations dedicated to agroforestry advocacy and those curating agroforestry-centric educational resources for farmers.
- 6. Network development and communities of practice for collective learning: The Embassy can be a beacon in sculpting networks and collaborations to promote collective learning, creating synergies and share knowledge and experiences between NGOs, local producer organizations, and market stakeholders.
- 7. Awareness raising: Increase the awareness about the potential benefits, challenges, and solution pathways to develop and scale agroforestry in Indonesia, e.g., in international fora or in specific policy processes or programs (e.g., NWO, RVO).

By nurturing inclusive collaborations and steering concerted actions, the Embassy of the Netherlands can substantially contribute to the expansion of sustainable and economically feasible agroforestry practices in Indonesia.



CHAPTER I. Background and Description of the Assignment

Chapter 1. Background and Description of the Assignment

Agroforestry has gained significant importance and attention in Indonesia. It offers not only environmental benefits, such as deforestation reduction and biodiversity enhancement, but also social and economic advantages for (smallholder) farmers and livelihood improvement.

The Indonesia Ministry of Environment and Forestry (MoEF), in cooperation with other related Ministries, promotes agroforestry in forest areas through various policies and regulations. This includes amongst others the Social Forestry Program, using agroforestry as an instrument for resolving oil palm plantation boundary violation in state forest areas, the multi-business forestry policy to accelerate the development of industrial-scale agroforestry in forest concession holders permits or the introduction of several incentives for tenurial strengthening, market opportunities, technical assistance, and financial assistance.

Several Dutch companies and organizations in Indonesia are actively engaged in commercial agroforestry, and the involvement of Dutch initiatives in this field is steadily increasing.

Despite the benefits, there remains a lack of a clear understanding regarding the broader impacts of agroforestry. Also, scaling efforts have fallen behind. It is essential to gain insights into the benefits, perceived barriers, and opportunities for scaling. Therefore, it is crucial to comprehend the current agroforestry practices, learn from successful projects, and analyze key issues and challenges to mainstream agroforestry practices, so as to identify strategies that improve the conditions for the adoption of agroforestry practices. It is important to not only consider upstream factors related to agroforestry production but also downstream aspects, including access to markets, industries, and financial resources. Once a better and holistic understanding is obtained, it becomes important to raise awareness on the opportunities of and how agroforestry initiatives provide solutions to food security, livelihoods, forest conservation, climate resilience and biodiversity goals on the forest-agriculture interface.

Given the benefits of agroforestry and the (potential) role of Dutch players to contribute to this, the Embassy of the Netherlands in Indonesia (further shortened as "the Embassy") commissioned Tropenbos Indonesia to conduct a quickscan study, aiming to provide a comprehensive overview of the current status of agroforestry in Indonesia, including perceived challenges, opportunities, and stakeholders involved. This study aims to facilitate a better understanding of scaling options and the potential role of the Dutch Embassy and other Dutch organizations. The Ministry of Agriculture, Nature, and Food Quality of the Netherlands has provided support to this study, enabling Tropenbos International consultants to bring in additional perspectives, particularly regarding Dutch organizations involved in agroforestry development in Indonesia.

1.1. Objectives of the quickscan study

The objective of this quickscan study is twofold, being:

- To get a better understanding and raise awareness on the opportunities of and/or how agroforestry initiatives provide solutions to food security, livelihoods, forest conservation, climate resilience and biodiversity goals on the forest-agriculture interface.
- To inform the Dutch Embassy to develop a long-term strategy (and position) on how Dutch players can contribute to the Indonesian agroforestry sector.

1.2. Scope and Approach of the Study

Agroforestry is defined in this study as a land use system at different spatial and temporal scales that combines trees, perennial crops and annual crops, and livestock within one area. within the same area in some form of spatial and temporal arrangement.

Agroforestry, as a topic is a multifaceted and comprehensive subject to explore. The broadness of agroforestry, from its ecological aspects to socio-economic considerations, encompasses a wide range of angles and contexts to explore. Agroforestry systems range largely depending on the crop, geographical setting, and socio-economic context. Also, transitioning from conventional forestry to agroforestry presents distinct impacts and implications compared to the shift from monoculture to agroforestry. Each dimension brings its own set of challenges and opportunities that require specific attention and analysis.

This report provides a quick scan of the agroforestry landscape in Indonesia, shedding light on important aspects such as impacts, benefits and (perceived) challenges and solutions, and highlighting key findings. This study involves a quick scan on various upstream to downstream aspects of agroforestry, such as Indonesian and European policies; how agroforestry practices contribute to the household and national economy and the environment; commodity marketing, and; mainstreaming efforts. The commodities selected are coffee, cocoa, rubber and spices. Oil palm agroforestry is also included in this study because of its increasing relevance as the government issued the *Jangka Benah* policy.

This assessment does not pretend to be exhaustive and does not cover all different dimensions and contexts of agroforestry in detail. The findings can, however, be used as a starting point for further discussion, research and collective learning.

This quick scan study took place between May and July 2023, and applied mostly qualitative methods, involving a desk study by reviewing reports, policy briefs, government regulations, and other relevant publications. Additionally, interviews and focus group discussions (FGDs) were conducted with key stakeholders connected to agroforestry in Indonesia at the national, sub-national and field level, and those working with Dutch organizations – providing good insight amongst the different stakeholder groups involved in agroforestry.

While valuable insights were gathered through interviews with relevant experts and stakeholders, it is important to acknowledge that perspectives from all stakeholders involved could not be covered in this

study, given the limitations in time and resources. It was especially challenges to get the perspectives from multinational companies and insights on their activities are therefore mainly based on data collection from reports and internet – and only to very limited extent based on interviews. Nonetheless, their (potential) roles for scaling agroforestry in Indonesia are included in the analysis.

A series of research questions, provided by the Dutch Embassy, formed the basis for the data collection, also on the case studies, and the interview format. Chapter 4 and Annex provide an overview of the stakeholders interviewed.

1.3. Target audience

This report aims to inform the Dutch Embassy of the Kingdom of the Netherlands in Indonesia, along with relevant Dutch and Indonesian government institutions, Dutch and Indonesian companies, and relevant civil society organizations.

The overview and analysis of the impacts, challenges, and opportunities for improving the enabling conditions of agroforestry practices are intended to support the development of scaling strategies for agroforestry in Indonesia and highlight the potential roles of different stakeholders.

1.4. Structure of the report

The report is structured as follows: Chapters 2 and 3 provide background information on agroforestry, while Chapter 4 focuses on stakeholder engagement in agroforestry and specific multi-stakeholder initiatives. Chapter 5 and 6 discuss the benefits, issues and challenges of agroforestry development in Indonesia. Chapter 7 provides a description of interesting flagship projects, Chapter 8 solution pathways defined based on earlier chapters, how the various key stakeholders can collaborate to scale agroforestry. Finally, some challenges and limitations are provided.



CHAPTER 2. Agroforestry in Indonesia: Context and Background Information

Chapter 2. Agroforestry in Indonesia: Context and Background Information

Section 2.1 describes the historical development of agroforestry in Indonesia, while section 2.2 provides an overview of what agroforestry in Indonesia entails, including a description of different types of agroforestry. Section 2.3 gives an overview of relevant Indonesian policies that relate to agroforestry development and scaling, while 2.4 focuses on relevant Dutch, European and global agreements and regulations.

2.1. Historical development of agroforestry in Indonesia

Agroforestry in Indonesia refers to a production system that has been practiced for hundreds of years by indigenous people and local communities, inside and outside of forest areas¹. Indigenous people and local communities in forest frontier areas have long experiences with the so-called 'dual economy' where food security depends on swidden agriculture, and cash crop monoculture or agroforestry systems, including oil palm, rubber, coffee, and cocoa, are to be maintained as financial resources for their livelihood. To local communities, this embodies a strategy to adapt to the shortage of resources, including land, labor and capital. Agroforestry is an instrument of production where the communities try to minimize the risk of uncertain production processes, inflicted by environmental factors, such as pests and plant diseases; as well as economic factors, such as the market price fluctuation.

Since the 16th century, local people in Sumatra have produced benzoin resin in agroforestry systems; as well as people in Lampung who produced *damar* resin, and people in West Kalimantan who produced *tengkawang* fruit and rubber gum (Foresta et al, 2000).

Agroforestry has also been implemented by the State-owned Forest Company in Java since colonial times, as a strategy to cope with the highly social pressure on forest resources. An intercropping agroforestry model was offered to the local communities in order that they could produce various food crops among the array of tree crops (especially teak and pine) for a certain period (four years). Some stakeholders consider this agroforestry model to be ineffective to address social, economic, and environmental problems in forest management in Java, still it has been brought to practice until today.

In different regions we can find agroforestry in various (traditional) agroforestry models. For example, in East Kalimantan, we will find *simpukng*, which is a rattan and fruits agroforestry system developed by Dayak communities. In West Kalimantan, another Dayak community developed *tembawang*: rubber and tengkawang fruits agroforestry. In Lampung, local community developed *repong*: resin and rubber agroforestry. In West Sumatra local people developed *parak*: spices and tree crop agroforestry. And in Java, villagers developed *pekarangan* and *talun*: local agroforestry dominated by tree crops and other commercial crops, including food crops.

¹ The forested landscapes of Indonesia are home to 37 million people spread across 26,000 villages. Based on national standards, at least 18% are still below the poverty line.

For villagers in Java, for a long time, agroforestry is considered as a part of the strategy to improve the productivity of their small plot of land, while most people in Kalimantan and Sumatra depend on forest resources, where agroforestry is a part of the strategy to keep their swidden fallow land productive without providing significant input. They manage their land by keeping useful forest species, planting various tree crops and other commercial crops to produce some commodities, such as timber, resin, rubber latex, coffee, cocoa, fruits, spices and so on. Referring to government statistics, those commodities are mostly produced by smallholder or family farming agroforestry.

In the last decade, a range of international multi-stakeholder projects have started adopting agroforestry, amongst others as an adaptation strategy to climate change and stronger effect of El Niño–Southern Oscillation (ENSO), and to empower the local communities. Chapter 4 provides a selection of relevant projects and other initiatives. Apart from the stakeholders' considerable amount of attention to agroforestry, some literature studies confirm that agroforestry practices still face challenges and do not reach their potential due to poor quality plant seeds, inadequate production inputs, passive management, low productivity, limited market access, randomly scattered locations, being "unbankable²", and so forth. Given such conditions, it is understandable that agroforestry still fails to attract much interest from the youth; and even in some places it has been under the threat of the expansion of oil palm monoculture plantation which is popularly seen as more modern, productive and profitable.

2.2. What does agroforestry in Indonesia entail?

2.2.1. Understanding agroforestry

This study refers to the definition of agroforestry as a land use or production system at different spatial and temporal scales that integrates trees, perennial crops and annual crops, and livestock within one area. Agroforestry has been practiced in Indonesia for centuries and is an important component of the country's rural economy. Indonesian agroforestry practices vary depending on the region, landscape, and ecological conditions. In some areas, agroforestry involves simple intercropping of annual crops with trees, while in other areas it involves complex integrated systems that include many natural ecosystem components and structures.

Most farmers apply agroforestry systems based on economic considerations rather than social and ecological considerations. This is indicated by the selection of plant species with the main objective of meeting the needs of farmer households in the short, medium, and long term.

The National Strategy of Agroforestry Research in Indonesia 2013-2030 applies the following definition to describe agroforestry:

1. Agroforestry is a collective term for various land use systems and technologies, which are designed for a single unit of land and applied by combining woody plants ((fruit) trees, shrubs and bamboos) and agricultural crops (palms, vegetables) or animals (livestock and/or fish),

² a project, business or opportunity is "unbankable" when investors are not (yet) willing to lend/invest to the project/business (<u>https://www.lawinsider.com/dictionary/unbankable#:~:text=Unbankable%3A%20a%20project%2C%20business%20or,invest</u> <u>%20to%20the%20project%2Fbusiness</u>)

simultaneously or consecutively, in a way that promotes ecological and economic interactions among the components.

2. Agroforestry is an integrated land use system, based on an understanding of multidisciplinary science, that a) maintains the balance between production and environmental conservation activities; b) applies a combination of food crops, livestock and trees; and c) plays a social role and reduces potential land use conflicts.

Agroforestry can be analyzed and is applied in this study at different levels³:

- 1. At the plot or farm level: this involves, for example, agroforestry, intercropping/multi-cropping systems, regenerative agriculture.
- 2. At the landscape level: patches of agroforestry or forests within or in between monoculture systems, for example, in oil palm plantations or concessions
- 3. At the policy level: although agroforestry as a concept is not clearly mentioned in Indonesian statistics or laws since it is at the interface agriculture and forestry.

2.2.2. Three broad types of agroforestry systems in Indonesia

In general, agroforestry is seen as an alternative production system to monoculture plantations. It is often classified as a sustainable and climate-smart production system, due to its ability to increase carbon absorption, food security among local communities, biodiversity, as well as income, in addition to supporting the supply chains of various agro-commodities at the global level. In Indonesia, one can distinguish three broad types of agroforestry systems, which include family farming agroforestry, smallholder agroforestry and corporate/industrial agroforestry. Government statistics indicate that the domination of family farming and smallholder farming in producing the cash crop commodities (coffee, cococa, rubber) has reached 80-90%. The three types of agroforestry systems are described in more detail in the sections below.

Family farming agroforestry

Historically and culturally, family farming agroforestry was developed by indigenous people and local communities following the tradition of shifting cultivation or swidden agriculture and adapted to local resource limitations. It is a permanent or long-term agroforestry system generally located in forested areas in the outer islands to generate food, diversify local income, while involved in the regional market supply chain. This type of agroforestry tends to be managed extensively so that at an advanced stage (climax phase) it turns into a secondary forest with high carbon stocks and biodiversity. This type of agroforestry is mainly developed in the context of securing the tenure system of shifting cultivation or swidden agriculture. By planting perennial crops or tree crops, tenure security is maintained in the long term, which is particularly important when children grow up and leave the villages.

Generally, family farming agroforestry is classified as a complex agroforestry system. Complex agroforestry systems are much more difficult to recognize, since they are successional systems and, while early stages usually exhibit typical agroforestry features, their mature ("forest" phase agroforest) is often being confused with natural forests. There are some models of family farming agroforestry, such as *pekarangan*, the Javanese tree-home garden, which is often described as one of the most

³ Knowledge institute, interview

sophisticated home garden systems in the world, developed by local people, mostly in central Java. Also, *simpukng, tembawang* and *repong* are considered complex agroforestry systems.

Smallholder agroforestry

Smallholder agroforestry systems, as defined in this report, generally have much more planning involved than family farming agroforestry systems. These are usually located outside of forested areas, and there is usually more focus on the selection of crops and trees, and on specific management practices in order to increase productivity and income. Smallholder agroforestry can vary from simple to complex systems, and in principle seek to produce for the market. To maximize economic benefits, this type of agroforestry is managed semi-intensively or even intensively to maintain a semi-climax phase, where various cash crops can still produce optimally.

Corporate agroforestry

Corporate agroforestry is industrial agroforestry managed by a company with specific economic purposes. It is implemented mostly in Java with the purpose to combine timber production with food crop production, especially in use in areas of high population pressure. It is mostly implemented as an intercropping model, by combining tree crops and food crops. Corporate agroforestry is mostly located inside the forest zone and designed as temporary agroforestry; often it turns to monoculture tree cropping several years later. This agroforestry system is classified as simple agroforestry since it consists of a few species only.

2.3. Relevant Indonesian policies

Since the last decade, the Indonesian government has paid increasing attention to agroforestry. Several recent legal frameworks address agroforestry as an important pillar in national forestry development. Agroforestry In Indonesia is now supported by at least 18 national legal instruments, including: 4 laws, 5 government regulations, 7 ministerial regulations and 2 director general regulations. In general, these policies address three main issues; *first*, securing the living space of indigenous people and local communities (IPLCs), as well as improving their livelihood that depend on forest resources, by developing agroforestry business models; *second*, mainstreaming community-based forest protection and rehabilitation through agroforestry and other technical approach; *third*, strengthening IPLC's social capital as a key component on sustainable forest management (Octavia et al, 2022).

Some examples of regulations that are contributing to mainstreaming agroforestry as a key element in national forestry development are, see also figure 1:

- Government Regulation No. 23/2021 concerning Forestry Management.
- Regulation of MoEF P 8/ 2021 concerning Production and Protection Forest Management.
- P 9/2021 concerning Social Forestry.

The following sections outline some of the main legal instruments covering agroforestry in Indonesia.

Social Forestry Program

The Social Forestry Program is considered becoming the main engine for the development of national agroforestry, especially located in the State Forest Land or Forest zone. Since 2016, the MoEF has established an institution at the level of a Directorate General to manage the Social Forestry Program (previously it was only at the directorate level). Social Forestry has also become one of the national strategic programs with a target of 12.7 M hectares. Currently, more than 5 million hectares has been

achieved. The most recent (by June 2023) Social Forestry Program is supported by a legal framework at the level of a Presidential Regulation (Presidential Regulation No. 28/ 2023 concerning Integrated Planning for the Acceleration of Social Forestry Management), indicating high-level policy support for the future of agroforestry development through social forestry.



Figure 1. Regulations related to agroforestry and social forestry at the operational level and their umbrella rules (extracted from Octavia et al., 2022⁴; the best possible copy) (Note: box colors indicate different rule levels and arrow colors indicate derivative rules)

⁴ <u>https://www.mdpi.com/2071-1050/14/15/9313</u>

No.	Institution	Extension service	Note	
1.	Directorate General of PSKL	 Legal tenure for 35 years (could be extended) Technical assistance (upstream and downstream) 	5.5 million ha has been delivered for 1.2 million households	
2.	Directorate General of DASRH	Agroforestry plant seedlingTechnical assistance (upstream)	30-40 thousand of plant seedlings have been delivered annually	

Table 2. Internal extension services (MoEF) of Social Forestry Program

Table 3. External extension services of Social Forestry Program

No.	Stakeholder	Institution	Expected support	
1.	Ministry of Finance	Environmental Fund Management	Finance and, technical assistance	
		Agency (BPDLH)		
2.	Ministry of Home Affair	DG of Regional Development	Regional development budget,	
		(Bangda)	technical assistance	
3.	Ministry of Village	-	Village fund	
4.	Civil society organization	Social Forestry Acceleration Team	Technical assistance	
		(TP2PS)		

The development of agroforestry through the Social Forestry Program is no longer simply working in sectoral domains— in this case it only involves the Ministry of Environment and Forestry— but instead it has turned to become multi-sectoral, involving several related ministries, such as the Ministry of Home Affairs, Ministry of Finance and Ministry of Villages.

Jangka Benah

Jangka Benah is a land settlement strategy for oil palm cultivation in the forest zone, both for (smallholder) farmers and companies. It works by changing the monocropping systems into agroforestry systems for a certain period of time, mostly one cycle of oil palm cultivation or 25-30 years. The legal framework of Jangka Benah is a mandate from the omnibus law policy package (Law No. 11/2021)⁵, which were then translated into government regulations, and MoEF regulations. It was a mandatory scheme for (smallholder) farmers as well as companies who cultivate oil palm in the forest zone. Elsewhere, Peru for example, settlement of illegal land use in forest areas is also often carried out by mainstreaming agroforestry for a certain time, which is then referred to as "agroforestry concessions" (Purwanto et al. 2020).

The Indonesian government classifies palm oil as a non-forest commodity; hence an oil palm plantation is not a forest. Cultivation of oil palm in the forest zone is classified as illegal. According to the MoEF, currently at least 3.4 million hectares of oil palm cultivation (mostly monocropping) are in forest zones, subject to transform into agroforestry concessions. As a legal instrument, agroforestry concessions would complement current social forestry schemes, such as forest village and community forestry, without claims that oil palm plantations are considered 'forests'. They would also allow investments in

⁵ Omnibus law no 11/2021 provides a legal basis and opportunity for forestry business actors to diversify their business and expand the role of the forestry sector in increasing contributions to the social, economic and environmental dimensions and contributing to the achievement of Indonesia's NDCs.

upgrading different types of production systems; systems that are more acceptable than mere oil palm monocultures. Current research interests in testing diversified oil palm agroforestry systems are opening new perspectives that might match farm economies (Purwanto et al. 2020).

Box 2. The Jangka Benah policy and its (potential) role in oil palm cultivation

Purwanto et al. (2020) highlights the various strategies in which agroforestry can play a role in oil palm cultivation. The Jangka Benah policy aims at phasing out 3,000,000 ha of oil palm that is cultivated within the forestry domain. The policy aims to avoid a massive and unfeasible instant removal of these illegally planted oil palms, but a gradual removal in which palms are removed and other crops and trees are interplanted in order to assure that land keeps being productive.

The productivity of oil palms is thus of secondary importance under this policy. It would be useful to connect the knowledge gained with this policy and practices, and use the knowledge gained to also develop systems in which the productivity of oil palms is regarded as an important criterion. The WUR, with their SustainPalm Project, are investigating agroforestry systems which aim at maintaining oil palm production. They look forward to learn from counterparts as the University of Jambi (UNJA) and Gadjah Mada University (UGM) that are working on the Jangka Benah policy, regarding interactions between crops, and eventually also promote agroforestry options in which oil palm keeps in productive function (interviews WUR; Service provider)

Multi-Forestry Business

Within the complexity of developing smallholder and family farming agroforestry through the Social Forestry Program and the *Jangka Benah* Strategy, the Job Creation Law package (UU No/11/2021), which is enacted into Government Regulation as replacement of the Law No. 2/2022, also mandates the development of industrial agroforestry. Through the Multi-Forestry Business scheme or industrial agroforestry, the MoEF encourages forestry concession holders to expand their business for timber and for non-timber commodities such as cocoa, coffee, rubber, and various other non-timber business commodities such as ecotourism, silvopasture, silvo-fishery and carbon. The main objective is to increase the competitiveness of forestry businesses, as well as forestry's contribution to national income. Apart from that, it is also considered to be able to accelerate the achievement of the national FOLU Net Sink.

The Multi-Forestry Business policy is well received by forestry concession holders. It can provide new opportunities that have not been developed so far. However, agroforestry can be a complex production system and therefore requires various new innovations to develop it at a larger scale. Referring to the interview with the Indonesian Forestry Business Association, providing incentives for accelerating the development of industrial agroforestry is urgently needed. Some of the incentives that are expected to be provided include friendly business licenses, as well as forest resource taxes, especially if industrial agroforestry development is carried out in a partnership scheme with (smallholder) farmers.

Related policies: Indonesia's Nationally Determined Contribution and Carbon policy

Next to above-mentioned policies, there are various policies worthwhile mentioning in this report as they may support the promotion of agroforestry through recognizing that (more) trees on land have the potential to support carbon sinks under Nature-based Solutions contributing to climate change adaptation.

Indonesia's NDC

Indonesia's Nationally Determined Contribution (NDC)⁶ outlines the country's transition to a low carbon and climate resilient future. The REDD+ National Strategy plays a strategic role in achieving Indonesia's NDC target for the forestry sector. In the forestry sector, Indonesia has set up an ambitious target by 2030 in peatlands restoration of 2 million ha and rehabilitation of degraded land of 12 million ha. In terms of climate adaptation, the NDC strategy is to mainstream and integrate climate change adaptation into the agricultural sector, especially for strategic commodities. Indonesia submitted its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat prior to COP-21.

Box 3. Ambitions of Indonesia stated in the enhanced NDC

- Increases unconditional emission reduction target of 31.89% of its GHG emissions against the Business as Usual (BAU) scenario by the year of 2030, compared to 29% in the 1st NDC.
- Indonesia can increase its contribution up to 43.20% reduction of emissions in 2030 conditionally, compared to 41% in the 1st NDC, subject to availability of international support for finance, technology transfer and development and capacity building.⁷
- The NDC has set an ambitious mitigation target for forest and land use and energy sectors which account for about 97% of the total national commitment.

Carbon policy

On July 15th, 2023, MoEF officially issued Minister Regulation No. 7 of 2023 about Carbon Trading Guidelines and Procedures, specifically for the forestry sector⁸. The Minister Regulation No. 7 of 2023 aims to enable the implementation of carbon economic values to support the achievement of the Nationally Determined Contribution (NDC) and 2030 Net Zero Emission target for the forestry sector. This regulation will be regulated by the Directorate General on Sustainable Forest Management of MoEF. The regulation serves as a guideline and is a follow up of two preceding regulations, i.e.

- 1. Presidential Regulation No. 98 of 2021 on The Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Over Greenhouse Gas Emissions in the National Development.
- 2. Minister of Environment and Forestry Regulation No. 21 of 2022 on Procedure for Implementing of Carbon Pricing (jdih.menlhk.go.id).

 ⁶ See also: https://unfccc.int/sites/default/files/NDC/2022-09/23.09.2022_Enhanced%20NDC%20Indonesia.pdf
 ⁷ <u>https://unfccc.int/sites/default/files/NDC/2022-09/ENDC%20Indonesia.pdf</u>

⁸ In the 26th Session of The Committee on Forestry (COFO26) held on October 3rd, 2022 in FAO headquarters in Rome, Siti Nurbaya (Minister of Environment and Forestry) stated Indonesia's commitment to reduce around 140 million tons of CO_2 emission by 2030 from the FOLU sector.

The regulations also govern the procedure of how national and local forestry private sectors can be involved in emission trading and carbon offset affairs, either in state forest land or non-state forest land (APL) as long as they have fulfilled the buffer carbon amount to contribute to Indonesia NDC target. This includes forests that are already under forest utilization business license (known as *perizinan berusaha pemanfaatan hutan* or "PBPH") or previously known as forest concessioner such as *HPH* (*Hak Pengusahaan Huta*) and *IUPHHK* (*Izin Usaha Pemanfaatan Hasil Hutan Kayu*), also those designated for social forestry purposes, land rights considerations, and more. This carbon trading policy is in line with Multi-Forestry Business policy stated through the Job Creation Law package (UU No/11/2021).

Schemes that can be carried out in the forestry sector can be in the form of GHG emission reduction and carbon storage and or sequestration. The main approaches of these carbon trading mechanisms can be implemented through Forestry Utilization Business License (PBPH), social forestry (silver grade), peatland, mangrove management sector, etc. This regulation also accelerated the establishment of carbon accounting⁹ and carbon credits project implementer organizations in Indonesia.¹⁰

The **Minister Regulation No. 7 of 2023** opens opportunities for funding and investment of community agroforestry development through the silver category 'social forestry'. For attaining the Silver Category of Social Forestry, one should:

- 1) Have prepared a long-term Social Forestry Management Plan
- 2) Have identified potential business(es); and
- 3) Have established Social Forestry Business Unit (KUPS)

Through the Minister regulation No. 7/2023, various forest status permits¹¹ and management permits¹² are accommodated for carbon trading affairs. This means that agroforestry land use situated in various areas can be connected by various actors to the carbon trading schemes and gain benefit from it. If done right, the regulation will trigger stakeholders (e.g., private sectors, local communities) within carbon trading submitted areas to inclusively participate in the sustainable management of agroforestry areas at the local level.

The flow chart (see figure 2) describes how various forest status and management permits are accommodated for carbon trading affairs. It is at the same time important to note that challenges of carbon trading development in social forestry scheme are the budget for project development, which is huge. Also, the management body of the permit holder often has a low understanding and capacity on carbon trading.

⁹ See also: <u>https://www.hcvnetwork.org/search?query=carbon</u>

¹⁰ See also: <u>https://www.replanet.org.uk/carbon-credits/;</u> <u>https://www.bumiterra.com/about-us;</u>

https://onetreeplanted.org/search?type=product,page,article&q=carbon; https://www.fairatmos.com/

¹¹ Examples are: Production, Limited Production, Protected and Non-state Forest (APL or Area Penggunaan Lain) Areas ¹² Examples of management permits: PBPH, Social Forestry, Forest Parks and private management right (conservation and restoration-based business)



Figure 2. Flow chart showing how various forest status and management permits are accommodated for carbon trading affairs. Based on Article 4 and 5 of the MoEF Reg 7/2023 referenced from ARMA Update June 21st, 2023: ESG and Climate Change Update: The Long-Awaited Carbon Trading for the Forestry Sector

The carbon trading policy also indirectly encourages the data inventory development of agroforestry land uses that are proposing the carbon trading scheme. This data inventory will be managed by national (MoEF), province (governor), and district (regent) level governments. Due to requirements on verification, validation, and certification¹³, **Regulation No. 7/2023** will may potentially also mainstream not only professional forest governance and sustainable management but also the availability of larger agroforestry land use data.

¹³ Various carbon trading scheme application can be registered through srn.menlhk.go.id. See also DG Climate Control Presentation about Implementation of Carbon Economic Value in the 7/2023 regulation socialization: https://drive.google.com/drive/folders/1 B58Ug79IPvqRNC8AYxMVNOjqTs452wl (in Bahasa Indonesia)

The Government of Indonesia has promulgated Presidential Regulation **No. 98 year 2021** which concerns the implementation of Carbon Trading. The Regulation prescribes carbon pricing, including arrangements for carbon trading, carbon levies and result based payments. The regulation identifies a few trading mechanisms, including a 'cap and trade' scheme between two business entities, a carbon offset scheme, and result-based payments. Carbon trading will be conducted via an Indonesian bourse, and levies will be charged on transactions.

The regulation focuses on the organization and management of government agencies, and it aims to improve the effectiveness and efficiency of public services. It stipulates several provisions related to the structure and functions of government agencies; and establishes the Ministry of National Development Planning/BAPPENAS as the lead agency responsible for formulating and implementing national development planning policies. Furthermore, this regulation emphasizes the importance of digital transformation in public services and encourages the use of technology to improve government performance. Overall, Presidential Regulation No. 98 Year 2021 is intended to streamline and improve the performance of government agencies in Indonesia.

2.4. Relevant Dutch, European and global agreements and regulations

This section provides an overview of relevant international and European policies, and their potential impacts on the further development and scaling of agroforestry in Indonesia. More information can also be found in Annex. Challenges are further discussed in Chapter 6.

The EUDR and its link with (smallholder) farmers, agroforestry or scaling agroforestry

The recently approved EU Deforestation Regulation (EUDR) requires companies to ensure that the products they place on the EU market or export from it are not associated with deforestation. Under the EUDR, 'agroforestry systems where crops are grown under tree cover' fall under the definition of agricultural plantations and are considered agricultural use. This also means that the expansion of agroforestry systems on the state forest land, which is based on the FAO definition, is considered deforestation under the EUDR.

The Paris Agreement and its link with (smallholder) farmers, agroforestry or scaling agroforestry

The Paris Agreement Article 6.4. is contributing to sustainable development and the mitigation of greenhouse gas (GHG) emissions globally and can thus be a driver of the implementation and scaling of agroforestry (projects) in Indonesia, provided that agroforestry is developed on degraded or agricultural lands.

The 2030 Agenda for Sustainable Development and its link with (smallholder) farmers, agroforestry or scaling agroforestry

Octavia et al. (2022)¹⁴ describes the existing conditions, opportunities and challenges in mainstreaming Smart Agroforestry, a set of agriculture and silviculture knowledge and practices, to support the SDGs in Indonesia. The development and scaling of agroforestry can contribute directly and indirectly the aforementioned Sustainable Development Goals (SDGs). For this reason, the 2030 Agenda for Sustainable Development can be a driver of the development and scaling of agroforestry in Indonesia.

¹⁴ <u>https://www.mdpi.com/2071-1050/14/15/9313</u>

The Convention on Biological Diversity (CBD) Kunming-Montreal Global Biodiversity Framework and its link with (smallholder) farmers, agroforestry or scaling agroforestry

Countries, including Indonesia, must now implement the CBD Kunming-Montreal Global Biodiversity framework through domestic and international action. Regenerative agroforestry development with native tree species and on degraded lands could contribute to the targets of the framework. However, there are some concerns raised, since it mentions biodiversity "offsets" and "credits", and it is unclear what this means exactly, since biodiversity cannot be traded like carbon. Further, ecosystems destroyed and species lost in one area cannot be "compensated" in another area, since ecosystems and biodiversity are local and embedded¹⁵. This should be handled with care when developing an agroforestry project in line with this framework.

2.5. Conclusions

There is a long history of agroforestry in Indonesia, a family-farming and smallholders agroforestry production system, that is being practiced for hundreds of years by indigenous people and local communities, inside and outside state forest land area. Since the last two decades the Indonesian government has paid a greater attention to the development of agroforestry, especially in the State Forest areas through the Social Forestry Program, that has been intensified through MoEF's wide range policies, supported by MoEF internal and external agencies to improve family-farming and smallholders agroforestry tenurial system. MoEF also encourages forestry concession holders to expand their business for timber and for non-timber commodities such as cocoa, coffee, rubber, ecotourism and carbon to increase the competitiveness of forestry businesses to be able to accelerate the achievement of the national FOLU Net Sink.

At the same time, although various policies have been launched, and incentives are provided, policies still fail to address some challenges that hamper the uptake and scaling of agroforestry, mainly due to budget shortages, lack of coordination and inadequately scattered data and information related to agroforestry practices. This is further discussed in Chapter 6.

More indirectly, several Dutch, European and global agreements and regulations can (potentially) impact the cultivation and scaling of agroforestry systems, through ambitions on biodiversity or climate mitigation/adaptation and the potential of agroforestry to contribute to this. Examples are the Paris Agreement, SDGs and CBD Kunming-Montreal Global Biodiversity framework. Under the EUDR, aiming to halt deforestation from commodity production, agroforestry is considered agricultural land. This limits the uptake of agroforestry at the expense of state forest land (if products are destined to the European market).

¹⁵ https://news.mongabay.com/2022/12/nations-adopt-kunming-montreal-global-biodiversity-framework/



CHAPTER 3. Current Status and Knowledge on the Production, Economic Productivity and Trade of the Relevant Agroforestry Commodities

Chapter 3. Current Status and Knowledge on the Production, Economic Productivity and Trade of the Relevant Agroforestry Commodities

The main focus of this study is on commodities that are cultivated in agroforestry systems in Indonesia and are exported from Indonesia to the Netherlands and Europe or the European Union. The key commodities selected for this study are coffee, cocoa, spices, (natural) rubber and palm oil. Coffee, cocoa, spices and rubber are frequently cultivated in agroforestry systems. In contrast, oil palm is not yet widespread cultivated in agroforestry or intercropping systems, but there is an increasing interest in diversification of oil palm monoculture systems, also because of the *Jangka Benah* policy.

Agriculture employs nearly a third of the population in Indonesia; and 93% of Indonesian producers belong to smallholder or family farming systems. At least 64% of poor rural households engage in agricultural production. Around 98% of cocoa production is dominated by smallholder or family farming; 96% for coffee, 88% for rubber, almost 100% for spices, and 41% for palm oil (See further Table 4).

The choice of family or smallholder farming in Indonesia for intercropping, multi-cropping or agroforestry systems is to be able to anticipate for risks and constraints, such as lack of access to production input, market fluctuation, scarcity of land, capital and labor. In this way, agroforestry is considered a strategy to mitigate some risks, as well as to optimize production.

Production	Family/smallholder farming	Large plantation	Total area
Сосоа	98	2	1,582,406
Coffee	96.6	3.4	1,264,331
Natural rubber	88.1	11.9	3,694,716
Palm oil	40.8	59.2	15,081,021
Spices	-	-	-

Table 4. Total production of cocoa, coffee, rubber, and palm oil (there were no data found for spices)

Note: agroforestry of oil palm family farming is still rare

3.1. Production in Indonesia and markets

Сосоа

Indonesia is one of the top five cocoa producers in the world. The total area of cocoa cultivation in Indonesia reaches 1.5 million hectares with production centers in Sulawesi. In the 1990s, cocoa production in Sulawesi boomed, followed by a massive expansion of land clearing for cocoa agroforestry. However, two decades later it collapsed due to plant diseases. Cocoa production declined dramatically, and many farmers were struggling to maintain their farm, or left, or converted their agroforestry into a new boom crop, such as oil palm.

About 98% of cocoa cultivation is under smallholder or family farming agroforestry. Nationally, the productivity of cocoa family farming is quite balanced with the productivity of private companies and the state (0.7 ton/ha/year). However, this is still much lower than the productivity of cocoa family farming in Africa (3 ton/ha/year).

Indonesia has invested significantly in setting up a cocoa processing industry in the last decade, but the actual production of cocoa has declined. Whereas this was supposed to be in conjunction with cocoa intensification, this intensification program failed. This resulted in overcapacity of the cocoa processing industry and a strong reduction in cocoa exports.¹⁶



Figure 3. Productivity of cocoa 2013-2018 (PR: Family farming; PBN: State company; PBS: Private company)

The Cocoa Barometer Consortium (VOICE network) has launched a consultation paper on agroforestry in the cocoa sector¹⁷, showing – in general - the shortcomings in current government and industry approaches to agroforestry in cocoa, and provides suggestions on how cocoa agroforestry can contribute to environmental sustainability and farmers' livelihoods, and how actors can contribute¹⁸.

Coffee

Indonesia and Vietnam are the two countries in Asia which are among the top five coffee producing countries in the world. Even so, the average coffee productivity in Indonesia is only 0.7 tons/ha/year, which is much lower than coffee productivity in Vietnam which reaches 1.6 tons/ha/year. The total area of coffee cultivation reaches 1.3 million hectares, of which about 96% is smallholder or family farming agroforestry, and of which productivity that is not far from the national average (0.7 ton/ha/year). Areas that are centers of coffee production include Java and Sumatra.

Unlike cocoa and rubber which in recent years have faced production pressures, coffee has boomed, due to an increase in national and global coffee consumption. That is why in various places in Sumatra, Java, and Sulawesi, as well as Kalimantan, coffee agroforestry began to expand to new regions.

¹⁶ Knowledge institute, interview

¹⁷ <u>https://voicenetwork.cc/2020/07/cocoa-barometer-consortium-releases-consultation-paper-on-agroforestry-in-the-cocoa-sector/</u>

¹⁸ https://voicenetwork.cc/wp-content/uploads/2020/08/Consultation-Barometer paper-2020 final-PDF.pdf


Figure 4. Productivity of coffee 2011-2018 (PR: Family farming; PBN: State company; PBS: Private company)

Whereas Indonesian coffee exports are significant, the domestic consumption of coffee is becoming increasingly relevant. In the domestic market there is demand for origin of coffee, but much less for the production system it is cultivated in, which is similar to international markets.¹⁹

Natural rubber

Indonesia is the second largest natural rubber producing country in the world after Thailand, with an average productivity of around 1.1 ton/ha/year, while in Thailand it reaches 1.8 tons/ha/year. The total area of natural rubber in Indonesia reaches about 3.7 million hectares, and about 88% is produced through smallholder or family farming agroforestry with an average productivity of 0.9 tons/ha/year, which is far below the average corporate rubber productivity of 1.4 tons/ha/year. Rubber productivity by family farmers and smallholders recently dropped since the price of natural rubber fell,

¹⁹ Knowledge institute, interview



Figure 5. Productivity of rubber 2014-2020 (PR: Family farming; PBN: State company; PBS: Private company)

Sumatra and Kalimantan are known as rubber agroforestry centers with rubber being the main source of income. Those rubber agroforestry systems have a similar structure as natural forests. However, people have slowly began to abandon rubber agroforestry or turn it into a new agroforestry system dominated by oil palm, due to a substantial decrease in the price for rubber in the past five years.



Figure 6. A farmer tapping rubber in a rubber agroforestry plot in Mekar Raya Village of Simpang Dua Sub District of Ketapang District of West Kalimantan. Photo by Tropenbos Indonesia

Spices

Spices are commodities that were booming in the past, and now continue to be produced at a lower production level. A total of 100% of the spices in Indonesia is produced through smallholder or family farming agroforestry. Unfortunately, so far there is not sufficient adequate data related to the production of spices.

Destination	2017	2018	2019	2020	2021
Country	(ton)	(ton)	(ton)	(ton)	(ton)
Pakistan	90,975.6	2,379.1	1,653.0	1,057.3	5,416.5
Thailand	68,299.9	101,664.0	162,812.3	64,560.9	117,489.3
United States	13,347.7	12,619.8	7,182.0	12,918.3	14,389.3
India	24,169.8	33,572.0	31,939.9	33,995.1	28,252.8
Vietnam	29,159.6	29,977.8	11,480.8	9,349.5	6,617.1
Singapore	11,179.9	10,170.5	5,007.0	4,276.3	5,922.6
Netherlands	3,799.9	2,672.2	2,235.9	2,666.1	2,223.5
China	5,496.1	4,413.2	10,297.8	18,950.5	37,067.8
Bangladesh	23,004.4	6,278.0	10,899.1	7,407.9	17,284.3
Germany	1,305.9	1,357.1	1,341.3	1,515.3	1,653.6
Others	55,053.4	130,989.5	73,291.2	118,597.9	58,371.3
TOTAL	325,792.2	336,093.2	318,140.3	275,295.1	294,688.1

Table 5. Destination country of spices export 2017-2021.

Palm oil

Indonesia is one of the top producing countries of palm oil in the world, with oil palm generally being cultivated in monoculture systems throughout the outer islands of Indonesia. The palm oil sector is often criticized for having negative impacts on forests and human rights, which have made palm oil one of the most scrutinized agro-commodities globally.

Oil palm agroforestry is not a mainstream practice yet, due to the assumed lower productivity of oil palm in such a system. In some regions, such as Kalimantan and Sumatra, the practices and experimentation of oil palm agroforestry are being carried out by local communities for the past two decades, as a strategy to manage the limitation of capital, while minimizing the risk of volatile market prices. Various cash crops that have been introduced by local communities in oil palm agroforestry include rubber (*Hevea brasiliensis*), jengkol (*Archidendron pauciflorum*) cempedak (*Artocarpus intiger*), sengon (*Albizia falcataria*), jelutong (*Dyera costulata*)g and meranti (*Shorea spp.*).

About 40% of national oil palm cultivation is in family farming or smallholder systems, with a productivity of around 3.0 tons/ha/year, which is lower than the productivity of palm oil companies that reach 4.0 tons/ha/year.



Figure 7. Productivity of oil palm in the period 2014-2020 (PR: Family farming; PBN: State company; PBS: Private company)

Information	Oil palm and Shorea spp	Oil palm, jelutong, rubber and other food crops	Oil palm and sengon
Location	Kuamang Kuning, Jambi	Sei Gohong, Central	Sei Gohong, Central
		Kalimantan	Kalimantan
Year of adoption	2000	2008	2016
Area (ha)	2	4	2
Motivations	Timber scarcity for	Volatility of commodity prices	Decrease of rubber latex
	construction and housing;	and improve income stability	price and development
	improve timber		plan of new sengon mill
	sufficiency		
Land Status	Privately owned	Privately owned	Privately owned
Spacing strategy	(9x9) meter for palm oil;	Irregular pattern with 80 oil	(9x8) meter with two rows
	3x3 meter for Shorea spp	palms/ha	of sengon in between oil
			palm rows
Harvesting pf palm oil FEB	700 kg/two weeks	400 kg/two weeks	-

 Table 6. Smallholder oil palm agroforestry cases in Jambi (Sumatra) and Central Kalimantan.

Source: Budiadi et al. 2019 IOP Conf. Ser.: Earth Environ. Sci.336012001

According to a service provider (interview), the Indonesian palm oil producer organization GAPKI is interested in agroforestry systems as it may increase incentives for (smallholder) farmers to maintain the last patches of forests in oil palm landscapes, and there appears a movement towards taking landscape approaches in which GAPKI wants to assess with members which alternative value chains might be established.

This conversion may subsequently lead to companies being held accountable for deforestation, which, in line with commitments made by various leading palm oil companies, they do not want to be associated with. The Palm Oil Collaboration Group²⁰ has a Production and Protection Beyond Concessions workgroup, which investigates possibilities for agroforestry to halt deforestation of forest islands.

3.2. Trade and export of commodities from Indonesia to the Netherlands and EU

As is shown in Table 7, almost a quarter of the coffee exported from Indonesia (in USD) was imported to the EU in 2021, while only a small share (<1%) was imported to the Netherlands. The same counts for rubber; about 14% of total export from Indonesia (in USD) was imported to the EU, while only a small share (<1%) was imported to the Netherlands. On the other hand, of the total amount of spices exported from Indonesia (in USD), about 15% was imported to the EU, while almost half of that amount (and 6% exported from Indonesia) was imported to the Netherlands (Table 7). About 11% of the palm oil and coccoa exports from Indonesia are imported to the EU, and only ~2% is imported to the Netherlands.

		Indo				
Commodity		EU		NL		Commodity frequently
	World ('000 USD)	in '000 USD	as % of Indonesian exports	in '000 USD	as % of Indonesian exports	produced in agroforestry systems in Indonesia
Сосоа	1,574,463	171,817	10.9%	30,326	1.9%	Yes
Coffee	849,977	203,337	23.9%	7,247	0.9%	Yes
Spices	720,990	101,743	14.1%	43,140	6.0%	Yes
Natural rubber	4,015,540	572,574	14.3%	31,059	0.8%	Yes
Palm oil	28,381,681	3,014,485	10.6%	635,824	2.2%	No
Total value	35,542,651	4,063,956	11.4%	747,596	2.1%	

Table 7. Crop production and export values in 2021 (FAOSTAT, accessed 01-06-2023). The Netherlands is considered a trade hub, meaning a large share of certain commodities are further exported to other countries in the EU.

Сосоа

The Netherlands is the largest cocoa bean importer and the second-largest cocoa-processor globally, and is considered an important cocoa trade hub within Europe (in 2020!)²¹. This means that the Netherlands is an important re-exporter of cocoa beans and semi-finished cocoa products to other European destinations. Amsterdam is the world's largest cocoa port. However, 91% of cocoa beans were imported from West Africa in 2020, and **only a small share of the cocoa was imported from Indonesia** (<2%).

²⁰ https://palmoilcollaborationgroup.net/

²¹ https://www.cbi.eu/market-information/cocoa-cocoa-products/netherlands/market-potential

According to the Dutch Initiative for Sustainable Cocoa²² (DISCO; see below), between 20-25% of the global cacao trade goes through The Netherlands, and 85% of this volume originates from Cameroon, Nigeria, Ivory Coast and Ghana. Cocoa can only be exported to the Netherlands if it complies with strict legal and non-legal European Union requirements²³, e.g. related to food safety and hygiene. More information about sustainability, international standards and regulations can be found in Annex.

Europe has a large coffee market, accounting for about one-third of global consumption²⁴. Germany, Italy, and Belgium (1,072,000; 597,000 and 333,000 tons respectively in 2021) are the largest importers of green beans. Most green bean coffee imports to the Netherlands are inter-European, and in 2020 only 36% arrived directly from coffee bean producing countries. The Netherlands plays a key role in coffee roasting²⁵.

Coffee

Competition in the coffee sector is strong, and the low-end coffee sector is difficult due to bulk buyers and established large chains. There are more possibilities with specialized sub-sectors. However, the **Dutch coffee market values sustainability and is therefore an important market for certified (organic, fair trade, direct trade) and higher-end coffees**, meaning more Arabica, less Robusta or mixed beans. These may not have certification labels, but often include delivering social impact and sustainable practices and long-term contracts are usually in place. These high-end coffees are usually sold by specialty roasters, but increasingly enter higher end supermarkets²⁶. Whereas the CBI website²⁷ provides many examples of coffee brands and coffee origins, coffee from Indonesia is not mentioned on their website at all.

Natural rubber

During this study, we did not find natural rubber processing companies in the Netherlands. Most rubber is processed in the tire industry, which is more relevant in France (e.g., by Michelin), Germany (e.g. by Continental) and Italy (i.e. e.g. by Pirrelli). The EU Deforestation Regulation (EUDR) also includes natural rubber. As a result, there is an increasing interest globally on how to make the production of this commodity more sustainable. Four companies have already committed to producing sustainable natural rubber, namely Barito, Socfin, Olam and Halcyon Agri²⁸.

Spices

Europe is one of the leading importers of spices, accounting for about 28% of total global production. About 14% of total European imports of herbs and spices in 2021 were to the Netherlands. The Port of Rotterdam in The Netherlands appears one of the most important European hubs for spices, after Hamburg, Germany, to serve other European markets²⁹. The Netherlands has an important spice-processing industry and is a re-exporter of spices, particularly spice mixtures, to Germany (6.5% of German imports).

²² DISCO Annual Report 2021 (https://www.idhsustainabletrade.com/uploaded/2022/12/DISCO-Report 161222 final.pdf)

²³ https://www.cbi.eu/market-information/cocoa-cocoa-products/netherlands/market-entry

²⁴ https://www.cbi.eu/market-information/coffee/what-demand

²⁵ https://www.cbi.eu/market-information/coffee/netherlands-0/market-entry

²⁶ https://www.cbi.eu/market-information/coffee/netherlands-0/market-entry

²⁷ https://www.cbi.eu/market-information/coffee/netherlands-0/market-entry

²⁸ https://www.worldwildlife.org/projects/transforming-the-global-rubber-

 $[\]underline{market\#:} ``text=Four\%20 companies\%20 have\%20 also\%20 committed, Socfin\%2C\%200 lam\%20 and\%20 Halcyon\%20 Agri.$

²⁹ https://www.cbi.eu/market-information/spices-herbs/what-demand

Almost 8% of the supply of spices to the Netherlands comes from Indonesia, particularly cinnamon and nutmeg. The import of spices to the Netherlands has increased (7.3% annually), but the import from Indonesia has declined between 2017 and 2021 (4% annually).³⁰ The increasing substitution of salt and sugar in many EU countries drive the use of spices and herbs in the European food industry.

Although the need for sustainable spices is clear, the market demand is only recently starting to grow, possibly because the promotion of sustainable spices by companies is challenging since they are an important ingredient but not the main substance in the end-products³¹. Further, the organization of the value chains for the large number of spices and their origins is considered a challenge.

Palm oil

Palm oil is the world's most traded vegetable oil, with Europe importing 10.6% of Indonesian palm oil³² exports in 2021. The Netherlands covered roughly 21% of these European imports, totaling ~636 million USD in 2021. Whereas Malaysian palm oil exports to the Netherlands were significantly higher, covering approximately 1.3 billion USD in 2021, The Netherlands clearly is a key player in the Indonesian palm oil export to Europe as well.³³

Many leading palms oil companies engage in No-deforestation, No-peat and No-exploitation (NDPE) commitments, and there is evidence that deforestation linked to oil palm expansion has reduced significantly over the past few years. Decreasing deforestation could be established by further protection of High Conservation Value Area (HCVA) and High Carbon Stock Area (HCSA)³⁴. The EU anti-deforestation legislation (EUDR) targets palm oil imports, and European market players are increasingly concerned about traceability, corporate social responsibility and responsible sourcing (Luttrell et al., 2018; Purwanto and Jelsma, 2020).

Although palm oil imported to the EU is required to meet certain sustainability criteria, there does not appear to be a high-end consumer market that is interested in purchasing palm oil from agroforestrybased systems, or palm oil with specific origins. The CBI even provides advice on their website to companies that want to replace palm oil in their cosmetics with oils that have less associations with deforestation³⁵.

3.3. Conclusions

Smallholder and family farming agroforestry in Indonesia has become an important livelihood at the household level and an important economic model at the national level. The production of major commodities such as cocoa, coffee, spices and rubber, has so far been dominated by family farm agroforestry and smallholder agroforestry systems. The challenge is that the productivity of family

³⁰ https://www.cbi.eu/market-information/spices-herbs/what-demand

³¹ https://www.idhsustainabletrade.com/initiative/sustainable-spices-initiative/

³² Palm oil values are taken from FAOSTAT and include item codes 2165 (palm oil) and 2169114 (palm kernel oil)

³³ FAOSTAT, visited 05-06-2023

³⁴ See also: Conservation Outside of Protected Areas-Lessons from West Kalimantan Policy Brief, May 2019: https://www.tropenbos-

indonesia.org/resources/publications/conservation+outside+of+protected+areas:+lessons+from+west+kalimantan

³⁵ https://www.cbi.eu/market-information/natural-ingredients-cosmetics/palm-oil-alternatives

farming agroforestry and smallholder agroforestry systems are still relatively low, compared to monoculture production systems, however, this varies between crops.

All the selected commodities are traded to Europe, including the Netherlands - from a larger (e.g., spices) to a smaller (e.g., natural rubber) extent. Agroforestry practices are frequently used for all selected commodities, except for palm oil production. Amid the climate and biodiversity crisis, efforts to increase the resilience and sustainability of agroforestry practices related to the above commodities are urgent. These efforts have started through regulations, market instruments such as standardization and certification, and multi-stakeholder initiatives. However, the practices of smallholder and family farming agroforestry are generally complex and have certain challenges that need to be tackled by certain or all stakeholders involved (see further Chapter 6).



CHAPTER 4. Key Agroforestry in Indonesia and the Netherlands and Relevant Global Collaborations and Multi-stakeholder Initiatives

Chapter 4. Key Agroforestry Stakeholders in Indonesia and the Netherlands, and Relevant Global Collaborations and Multi-stakeholder Initiatives

This chapter provides a description of key stakeholders involved in the development of agroforestry in Indonesia. The first section describes the key stakeholder groups (in-)directly involved in agroforestry and gives insight in the organizations interviewed under the different stakeholder groups for this study. The second part of the section (4.2) provides a selection of current agroforestry projects in Indonesia by Indonesian, Dutch and European organizations.

There are various global and Dutch, and commodity-specific collaborations and multi-stakeholder initiatives and platforms that promote sustainable agricultural, forestry or agroforestry practices, and that are relevant for the implementation and scaling of agroforestry. A summary of those initiatives is provided in section 4.3.

4.1. Key stakeholders and their roles in agroforestry

Within the value chain, and through the enabling environment, a range of stakeholders are involved in the development and promotion of agroforestry (see Figure 8) and they all have a different role to play.



Figure 8. Current collaboration between various stakeholders in agroforestry in Indonesia based on the interviews and FGDs conducted.

Distributed amongst the different stakeholder groups, a total of 44 Indonesian and Dutch stakeholders were interviewed by semi-structured interviews and/or focus group discussions (FGDs). Further, a 5 days' field visit to the Tembawang agroforestry project in Simpang Dua Sub District (West Kalimantan) was conducted where FGDs have taken place. The interviewees were selected based on discussions with the Embassy and/or based on their association with agroforestry-based production systems in Indonesia. These stakeholders and their associated organizations capture a variety of commodities or

value chains. Table 14 in Annex provides an overview of all stakeholders interviewed, including the type and name of the organization, and the contact persons. Annex shows also further details of these individual stakeholders and their current role in promoting or scaling agroforestry.

Policy makers

The Ministry of Environment and Forestry (MOEF) is the policy maker that plays the most active role in developing agroforestry in forest areas (see section 2.3). Another Ministry that is directly involved in the development of agroforestry through the Social Forestry Program is the Ministry of Finance, by providing financial support through specific mechanisms through Environment Fund Agency (BPDLH)³⁶.

Forest / farm communities and (smallholder) farmer organizations

Households and farmer groups have so far also played an active role in initiating agroforestry system inside and outside forest areas, by taking advantage of some opportunities, such as family labor, richness of forest tree species, government's development programs (such as social forestry); and other project opportunities from civil society organizations and market players. They also play a significant role in internalizing agroforestry into their social and cultural systems.

Knowledge centers

Knowledge authorities such as universities and research institutions generally play an active role in promoting, facilitating, and documenting agroforestry practices at the field and provincial level. They also provide practical knowledge and technology packages for the development of agroforestry. The term "agroforestry" itself was even originally constructed by the knowledge authorities, before being adopted into policy by the government. Universities and applied universities in the Netherlands (i.e. WUR, Van Hall Larenstein) are already focusing on many subjects related to agroforestry in Indonesia, including intercropping/multi-cropping, sustainable value chains, sustainable planting on peat and local development of agroforestry.

Consultancy firms/service providers

The government is a permanent service provider for agroforestry development by providing technical and financial assistance and increasing market access.

Other service providers include NGOs, knowledge authorities and specific market players as they provide tools and services to local parties in support of (among others) agroforestry projects in Indonesia. With these tools and techniques, (smallholder) farmers, cooperatives and their supporting organizations (either NGOs or social enterprises) can improve their farming techniques, farm management, select suitable trees, define the number of trees/crops to be planted and can potentially estimate the growth of the trees and their potential income from the sales of the commodities and carbon credits. Service providers can also support with market access.

NGOs

NGOs play a role both in directly supporting farmers and communities, and in guiding the implementation of projects, NGOs support (smallholder) farmers and cooperatives with policy advocacy, facilitating and strengthening of local community institutions, securing tenure systems,

³⁶ See also: https://bpdlh.id/

business development, market access, and finance. Also, focus of NGOs is on fighting poverty, equal chances for and empowerment of girls and women, and minimizing degradation, and on co-financing, co-creating and certification. For example, the issuance of government policies in support of family farming agroforestry, such as social forestry and *Jangka Benah*, has been driven by NGOs' advocacies at the regional, national, and global levels.

Social enterprises

Social enterprise players have recently begun to grow, in line with the intensification of the Social Forestry Program. They play an active role in absorbing commodities produced by family farming agroforestry, timber or non-timber. Apart from that, they also provide extension services regarding good agriculture practices, starting from providing quality plant seeds, improving management systems, post-harvest management, and market access for commodities and carbon credits.

Trading companies

Dutch and Indonesian companies and market players are generally not directly involved in the development of agroforestry, other than conducting market transactions, either directly or indirectly through, e.g. social enterprises. Many companies are not even aware that the commodities being traded are produced through family farming agroforestry. Other indirect involvement of companies in agroforestry involves, for example, providing funding schemes for environmental development and community empowerment, through the scheme of corporate social responsibility (CSR). However, CSR is not specifically aimed at developing agroforestry. Companies and other market players currently do not necessarily promote agroforestry in Indonesia.

Large-scale importers to Europe or the Netherlands usually have minimum volume requirements starting at around 10 containers, covering a wide range of qualities, varieties and certifications. Examples of medium- and large-scale importers in the Netherlands include J&B Commodity Trading, S&D Sucden, Greencof and Bijdendijk³⁷. These supply coffee to large roasters and mainstream retailers in Europe³⁸. Specialized importers are able to buy small and mid-sized volumes of high-quality and single origin coffees. Examples of specialized importers in the Netherlands are: Daarnhouwer & Co, Trabocca, This Side Up and The Coffee Quest³⁹. Coffees from these importers end up partly in mainstream retail, organic retail and specialty shops. In 2021, the Indonesian Embassy in The Netherlands hosted a Coffee Cupping event, in which it promoted 36 special coffee varieties and brought together farmers, roasters, importers and other Dutch and Indonesian stakeholders⁴⁰.

Financial service providers

Financial service providers such as banks play an active role in funding the production of agroforestrybased export commodities, in accordance with market mechanisms, e.g., through investments or providing loans. Within Indonesia, there is no specific credit scheme to support the development of family farming agroforestry.

³⁷ <u>http://jbcommoditytrading.com/;</u> <u>https://www.sucden.com/en/products-and-services/coffee/;https://www.greencof.com/;</u> <u>https://www.bijdendijk.nl/?lang=en</u>

³⁸ <u>https://www.cbi.eu/market-information/coffee/netherlands-0/market-entry</u>

³⁹ <u>https://daarnhouwer.com/;</u> <u>https://www.trabocca.com/;</u> <u>https://thissideup.coffee/;</u> <u>https://www.thecoffeequest.com/</u>

⁴⁰ https://kemlu.go.id/thehague/en/news/15782/indonesia-promotes-36-specialty-coffee-varieties-in-the-netherlands

Multi-lateral organizations

Multilateral organizations have been playing an active role in the development of agroforestry, by mobilizing supporting funds for specific projects regarding climate change and community-based natural resources management, especially social forestry. Additionally, multi-lateral organizations provide information, knowledge and connections related to climate, nature, pollution and sustainable development, including the development of agroforestry systems.

4.2. Current agroforestry projects in Indonesia by Indonesian, Dutch and European organizations

Several Dutch based and/or Dutch related organizations have initiated and developed agroforestry projects in Indonesia. A selection is provided in Table 8 with details and weblinks of the projects provided in Annex . Next to that, also additional support is provided to strengthen the enabling environment. For example, the Coordinating Ministry for Economic Affairs and the KEHATI Foundation (with the support of UK CCU)— through the Sustainable Palm Oil Support Indonesia (SPOSI) project— encourage the development of agroforestry into the *Jangka Benah* policies. Meanwhile, the MoEF (with the support of Global Environment Facility/GEF and World Bank) encourages the strengthening of agroforestry practices through social forestry. Supported by the Ford Foundation, the KEHATI Foundation provides some extension services for coffee agroforestry in East Nusa Tenggara.

Project or program	Period	Initiators and implementers		
Agroforestry: Our Natural Climate	Since 2014	Nespresso, OLAM (since 2016) and PUR Projet (since 202		
Solution				
Fairventures Social Forestry		Fairventures, LDN Fund, IDH, Mirova		
Green Villages program in		Solidaridad and diverse stakeholders in business,		
Indonesia		government and the local communities		
IDH and Unilever project in Aceh		IDH and Unilever		
Tamiang, Indonesia				
Increase Earnings Capacity for	2017-2020	Jacobs Douwe Egberts (JDE), Louis Dreyfus Commodities		
Indonesian Coffee Smallholders in		(JDC)		
Indonesia				
KADIN Regenerative Forest		Indonesian Chamber of Commerce and Industry (KADIN)		
Business Sub Hub (RFBSH)				
Kopi Lestari: Agroforestry project	Established	PUR Projet		
in Indonesia	in 2013			
Landscape Approach to	Initiated in	United States Agency for International Development		
Sustainable and Climate Change	May 2023	(USAID) in partnership with Olam Food Ingredients (ofi),		
Resilient Cocoa and Coffee		Rikolto, Hershey's, and the Government of Indonesia		
Agroforestry (LASCARCOCO)				
Nescafé Plan 2030		Nestlé		

Table 8. Ongoing agroforestry projects and activities by Dutch, European and Indonesian stakeholders in Indonesia

 (see Annex for further details about the projects)

Project or program	Period	Initiators and implementers	
Program: Transforming the Cocoa		implemented by Kalimajari (a local Bali-based NGO),	
Sector in Indonesia Through Value		Rainforest Alliance and Rikolto	
Addition for Smallholders			
(TRACTIONS)			
Project To Advance Regenerative		Danone, L'Oréal, Mars, Incorporated, The Livelihoods	
Agriculture		Funds, And SNV, Musim Mas	
Regenerative Robusta in Indonesia	Initiated in	Social enterprise Coffee (project partners: 100 farmers	
	2020	from Flores, Indonesia, Social enterprise, MVO, Asnikom,	
		Preta Terra, CCF, and Progreso	
Siak Pelalawan Landscape	Initiated in	Proforest and Daemeter (the Consortium of Resource	
Program (SPLP) in Indonesia	2018	Experts) – next to coalition members	
Smallholder replanting finance		Einancial Access Bank Sumut Livelihoods Eunds (13E) and	
and support program		Musim Mas	
The Sugar and Steam Project		AidEnvironment Dutch Ministry of Foreign Affairs (SDG	
Sustainable Intensification of		Partnership facility). RVO	
Agroforestry Production Systems			
in Indonesia			
White pepper Agroforestry in	Initiated in	Verstegen, ReNature and Preta Terra	
Indonesia	2019		
Working Landscapes Program	2019-2023	financed by the Netherlands Ministry of Foreign Affairs	

4.3. Key collaborations and multi-stakeholder initiatives

There are various global and Dutch, and commodity-specific collaborations and multi-stakeholder initiatives and platforms that promote sustainable agricultural, forestry or agroforestry practices. See Annex for more details about these main initiatives and multi-stakeholder platforms involved in promoting sustainable practices/ agroforestry in Indonesia.

The **Sustainable Agriculture Initiative (SAI) Platform**⁴¹ is a global organization created by the food and drink industry to communicate and to actively support the development of sustainable agriculture. The SAI has 170 members from small to large multinational companies and organizations. However, there is no mentioning of agroforestry as a cultivation practice on their website or in other documentation.

For cocoa, we found three initiatives, namely:

- **The Dutch Initiative for Sustainable Cocoa (DISCO)**: a public-private partnership active in the Dutch cocoa and chocolate sector working to sustainably improve the livelihoods of current and future cocoa farming families.⁴²
- **VOICE network**: a global network of NGOs and Trade Unions working on sustainability in cocoa, tackling issues such as poverty, deforestation and child labor.⁴³

⁴¹ https://saiplatform.org/

⁴² https://www.idhsustainabletrade.com/initiative/dutch-initiative-on-sustainable-cocoa-disco/

⁴³ <u>https://voicenetwork.cc/</u>

- The Cocoa Origins Program (ran from 2018-2021): supported companies using relatively small volumes of cocoa to become involved in sustainability projects at the origins of their cocoa supply chain and contribute to the overall sustainability of cocoa products linked to the Dutch market.⁴⁴

For coffee, we found two initiatives, namely:

- International Coffee Organization (ICO) is engaged in assisting its members with the development, fund mobilization, implementation, monitoring and evaluation of coffee sector development projects aiming to promote sustainable growth for the benefit of all stakeholders, from coffee farmers to consumers.⁴⁵
- Sustainable Coffee Challenge (SCC) is a collaborative effort of companies, governments, NGOs, research institutions and others to transition the coffee sector to be fully sustainable. The Challenge is facilitated by Conservation International, with the agenda and actions led by Challenge partners.⁴⁶

For spices, we found three initiatives, namely:

- **European Spice Association (ESA)** is a non-profit association that brings together the expertise of a wide group of people to promote the use of pure, safe and wholesome herbs and spices that are true to name and provide the quality and safety that is expected by the consumer.⁴⁷
- The Royal Dutch Spices Association (Koninklijke Nederlandse Specerijenvereniging/KNSV) is a member of the European Spice Association (ESA), and strongly supports sustainable sourcing of spices. It consists of 70 members. ⁴⁸
- The Sustainable Spices Initiative (SSI) is a sector-wide consortium established in 2012 by IDH, bringing together an international group of NGOs and spices and herbs companies, who aim to sustainably transform the mainstream spices sector, thereby securing future sourcing and stimulating economic growth in producing countries.⁴⁹ The SSI has supported Rainforest Alliance to develop their standard for spices certification. Other certification standards recognized by SSI members include Fairtrade, Fair for Life, FSA, UTZ, and GlobalG.A.P. .

For rubber, we found one initiative, namely:

- Global Platform for Sustainable Natural Rubber (GPSNR) brings together companies, smallholders, academia and civil society to transform the natural rubber supply chain into a sustainable, equitable and fair one. ⁵⁰

For oil palm, we found two initiatives, namely:

SustainPalm, which is a joint implementation program between Indonesia and The Netherlands to support sustainable palm oil production in synergy with the Sustainable Development Goals (SDGs). The program will be executed in Communities of Practice (COPs) and in geographically based Living Labs (LL), where multiple stakeholders are responsible for local implementation of interventions with smallholders, company plantations and mills, and for addressing barriers to implementation. The COPs serve to facilitate the sharing of experiences between Living Labs, capacity building of

⁴⁴ <u>https://www.idhsustainabletrade.com/initiative/cocoa-origins/</u>

⁴⁵ https://icocoffee.org/

⁴⁶ <u>https://www.sustaincoffee.org</u>

⁴⁷ https://www.esa-spices.org/

⁴⁸ <u>https://www.specerijenvereniging.nl/</u>

⁴⁹ https://www.idhsustainabletrade.com/initiative/sustainable-spices-initiative/

⁵⁰ <u>https://sustainablenaturalrubber.org/</u>

local service providers, joint assessments, and as a vehicle of joint actions to assure conducive enabling environments, needed for scaling at a national and international level. ⁵¹

 Roundtable on Sustainable Palm Oil (RSPO) is a not-for-profit multi-stakeholder platform that brings together stakeholders across the supply chain to develop and implement global standards for producing and sourcing certified sustainable palm oil.⁵²

4.4. Conclusions

There is much awareness of agroforestry and its benefits (see Chapter 5) and challenges (Chapter 6) among the various stakeholders, which is shown in the number of projects and programs already being implemented.

So far, and as discussed earlier, each stakeholder has played a role in partnerships for developing agroforestry, but in a relatively isolated manner and by using limited and segmented resources. Most of the partnerships we've analyzed involved bi-lateral partnerships (for example, consultancy and company, social enterprise and company, NGO with company), or involved three to four partners. Often, some key stakeholders were missing.

There are a variety of commodity-specific collaborations and multi-stakeholder initiatives and platforms that promote in one way or the other sustainable agriculture, sustainable forestry or agroforestry practices. These can be very relevant for the implementation and scaling of agroforestry. However, we did not find a horizontal cross-commodity or multi-stakeholder initiative or platform that focuses specifically on promoting agroforestry systems or practices.

Regenerative agriculture platforms may be of use in scaling agroforestry practices.

⁵¹ https://www.wur.nl/en/project/sustainpalm-sustainable-oil-palm-indonesia.htm

⁵² https://rspo.org/



CHAPTER 5. Environmental, Social and Socio-economic of Agroforestry

Chapter 5. Environmental, Social and Socio-economic Benefits of Agroforestry

Agroforestry systems can be socio-economically and ecologically viable on the longer term. Agroforestry is perceived by all Indonesian and Dutch stakeholders interviewed to provide various environmental, social and socio-economic benefits. Therefore, under the threat of the climate change, deforestation and biodiversity crises, mainstreaming agroforestry as a production system that supports not only local interests, but also national and global interests, is a necessity. This chapter will discuss the various benefits of agroforestry, both from an environmental, social and socio-economic perspective.

5.1. Environmental benefits

Sustainability and biodiversity

Agroforestry is a production system which allows combining trees with agricultural production, resulting in the conservation of or increase in biodiversity. Local communities practicing agroforestry can transform natural forests into productive agroforestry systems without deforestation. Also, they can support the regeneration of degraded lands by transforming those into smallholder agroforestry systems, such as in the Gula Gula project in West Sumatra⁵³.

The biodiversity reported in a study by Foresta and Michon (2000) about natural forest conversion into agroforestry was quite high: a plot of 400 m² (about the area of a basketball court) contained more than 50 plant species. In terms of vegetation structure, *pekarangan* and *talun* agroforestry could be considered as a forest replication, since it consists of 3-5 vegetation strata from the soil to the top of the canopy, at about 35 m of height (Foresta and Michon, 2000).

Interviewees, including social enterprises or the involved smallholders and communities, confirmed to experience the return of megafauna (such as tigers, monkeys and apes), but also insect populations to the landscapes, the latter improving pollination. However, the return of megafauna, such as tigers and elephants to production landscapes, is not always appreciated as it can lead to human-wildlife conflicts.

In addition, trees can also improve soil structure, and prevent or reduce soil erosion and landslides, the latter being particularly evident and important in the higher slopes, due to the strong rooting system around the soil matrix (Dollinger et al. 2018; DeSouza et al. 2012). The presence of trees in agroforestry systems can also improve microclimatic conditions through shading which reduces the sun radiation and improves the buffering of the temperature around the farm (Lott et al. 2009). The interviewees indicated that agroforestry generally uses less pesticides, herbicides and fertilizers, compared to conventional monoculture systems, leading to reduced soil and air pollution, and reduced carbon emissions.

⁵³ https://gulagula.org/en/

Improved water conservation and hydrology

Another ecological benefit and ecosystem service of agroforestry is improved water conservation and hydrology, due to the optimal water uptake by the integrated tree-crop system. Research shows that during the dry season, only about 25% of the rainwater was transpired from plant biomass, indicating the efficiency of the system in utilizing off-season rainfall. Meanwhile, the rest of the water remains in the soil layers even after the harvesting period. Improved soil organic matter in agroforestry systems due to the addition of organic amendments can increase water retention, and therefore prevents excessive evaporation or water runoff (Rawls et al. 2003).

Box 4. Coffee agroforestry and their benefit to improving watershed functions

ICRAF has worked on coffee agroforestry production systems in Indonesia for many years. Whereas in the early years, coffee was regarded as an enemy of the forests, with the government actively removing coffee trees from the forests, this has changed over time.

ICRAF's research demonstrated that coffee production systems can maintain watershed functions and it has become an accepted mixture of agriculture and forests. This subsequently reduced conflict between local populations and the government.

Carbon storage and climate change mitigation

Agroforestry systems in tropical regions are important sinks of atmospheric carbon, particularly due to the presence of tree biomass, but also due to reduced soil erosion, improved soil structure and increased soil organic matter (Gupta et al., 2017). It therefore has much potential to become an important climate change mitigation strategy in favor of various national and international policies.

Empirical studies show that the carbon sequestration potential in aboveground components of agroforestry systems is estimated to be about 2.1×10^9 tons of carbon/year in tropical biomes and 1.9 $\times 10^9$ ton of carbon/year in temperate biomes (Oelbermann et al., 2004). In the humid tropics, over 70 tons of carbon/ha was sequestrated in the top 20 cm of the soil of agroforestry (Mutuo et al., 2005). According to Nair et al. (2010), the available estimates of carbon stored in agroforestry ranges from 0.3 to 15 tons of carbon/ha/year aboveground, and 30–300 tons of carbon/ha/year belowground (up to 1 m depth of the soil). Atangana et al. (2014) also reported that shaded perennial crop-based agroforestry systems have great potential for soil carbon sequestration.

Climate adaptation and climate resilience

In general, smallholder and family farming systems are quite vulnerable to climate change, including increased droughts, floods, fires and winds (Verchot et al., 2007). Farmers generally do not have adequate resources to adapt to climate change, thereby risking the loss of their livelihood and access to food.

Agroforestry has the potential to increase the farms' resilience to micro-shocks, climate change and extreme weather events, such as strong winds, floods, droughts and high temperatures, both at the local and landscape level, and can thus play a role in climate change adaptation (Ekpo and Asuquo, 2012; Hoang et al., 2014, Lasco et al., 2014). Particularly the tree component in agroforestry systems has

played a significant role in enhancing land productivity and improving livelihoods (Murthy et al., 2013) through the provision of multiple direct and indirect ecosystem goods and services.

5.2. Social and socio-economic benefits

Food security

Agroforestry is perceived by the stakeholders interviewed as a more resilient production system, compared to conventional agriculture, due to the increased crop and tree diversity. Because of agroforestry, there is less dependency on the performance of and market price for a single crop, and income can be distributed throughout the year. Further, food crops planted in the first 5 years or during entire life cycle, including fruit and vegetables, can be mixed with cash crops. This not only improves diet and food security, but also results in an improved and diversified income, and contributes to poverty alleviation.

According to Ickowitz et al (2016), there is a correlation between agroforestry and increased consumption of legumes at the national level. At the regional level, there is a correlation between the presence of agroforestry and the increased consumption of fruits and leafy vegetables rich in vitamin A. Agroforestry was also associated with higher meat consumption, particularly from those farmers adopting silvo-pastoral practices (Ickowitz et al. 2016). Increased volume of food productivity and diversity was also shown among the lower-income farmers who had engaged in agroforestry training, indicating higher food availability following the implementation of agroforestry (Pratiwi et al. 2019).

Analysis of the other studies also indicate that traditional and commercial agroforestry contribute to food security in diverse ways: for example, traditional home gardens offer 20% more dietary diversity than commercial counterparts, while commercial farms may contribute up to five times more income (Dufy et al. 2021). Nearly all agroforestry systems offered indirect benefits to food security, such as allowing more off-farm work than conventional agriculture and contributing to environmental stability: users of agroforestry were found by one study to collect 83% less fuelwood from natural forests. Agroforestry can enable a more stable environment for food security through ecosystem resilience and services brought by the functional diversity and species interactions of its inherent biodiversity (Rahman et al 2017).



Figure 9. Studies on agroforestry in Indonesia, mostly related to food security (Duffy, C., Toth, G.G., Hagan, R.P.O. et al. Agroforestry contributions to (smallholder) farmer food security in Indonesia. Agroforest Syst 95, 1109–1124 (2021). https://doi.org/10.1007

Livelihoods and income

Local production systems in rural areas, including smallholder and family farming agroforests, are generally considered by outsiders as mere "kitchen gardens", solely devoted to subsistence production of food and firewood. However, the generalized perception of agroforestry being solely devoted to subsistence production is not necessarily supported by the literature. Studies show the substantial economic contributions of agroforestry to local communities compared with conventional agriculture. Some sources describe various agroforestry systems as "living savings accounts" (Roshetko et al. 2013; Prihatini et al. 2018). The adoption of a coffee agroforestry system in Lampung (Sumatra) contributed to more than 50% of the household income compared to only 12% from conventional agriculture. Finally, two studies compared agroforestry options to conventional options, and found agroforestry to have up to (a) 98% and (b) 65% greater net present value (for periods more than 30 years) compared to (a) slash & burn and (b) maize or rice production (Wibawa et al. 2005; Rahman et al. 2017). Meanwhile, the contribution of cocoa agroforestry in Sulawesi on average contributes more than 50% to the household income, compared to 40% from cocoa monocropping systems. According to the interviewees, agroforestry can also lead to reduced farm-level costs, for example, because of lower farm management and labor costs, but also the reduced costs for agrochemical costs, including pesticides, herbicides and fertilizers.

5.3. Social and societal benefits

Firstly, interviewees indicated that the development of agroforestry can increase a feeling of pride among farmers, given that these are built on existing local systems, crops, technology and knowledge. Various interviewees indicated that agroforestry systems, when well-planned and productive, may also keep or attract younger people back to the villages, under the condition that those systems are based on successful business models. This may help overcome the losses in human capital and agricultural labor in the villages.

Companies and social enterprises also suggested that supporting farmers with the development of agroforestry systems in Indonesia, or the sales of agroforestry-based commodities contributes to the SDGs, supports CSR-programs of companies and provides a "Do good" feeling. The development of agroforestry also provides a means to compensate for or rectify historical deforestation by companies.

5.4. Conclusions

There is consensus in the literature and among the stakeholders interviewed that agroforestry can contribute to climate change mitigation and adaptation, improved soil and farm health and water conservation, while contributing to improved food security, income, and environmental stability.

Apart from that, various stakeholders have different emphasis on the benefits of agroforestry. Local communities generally prioritize social and socio-economic benefits over other benefits. Meanwhile stakeholders, such as the government, companies and civil society organizations as well as experts at universities, prioritize environmental benefits over others.

Agroforestry can provide an original model of a sustainable and profitable production system suited to conditions prevailing in farms and offers numerous benefits. The potential benefits of agroforestry are, however, only fully realized when the system is carefully developed and thoughtfully adapted to the local context. This required combination of knowledge, skills and resources can be challenging and is further discussed in Chapter 6.

Perceived positive impacts of agroforestry

Perceived positive impacts:

Environment/ecology

- Improves soil structure and quality/organic matter
- Reduces/prevents erosion
- Improves hydrology
- Maintains/increases forest cover
- climate change adaptation and mitigation
 - Improves microclimate and contributes to mitigation of climate change
 - Increases resilience to microshocks, climate change and extreme weather events (winds, floods, droughts, high temperatures)
- Increases carbon stocks (if previous carbon stock is lower)
- Reduced use of pesticides, herbicides and fertilisers leads to reduced pollution and emissions
- Increases biodiversity (flora/fauna, insect populations, pollination)

Agroforestry Plot level: Agroforestry Intercropping/diverse systems Regenerative agriculture

- Landscape level: patches in monoculture (e.g. oil palm) plantations/concessions
- Policy level:
 - At the interface agriculture and forestry
 - Bridging dichotomy: integration agriculture

Perceived positive impacts: Social/societal

- Dealing with demographic changes:
 - Attracting (younger) people back to the villages for better business models
 - Overcome lack of labour
- CSR/"Do Good" feeling: commitments to living wages
- Dealing with landscape-level developments
 - Providing alternative livelihoods/land uses to people
 - e.g. diversifying monoculture oil palm landscapes
 - e.g. for the Dayak communities in Kalimantan
- Increases pride: building on existing systems and commodities/crops and technology/knowledge
- Agroforestry-based land sharing between companies and communities can reduce land conflicts
- Positive impacts on Sustainable Development Goals: "Do Good" feeling for companies
- "compensation"/rectifying historical deforestation by companies

Figure 10. A quick scan overview of perceived positive impacts and benefits of agroforestry in Indonesia based on interviews with Dutch and Indonesian stakeholders.

Perceived positive impacts: Finance/business

- Resilience due to crop diversity leads to more stable
 production systems and supply chains
- Reduces agrochemical costs (pesticides, herbicides, fertilisers)
- Commitments to net-zero, no-deforestation and living wages make companies future-proof
- "Do Good" CSR and/or marketing
- Spreading risk:
 - Smallholders:
 - Less dependency on 1 crop
 - If crop fails
 - Food (fruit & vegetables) crops can be mixed with (non/cyclical) cash crops to improve diet and food security (in first 5 years, or during entire life cycle)
 - Improved and diversified income: contribution to poverty alleviation (particularly if feeding into accessible niche markets)
 - Matching labour demand to availability
 - Better income distribution throughout the year
 - Company:
 - Land-sharing:
 - Positive impact on resolution of conflicts
 - Additional income to company



CHAPTER 6. Key Issues and Challenges for Mainstreaming and/or Upscaling Agroforestry

Chapter 6. Key Issues and Challenges for Mainstreaming and/or Upscaling Agroforestry

In Indonesia, various commodities, including cocoa, coffee, rubber, and spices, have been traditionally produced in extensively managed agroforestry models, both within and outside the forest zone, on subsistence, semi-commercial, or commercial scales. Despite the benefits of agroforestry, its development faces a variety of challenges hindering the scaling of agroforestry systems and realizing its full potential. The various challenges and the, sometimes different, perception of the types of challenges between Indonesian and Dutch stakeholders are discussed in the sections below.

6.1. Complexity

As perceived by Indonesian stakeholders

Agroforestry systems can be considered complex. Its presence in remote locations in frontier areas, uncertain commodity production volumes and predominance of small-scale farming contribute to this perception.

Additionally, agroforestry is sometimes perceived by companies, investors, and policy makers from the non-forestry sector as a traditional and outdated production system. Meanwhile, the economic orientation of local communities is shifting towards a further integration within the market economy, focused on monoculture production while the profitability of monoculture commodities like palm oil and corn attracts attention.

As perceived by Dutch stakeholders

Some Dutch stakeholders interviewed indicated that they perceived agroforestry systems as new and complex production systems⁵⁴ which entail uncertainty in terms of management, production volumes, productivity and interaction between crops. The varying composition of primary and secondary crops from one agroforestry system to another requires different strategies in terms of capacity (building), knowledge, inputs, finance and market access. In other words, the stakeholders involved, particularly the (smallholder) farmers, need to become experts in, for example, the cultivation of multiple crops, conservation and transportation of commodities and access to markets, and this takes time and money. Besides, not all farmers are willing to and/or able to experiment.

Box 5. Challenges in the field deserve a fair story

Plants compete for nutrients and sunlight, and the exact interactions between crops in a certain location are still poorly understood and have been limitedly verified in the field⁵⁵. Also, the prices forcertain commodities fluctuate, for example, prices for clove are volatile⁵⁶. In general, a fair story needs to be presented to (smallholder) farmers and the traders involved.

⁵⁴ Based on interviews with Company, Social enterprises

 $^{^{\}rm 55}$ Based on interviews with Knowledge institutes

⁵⁶ Based on interview with Social enterprise

Additionally, agroforestry projects often involve a high number of (smallholder) farmers, often in different locations and socio-political circumstances, and collaboration with those (smallholder) farmers and coordination of the projects are considered challenging by companies and traders⁵⁷. A company indicated that they are not familiar with a "structure" in Indonesia to connect to in order to overcome these challenges. Also, the conversion from degraded lands, agricultural systems or forestry systems to agroforestry systems is considered a complex exercise.

All these factors make agroforestry systems very different from large-scale monoculture production systems (see Table 9 for a comparison), and particularly financiers and traders of those commodities do not seem to be familiar with such complexity and the uncertainties and risks involved.

Factors	Monoculture	Agroforestry	
Number of (smallholder)	Medium	High	
farmers or cooperatives			
involved			
Diversity of the system	Homogeneity	Heterogeneity	
Design	Selection of 1 crop or tree	Selection of multiple crops and trees	
Development of the site	Homogenous	Heterogeneous	
Management (inputs, pruning,	Of only 1 crop or tree	Of multiple crops and trees, so high	
harvesting)		variation	
Productivity, production	Based on 1 crop and its products	Based on multiple crops, products	
volumes and income		and services	
Capacity, knowledge and	Needed for 1 crop	Needed for multiple crops and their	
experience		interactions	
Logistics/transportation	Needed for 1 crop, usually in 1	Needed for 1 crop, usually in multiple	
	season or throughout the year	seasons or throughout the year	
Marketing, market access and	Generally, 1 buyer	Generally, multiple buyers	
buyers			
Finance	Considered low to high risk	Considered medium to high risk	
		because of above complexities	

 Table 9. Overview of factors that make agroforestry systems being perceived as more complex than monoculture systems

Challenging to convince (smallholder) farmers if they see monocultures as the golden standard Traditional knowledge on agroforestry is fading away with the aging of people and may become less relevant in transforming landscapes⁵⁸. Instead, knowledge from companies is often regarded by (smallholder) farmers as modern and superior, namely the Golden standard⁵⁹, while this knowledge mostly involves the development and management of monoculture production systems and high productivity. This makes it challenging to convince (smallholder) farmers of working in agroforestry systems⁶⁰. The image of these companies as examples of desirable practices may need to be changed⁶¹.

⁵⁷ Based on interviews with Company

⁵⁸ Based on interview with NGO; Service provider

⁵⁹ Based on interview with Service provider

⁶⁰ Based on interview with Social enterprise

⁶¹ Based on interview with Service provider

6.2. Lack of economic viability, particularly in the first years

As perceived by Indonesian stakeholders

Traditional agroforestry practices, such as *tembawang* in West Kalimantan and *parak* in West Sumatra generally have a low productivity and consequently provide a low income. As a result, they are increasingly being converted into monoculture plantations, particularly for oil palm cultivation. Also, as informants reported, now the clearing of new land for agroforestry is generally further away from settlements, posing a challenge for the younger generation interested in agroforestry development. Moreover, the older agroforestry systems that are still managed by their parents have become less productive, necessitating the replanting of cash crops like rubber, coffee, and cocoa.

As perceived by Dutch stakeholders

Economic viability in the long term, but finance needed in the first years of development

It takes 4-8 years before agroforestry systems produce the first outputs and it takes about 15 years for trees to mature. These young agroforestry systems, with young trees and shrubs, are not considered economically viable⁶² because in these early years, the overall productivity and thus income are low especially without the implementation of high-quality seedlings. This period must be bridged financially. Once mature, agroforestry systems have the potential to become economically viable⁶³. Older agroforestry systems have lost their productivity and therefore also their economic viability. Companies, projects and financiers often need relatively quick returns or repayments, which may not be possible with agroforestry due to the long development stage compared to conventional production systems⁶⁴.

Risks and costs to make the transition

Conversion from a conventional system to an agroforestry system involves risks and costs⁶⁵, and results in lower yields in the first few years since soils need to recover and tree species generally take 4-8 years to produce⁶⁶. Particularly, the productivity of the primary crop decreases when a share of the crop is replaced by other species, which is the case when, for example, shade trees are added to monoculture cocoa and coffee systems.

Undervaluation of long-term benefits

A narrower focus on profit and short-term economic benefits might outcompete a more holistic, economic approach, where the environmental benefits remain undervalued. It is important to demonstrate the benefits with cases.

⁶² Based on interviews with Social enterprise, Company, Social enterprise

⁶³ Based on interviews with Social enterprise, Company

⁶⁴ Based on interviews with NGO; Knowledge institute

 $^{^{\}rm 65}$ Based on interview with NGO

⁶⁶ Based on interview with Social enterprise

6.3. Unharmonized laws, policies and insufficient government support

As perceived by Indonesian stakeholders

Sectoral – Lack of aligned policies and insufficient attention for GAP

The integration of family farming agroforestry into the Social Forestry Program and the *Jangka Benah* initiative has not been effectively consolidated with the Ministry of Agriculture's development program for family farming. As a result, issues regarding productivity and good agriculture practices (GAP) have not received sufficient attention within the context of social forestry. The low productivity of family farming within the Social Forestry Program, and the lack of attention for increasing agricultural productivity, can be attributed to these sectoral policy challenges, primarily influenced by a forestry-oriented mindset.

Mismatch

Interviews with various sources indicate that the development of family farming agroforestry through social forestry is not matching. Agroforestry development programs through social forestry are often mismatched and existing agroforestry practices such as *tembawang* in West Kalimantan, mostly are not incorporated with the Social Forestry program. Areas that are considered feasible for Social Forestry (SF) schemes are mapped in PIAPS (*Indicative Map of Social Forestry Area*). This map is developed on the basis on inputs from various sources, including civil society organizations. It is shown that PIAPS has identified potential Social Forestry areas in open and unproductive forest lands than on productive agroforestry. The latest Social Forestry Indicative Map (PIAPS 2023) covering an area of more than 15 million hectares, has not been able to fully adopt existing agroforestry practices. A closer look at the PIAPS shows that many areas are in remote forest areas, quite far (> 3 km) from community settlements, while the areas that have long been managed by communities as agroforests and mixed gardens are excluded for Social Forestry areas. In West Kalimantan, only 25-30% of existing agroforestry areas are included in PIAPS (Tropenbos Indonesia, 2020).



Figure 11. Map that shows the mismatch between IPLC's land used in the forest zone and PIAPS in West Kalimantan Province (Widayati et.al, 2019, from Tropenbos Indonesia Policy Brief).



Figure 12. Map that shows examples of comparison and mismatch between the PIAPS and SF Potential for Ketapang District (Widayati et.al, 2019, from Tropenbos Indonesia Policy Brief)

Competition - insufficient support for building capacity of agroforestry family farms

Through the Multi-Business Forestry Policy, the government has indirectly created new competitors for family farming agroforestry. Without the support of affirmative policies and appropriate policy strategies to build the capacity of agroforestry family farms, the competition between agroforestry family farming and industrial agroforestry may become imbalanced, given that the communities only have limited ability to access all production inputs. By contrast, forestry business actors do have strong access to the factors of production (means of production), both land for labor and capital.



Figure 13. Imbalance of supporting factors between industrial and family farming agroforestry.

Lack of secure land tenure

The lack of secure land tenure was considered a key issue that needs to be addressed in developing (smallholder) agroforestry systems.

Low government budget allocation for agroforestry development

The strong support for agroforestry policies (through the Social Forestry Program) is inversely proportional to the total budget of the Director General of Social Forestry and Partnership (PSKL), the institutions that have an authority to run and control the social forestry programs. This can be seen from the budget allocation managed by the Directorate PSKL 2015-2017 that the average is IDR 239.67 billion/ year, or an average of IDR 100 thousand/ ha (Zakaria et al. 2019) - if we refer to the results of the Partnership for Governance Reform study (2010), the average cost standard for Social Forestry development is at least IDR 300 thousand/ hectare. The low government budget allocation for agroforestry development is one of the obstacles that causes agroforestry conditions in the field level to be on average still underdeveloped. The limited budget for social forestry development forces the development of agroforestry to delay in the field and data source support is also very limited.

As perceived by Dutch stakeholders

Lack of coordination and (aligned) policies

Agroforestry is considered to be limitedly acknowledged in the policy domain and bureaucracy⁶⁷, which also results in that policies are lacking or not well coordinated. One stakeholder⁶⁸ experienced that agroforestry was being promoted by the local government, but that same local government was also promoting monocropping with high yielding crops, which goes against the design of agroforestry. It was also mentioned that import taxes for one oil/butter into the Netherlands and the EU was higher than import taxes for a similar oil and butter⁶⁹. As a result of these discrepancies, certain Dutch stakeholders do not experience being supported in their agroforestry-based practices.

Further, some Dutch stakeholders perceived a strict division⁷⁰ and competition⁷¹ between the forestry and agriculture departments. Other stakeholders⁷² experienced understaffing of the ICRI, which was undermining the seedling and seedling provision policy.

Box 6. Lack of policies as a hurdle

"In terms of policy support, they were lucky to have a mayor who was interested in working with the private sector. But what happens if he is no longer elected; many projects hinge on the person" (NGO, interview) "BAPPEDA supported planting of Macadamia nuts, but when they were harvested there was no market (NGO, interview)."

Potential challenging requirements for smallholders to comply with EUDR

Under the EUDR (see section 2.4), some of the requirements may be more challenging to comply with when companies work with (smallholder) farmers. One such example is the requirement that the product must be traceable to the plot of land by documenting coordinates of the plot. The EUDR could contribute to excluding oil palm (smallholder) farmers from the EU market, but also (smallholder) farmers that cultivate the other EUDR commodities, including coffee, cocoa and rubber. This means that the realities and needs of smallholder producers must be considered and adequate support measures should be provided in time. As a result, this could impact the cultivation of the commodities in agroforestry systems and the potential to scale agroforestry at the expense of state forest land.

 $^{^{\}rm 67}$ Based on interview with Knowledge institute

⁶⁸ Based on interview with NGO

⁶⁹ Based on interview with Social enterprise

⁷⁰ Based on interview with Knowledge institute

 $^{^{\}rm 71}\,\rm Based$ on interview with NGO

 $^{^{\}rm 72}$ Based on interview with NGO

6.4. Lack of knowledge, innovation and information

As perceived by Indonesian stakeholders

Lack of skills, information and market access

In the past, farmers' tree planting activities were often restricted by limited access to quality planting material, poor nursery skills and a lack of appropriate technical information (Daniel et al 1999; Gunasena and Roshetko 2000).

Lack of research(-ers) and innovation targeted on agroforestry

There is a need for research and innovation in agroforestry to develop new techniques and technologies that can improve productivity, increase resilience, and reduce risks.

As perceived by Dutch stakeholders

Lack of up-to-date local knowledge – integrated with evidence-based data

Scientific, traditional and local knowledge is needed to develop agroforestry systems. Much local knowledge is present, however, not all of this knowledge is efficient or up to date, and integration with new evidence-based data and knowledge would be useful⁷³.

Requires insight and understanding of local environmental contexts and dynamics, and risk-sharing Climate change is also already impacting monoculture plantations, but also agroforestry systems. A changing (local) climate, including higher temperatures, droughts, fires, unpredictable rainfall, floods and stronger winds, are considered important challenges by both farmers and companies⁷⁴. Climate change may impact the strategies that work now, but those same strategies may not work in the next 10 or 20 years.

Knowledge institutes and NGOs provide knowledge and support based on research, but potential risks remain on the (smallholder) farmers and, potentially, the traders involved.

"Droughts and strong winds due to climate change are negatively impacting the survival rates of young and/or small trees in agroforestry systems" (Company, interview).

Lack of information and data about agroforestry management and systems

As indicated earlier in this chapter, it is yet unknown how crops interact exactly in agroforestry or intercropping systems, and how agroforestry systems need to be managed to account for these uncertainties. Smallholder farmers and companies therefore need to acquire this knowledge and experience, while also waiting for the agroforestry systems to produce at a sufficient production level and a sufficient income.

⁷³ Based on interview with NGO

⁷⁴ Based on interviews with Social enterprises

There is also insufficient quantified data available on the productivity of agroforestry systems, since farmers generally do not record their yields and economic performance. As a result, there is much "guess work" instead of data-driven analyses and advice⁷⁵.

Lack of agroforestry-specific expertise

Certain experts from universities in Indonesia now involved in the development of agroforestry systems were not trained as such, but have a background in either forestry or agriculture due to the policy and bureaucratic system in Indonesia⁷⁶. As a result, they generally have more experience with monoculture production systems with one key commodity, and how to increase productivity and production volumes of that particular commodity, thereby not accounting for other important variables, such as interactions between the crops in agroforestry systems⁷⁷. Further, certain experts from knowledge institutions prefer not the reside long-term in areas where they are needed, while this could contribute to the development of agroforestry systems⁷⁸.

6.5. Lack of capacity (building and support)

As perceived by Indonesian stakeholders

Capacity needed among many stakeholders

Although many capacity building efforts have taken place, there are still many cases where the agroforestry systems have not yet improved. For example, in the case of cocoa agroforestry in Sulawesi, due to a lack of information and skills, and limited access to extension services, attacks by plant pests and diseases, such as fruit borer insects (PBK) ultimately becomes a challenge that the community cannot overcome.

Promotion of commercial agriculture on (smallholder) farms includes a technological "package" that entails a total reorganization of farming systems. In many cases it is indicated that (smallholder) farmers have little experience with intensive tree planting; and little access to technical information and seeds or seedlings. In Lampung (Sumatra), agroforestry and the productivity of those systems are limited by a lack of technical information, resources, and consultation.

Capacity building is critical to ensure that (smallholder) farmers, extension agents, policy makers, and other stakeholders have the knowledge and skills to effectively implement and support agroforestry practices. Farmers, for example, need to have the knowledge and skills to properly select and manage tree species, integrate trees with crops and livestock, and cultivate and process tree products for economic benefits. Extension agents and researchers need to have technical expertise to provide training and guidance to farmers and other stakeholders. Policy makers and institutional leaders need to understand agroforestry and its benefits to ensure that it is promoted and supported within national and local policies and programs.

⁷⁵ Based on interviews with Knowledge institutes

⁷⁶ Based on interviews with Knowledge institute, Service provider

⁷⁷ Based on interviews with NGOs, Service provider

⁷⁸ Based on interview with NGO

As perceived by Dutch stakeholders

Access to inputs and high-quality seedlings with regards to both the primary and secondary crops remains a challenge, particularly in remote rural areas⁷⁹. Besides, accessibility to labor, good transportation and markets is often a challenge as well, particularly in rural areas in the outer islands compared to the densely populated areas in Java⁸⁰. In remote areas, it may therefore be useful to focus on crops that are less labor intensive.

6.6. Challenge to generate business, offtake and market deployment

As perceived by Indonesian stakeholders

In the past, market opportunities and willingness to establish agroforestry systems could not always be translated directly into well-developed agroforestry systems. Smallholders also generally had weak market linkages and poor access to market information (Hammett 1994; Arocena-Fransico et al. 1999). With reference to the Ministry of Environment and Forestry (2022), the percentage of agroforestry practices that have capacity to running a business is very low. Only 0.5% of agroforestry practices that are involved in the Social Forestry Program could formulate a business plan, produce commodities, and generate market incentives, but about 9.3% are still struggling to get market incentives. About 43% have formulated a business plan, but are still struggling to generate a product. The highest percentage (i.e. 47%) have developed formal groups of community business, but are still struggling to formulate a business plan.

Fluctuating and low prices

In the case of rubber agroforestry in Kalimantan and Sumatra, the fall in rubber prices which has been going on for a long time (and never got back) has triggered the collapse of rubber agroforestry systems in many places, such as *tembawang* in West Kalimantan. Additionally, various pests and plant diseases could not be handled. As a result, farmers convert or leave their rubber agroforestry systems and choose to seek income from other sources, such as converting their agroforestry systems into oil palm or by becoming workers in oil palm plantations, mining, or other informal sectors.

Meanwhile, on the one hand the economic orientation of local communities is changing as they are increasingly integrated within the market economy, on the other hand the boom in new commodities such as palm oil and corn, which are generally produced in monoculture, promises better profits.

Risk for exclusion of agroforestry because of challenge to meet (standardized) requirements.

Making agroforestry as a global climate-friendly production system will most likely expose agroforestry to market instruments, such as standardization and certification. Lesson learned from the implementation of market instrument to smallholders' production, such as ISPO and RSPO on palm oil, smallholder production such as agroforestry will be problematic to meet the standards. The application of standardization and certification in agroforestry has the potential to create new exclusions for

⁷⁹ Based on interview with NGO

⁸⁰ Based on interview with Service provider

agroforestry. At least this happened when the Ministry of Environment and Forestry implemented agroforestry standards that required the number of trees in 1 hectare of land to be 100 trees. Based on this provision, there are many agroforestry models at the field level that cannot be classified as agroforestry, and therefore are not eligible to access extension services provided by the government.

Without an affirmative scheme, agroforestry standardization and certification may be profitable for forestry companies that are currently preparing industrial agroforestry under the umbrella of a multi-forestry business, but work restrictive for family farming agroforestry due to challenges to meet requirements. With the support of government subsidies (because they are treated as pro-climate and pro-environmental), industrial agroforestry can be developed by forestry corporates To ensure that family farming agroforestry also become competitive, (political) commitments is needed to provide an adequate market incentive and extension services, as well as affirmative scheme to standardization and certification).

As perceived by Dutch stakeholders

Challenges around scale and logistics

The volumes of the primary and secondary commodities that are produced in agroforestry systems are usually smaller compared to monoculture production systems, and as a result, transport advantages and economies of scale are not achieved⁸¹. There are direct and indirect costs involved which are not immediately quantifiable. For example, supply chain stability is important but not always easily justifiable to accountants⁸².

Marketing of agroforestry (niche) products: Lack of demand/ markets

Agroforestry entails the production of multiple commodities, and all these products need to be marketed, which may be a challenge⁸³. It is important to find markets for all produce (mainstream and niche). Certain agroforestry systems produce niche products, for which it is challenging to find a market and convince customers that they have "a good" product⁸⁴. Besides, there is not a specific market or consumer demand for commodities from agroforestry production systems, particularly not in Indonesia. In contrast, on export markets, a premium can be paid for agroforestry-based commodities⁸⁵ which may benefit (smallholder) farmers.

Capacity: Challenge to translate the agroforestry project into a business case

Overall, it is important to develop a strong business case specific for each (smallholder) agroforestry system, and (smallholder) farmers need to be aware of these business cases⁸⁶, and about the return on investments which are often uncertain and long term⁸⁷.

Challenge to link the product to off-takers and logistics

⁸¹ Based on interviews with Service provider, NGOs

⁸² Based on interview with NGO

⁸³ Based on interviews with Company, NGOs, Social enterprise, Service providers

⁸⁴ Based on interview with Social enterprise

⁸⁵ Based on interview with NGO

⁸⁶ Based on interview with NGO

⁸⁷ Based on interview with Knowledge institute

Some social enterprises indicated that it can be challenging to set up partnerships with trading companies⁸⁸. Companies are not always willing to invest in the development of the agroforestry system and production component of the commodities they are interested in, while finance is needed, particularly in the first years of development when the rates of return are close to zero. Additionally, some trading companies seem to be focused on and want to trade one single commodity, and do not focus on the agroforestry system as a whole and all its commodities⁸⁹. As a result, there is often engagement with many traders which is costly and time consuming for the (smallholder) farmers and the supporting organizations.

6.7. Lack of (economic) incentives

As perceived by Indonesian stakeholders

Referring to Susanto's article (Kompas, 9 June 2023), in general, the growth of agribusiness in Indonesia (including agroforestry businesses) is indeed relatively low, at least when compared to several countries in Southeast Asia, such as Thailand; even though statistically in macro level, its contribution is very real in maintaining national economic growth (around 47%). One of the biggest obstacles is considered the low incentives for producers, most of whom are smallholder or family farmers, both in terms of financial and technical support, as well as support for resource security (especially land), and other supports in the downstream sector such as market access.

Lack of governmental incentives

Through the Social Forestry Program, the government has provided agroforestry incentives, such as formalizing the tenure system, providing technical and financial assistance, and strengthening the market, but its capacity is very limited. Not all agroforestry practices can access government incentives. Therefore, the development of an agroforestry incentive system outside the government is necessary.

Lack of market incentives

So far, the market's resources have not been fully consolidated for the development of agroforestry and market incentives for commodities produced through agroforestry systems have not been sufficiently available. Several models of market incentives such as Corporate Social Responsibility (CSR) which is mandatory for companies in Indonesia, so far have not been fully devoted to the development of agroforestry.

At the same time, PES is currently only done by enormous international larger-scale oil palm producers and product user companies, partly through the Remediation and Compensation Procedure (RaCP) and Performance Based Payment for Ecosystem Services (PES) incentives for large-scale oil palm companies who apply or hold ISPO and RSPO certification. However, currently, due to a very weak regulatory framework and centralized (national) compliance verification that tends to trigger fraud/false verification, RaCP has not been mainstreamed, verified, and implemented properly.

⁸⁸ Based on interview with NGO

⁸⁹ Based on interview with NGO
Also, MoEF also is still very careful on allowing the PES scheme to be implemented in Indonesia by international companies to make sure the availability of social forestry or beneficiary areas to be linked to local certification submitter companies.

Apart from various existing incentive systems, the development of new incentive systems for agroforestry sustainability is a necessity. As previously mentioned, informal agroforestry models, such as *tembawang* in West Kalimantan, or *simpukng (forest gardens)* in East Kalimantan⁹⁰, tend to be excluded from these various incentive systems: they are in the forest zone, but out of reach of the Social Forestry Program. Such agroforestry models are widespread in many regions and require the support of a new incentive system.

As perceived by Dutch stakeholders

There are various projects and programs initiated by larger companies that stimulate agroforestry practices for the commodity itself (see e.g., Table 8). Besides, there are commodities from agroforestry systems that are being certified on the initiative of companies for which the farmers receive a certification premium (e.g. Rainforest Alliance, EKO, FairTrade and Organic). However, there is no specific premium in the market for the primary or secondary (niche) commodities that are produced specifically in agroforestry systems. As a result, the additional investments in agroforestry systems, and the additional benefits that arise from agroforestry systems are currently undervalued in the market.

6.8. Lack of access to 'traditional' finance

As perceived by Indonesian stakeholders

Traditional finance service providers usually find the financing of individual farmers or farmer cooperatives high risk and offer high interest rates on their loans. Also, community-managed agroforestry and family farming agroforestry access to finance might remain challenging since most of them are still household based.

Referencing Tropenbos Indonesia's case with Rubber Agroforestry in Simpang Dua Sub-District, one local financial institution, The Credit Union (CU, local Dayaks financial institutions), expressed no interest in further assisting smallholder rubber, including providing financial support. The major reason was that production is very low due to falling prices; while in addition, productivity is also low due to the local variety of rubber trees that agronomically has low productivity. Another factor that deters interest of CU, is the low quality of the latex produced, due to various factors, while the market demands good quality rubber. With the mentioned condition and conventional repayment schemes in monthly instalments, farmers will have difficulty paying back the loan on schedule.

Credit Union also often requires a business unit to take out a loan under one of its member's names. This leaves the loan signing member vulnerable to carrying the responsibility to return the loan if the business unit fails to accumulate profit. This case frequently occurred, since household-based

⁹⁰ https://www.sciencedirect.com/science/article/abs/pii/S0378112709000619

agroforestry is unregistered to the nearest Agricultural Office, thus commonly unsupervised by the government and doesn't have any legal standing. Agroforestry plots and agroforestry-based businesses situated near economic centers can have more options to access finance.

As perceived by Dutch stakeholders

Perceived as high risk

As indicated before, agroforestry systems are complex and need time to develop, which does not necessarily match with the systems finance providers work with generally, namely conventional or monoculture systems with higher rates of return that need short-term finance. The complexity of agroforestry systems is often poorly understood by banks and their bureaucratic protocols, and thus difficult to finance.

Lack of adequate financial mechanisms

Current investment criteria of financial institutions, including payback periods and interest rates, often do not match the characteristics of diversified production systems, such as agroforestry or restoration. Often, financial institutions do not have sufficient information to correctly estimate the risks and returns from investments in agroforestry.

For example, the loans banks can offer often do not match with what farmers need. For example, banks require to provide high loans and to ask for collateral, the latter usually not available⁹¹. Some finance providers do see opportunities of diversification and spreading of risk by the development of agroforestry⁹², however, finance is still not readily available for the development of agroforestry.

6.9. Conclusions

Mainstreaming and upscaling agroforestry requires support at all levels, not only at the level of (smallholder) farmers, but also at the level of policy makers, knowledge institutions and service providers, and companies and traders. Limited capacity of (smallholder) farmers to develop productive and sustainable agroforestry, policy gaps and limited government funding, practical scientific and technological innovation, as well as the availability of market incentives are challenges that need to be addressed.

As shown in Table 10, there is much overlap between the perceived challenges by Indonesian and Dutch stakeholders, although the focus differs at times. The Indonesian respondents identified more challenges related to policies, while the Dutch respondents focused more on the challenges related to knowledge, innovation and information.

⁹¹ Based on interview with NGO

⁹² Based on interview with NGO

Challenge	Perceived by Indonesian stakeholders	Perceived by Dutch stakeholders
(Perception) of complexity (in comparison with monoculture)	Perceived as complex and smallholder dominated ("outdated").	Considered new and more complex systems (compared to monoculture), e.g., knowledge of multiple crops needed.
Lack of economic viability (particularly in first years)	Low productivity and low income, and as result conversion to monoculture. Older systems are less productive.	Economic viability in the long term, but finance needed in the first years of development. Undervaluation of long-term benefits (including environmental ones). Risks and costs to make the transition.
Unharmonized laws, policies and insufficient government support	Good agricultural practices (GAP) get insufficient attention within the context of social forestry. Mismatch and lack of aligned policies. Insufficient support for building capacity of agroforestry family farms. Lack of secure land tenure. Low government budget allocation for agroforestry development and data collection.	Lack of coordination and (aligned) policies. Potential challenging requirements for smallholders to comply with EUDR.
Lack of knowledge, innovation and information	Lack of technical information. Need for research and innovation to improve techniques to improve productivity/ reduce risks.	Lack of up-to-date local knowledge – integrated with evidence-based data. Requires insight and understanding of local environmental contexts and dynamics, and risk-sharing. Lack of information and data about agroforestry management and systems Lack of agroforestry specific expertise.
Challenge to generate business, offtake and market deployments	Weak market linkages, poor access to market information and lack of market access. Challenging to formulate a good business plan. Fluctuating and low prices. Risk for exclusion of agroforestry because of challenge to meet (standardized) requirements.	Challenges around scale and logistics. Marketing of agroforestry (niche) products: lack of demand/ markets for all products. Capacity: Challenge to translate the agroforestry project into a business case. Challenge to link the product to off-takers and logistics.
Lack of (economic) incentives	Lack of governmental and of market incentives	No specific premium in the market for the (niche) agroforestry products > benefits and investments undervalued.
Lack of access to 'traditional' finance	Financing of smallholder/ individual farmers and cooperatives considered too risky (only loans with high rates). Lack of business plan that meets financial requirements (e.g. economic viability, legal requirements).	Perceived as high risk; complexity of agroforestry systems is poorly understood. Lack of adequate financial mechanisms.

Table 10. Overview of challenges perceived by Indonesian and Dutch stakeholders



CHAPTER 7. Agroforestry Flagship Projects

Chapter 7. Agroforestry Flagship Projects

Despite the numerous challenges in agroforestry (see previous chapter), there exist compelling examples that demonstrate its effectiveness in overcoming these obstacles while harvesting significant benefits. This chapter summarizes five agroforestry best practices or so-called agroforestry "flagships" and other successful projects/programs in Indonesia. These flagships are (elements of) initiatives, projects or programs that have a positive impact on the (smallholder) farmers involved, the environment and society at large, but are also (potentially) impactful to further implement and scale agroforestry. A summary of the approach of and impacts by the projects/programs are provided in this chapter. A more detailed explanation of the projects can be found in Annex .

The selection criteria for the flagship projects were:

- 1. Transparency of the approach and impacts
- 2. Positive impact on the (smallholder) farmers involved, the environment and society at large
- 3. Success factors
- 4. Tackling of known or unknown challenges
- 5. Potential to contribute to the implementation or scaling of agroforestry in Indonesia

Following these selection criteria, *the following four projects were selected:*

- Flagship 1. Managing Agroforestry Transition in Simpang Dua (West Kalimantan)
- Flagship 2. The Gula Gula Food Forests in West Sumatra: Agroforestry products and carbon credits
- Flagship 3. Empowering Robusta Farmers for Coffee Garden Rejuvenation and Enterprise Development to Strengthen and Diversify incomes (EMPOWER) in Indonesia
- Flagship 4. SukkhaCitta: ethical produced fashion from smallholder cotton and dyes
- Flagship 5: Public-Private Partnership Towards HCV Area Protection in Ketapang District, West Kalimantan Province

7.1. Flagship projects

Flagship 1. Managing Agroforestry Transition in Simpang Dua (West Kalimantan)

1. Transparency of the approach and impacts

Tembawang is a traditional agroforestry system of the Dayak people in West Kalimantan, involving the process of natural forest formation; from the pioneer phase to semi climax and further to climax phase. This agroforestry system combines various crops such as rubber (usually the primary crop), coffee and cocoa along with timber trees and fruit trees, with forested areas. This approach provided farmers with multiple sources of income, as well as food security, and all sorts of economic, ecological, and social benefits, while ensuring the conservation of local biodiversity and natural resources. The agroforestry model also helps to prevent soil erosion, reduce water run-off, and increase biodiversity. *Tembawang* agroforestry has proved to be a livelihood system for farmers in the Simpang Dua Sub-district.

However, low productivity of the rubber agroforests, the lack of organization of smallholder rubber farmers, changes in the economic focus of some farmers and a decrease in the rubber market price impacted the farmers' livelihoods, and they decided to become laborers in oil palm plantations or change the *tembawang* agroforestry system into mixed or monoculture oil palm plantations.

For this reason, and to maintain the *tembawang* agroforestry system in Simpang Dua Sub-district, Tropenbos Indonesia initiated a program to support the farmers with transforming this extensively managed agroforestry system into an intensive agroforestry system by improving maintenance and management, and in order to increase its productivity and sustainability, particularly in the semiclimax phase, which is a very important phase in this system. More importantly, Tropenbos International also focused on improving market access.

The approach was as follows:

- *Farmer Field School (upstream):* Since April 2021 until now, Tropenbos Indonesia has operated the Farmers Field School (FSS) approach to improve farmers' practices and develop climate friendly livelihoods. FFS curriculum is developed based on the identification of on-site agriculture problems and challenges combined with objectives of the project to mitigate and adapt climate changes.
- *Collective Rubber Raw Material Processing and Marketing Unit (Unit Pengolahan dan Pemasaran Bokar or UPPB) (downstream)*: is one of the strategies to acquire better prices for rubber produce by ensuring organization of smallholder farmers, improving plantation management, improving rubber quality to meet buyer demands, sustainable rubber production and processing, and building more inclusive natural rubber value chains and linkages to responsible buyers. In total 121 rubber farmers were involved. In the future, the UPPB is expected to accommodate the agroforest's secondary products, such as spices and fruits. Tropenbos Indonesia also helped the UPPB with developing an agreement with a rubber factory located in the city of Pontianak, to secure offtake.

The UPPB then required capital to purchase the first batch of rubber from the participating farmers, but financial institutions operating in the landscape did not have mechanisms in place that make it possible to provide loans to starting farmers' organizations that do not yet have a track record.

- To overcome this hurdle, Tropenbos Indonesia used its own finances to provide the UPPB with a zero-interest loan. This enabled them to start buying rubber from the participating farmers. The UPPB is now up and running, and it is estimated that the individual farmers' income from selling rubber will increase by 30%. By developing a portfolio, the UPPB will have better possibilities to access loans in the future.
- 2. Positive impact on the (smallholder) farmers involved, the environment and society at large
 - Maintenance of the traditional agroforestry system *tembawang* helps to prevent soil erosion, reduce water run-off, and increase biodiversity.
 - The system also provided the farmers with multiple sources of income, as well as food security.

- The support by the Tropenbos program additionally improved plantation management, rubber quality, the sustainability of rubber production and processing, and access to the market and finance.



Figure 14. A woman tapping rubber in Simpang Dua Sub District of West Kalimantan. Photo by Tropenbos Indonesia

3. Success factors

- Focus was on improving and intensifying an existing traditional agroforestry system of which the farmers have experience with.
- Focus of support on the entire value chain, from production to marketing, ensures all issues are tackled.
- Involving relevant stakeholders such as buyers and financial institutions.

4. Tackling of known or unknown challenges

- Solving rubber plantation management, productivity and processing issues
- Tackling market access and financial support

5. Potential to contribute to the implementation or scaling of agroforestry in Indonesia

- This example of intensification of an extensively managed agroforestry system, by improving maintenance, management and market access, and increasing productivity, may incentivize smallholders elsewhere to implement agroforestry as well.
- Farmer Field Schools can be implemented elsewhere to improve farmers' practices.
- A Collective Rubber Raw Material Processing and Marketing Unit can be implemented elsewhere to add value to the commodity, increase its price, and to improve market access.
- Collective processing and marketing units can be developed for other commodities as well.

Flagship 2. The Gula Gula Food Forests in West Sumatra: Agroforestry products and carbon credits

1. Transparency of the approach and impacts

The Gula Gula Forest program in West Sumatra, Indonesia was initiated in 2012 by Paul Burgers ($CO_2Operate$ B.V.). This program, in close collaboration with a local NGO named Yayasan Rimbo Pangan Lestari (RPL), is considered a very successful agroforestry-based land restoration initiative in which the smallholder farmers and communities are central to the decision making and implementation. This success is shown by the fact that the farmers and communities seem to be very content with their new livelihoods and positive impacts on the landscape.

Through Assisted Natural Regeneration (ANR) and the development of agroforestry, forest cover is being restored in the landscape, biodiversity is being enhanced and carbon is being sequestered/removed. Incomes for the local farmers are also increased substantially. Trees that are being cultivated are a mix of fruit, spices and hardwood trees for own consumption and for trade, and include avocado, acacia, cinnamon, clove, cocoa, coffee arabica, coffee robusta, jengkol, jirak, glyricidia, lamtoro, mahogany, melinjo, petai and surian.

An increasing interest in the program is shown by the people in the surrounding villages and villages elsewhere in Indonesia. Meanwhile, $CO_2Operate$ attracts companies in Europe and the USA to invest in this program, while supporting RPL and the smallholder farmers with business linkages and marketing of the agroforestry products and Plan Vivo certified carbon credits.

2. Positive impact on the (smallholder) farmers involved, the environment and society at large

- Farmers are central to the decision making in and implementation of the project, creating a high sense of ownership of the project.
- Farmers and communities seem to be very content with their new livelihoods and positive impacts on the landscape.
- agroforestry-based land restoration leading to forest-like structures, where biodiversity is being enhanced, carbon sequestered and local incomes improved.



Figure 15. Impacts of the Gula Gula project on CO₂ captured, trees planted and smallholders involved (Source: <u>https://gulagula.org/en/</u>)

3. Success factors

- Farmers are central to the project.
- Strong and long-term partnerships with a local NGO, Regional Development Offices (BAPPEDAs), MoEF (Specifically BPDAS or translated to Watershed Management Center, as technical implementation unit of MoEF); and Ministry of Village, Development of Disadvantaged Regions and Transmigration (MoVDDRT), Ministry of National Development Planning (BAPPENAS), and Universities.
- Business linkages to investors and buyers of commodities and certified carbon credits.
- Increasing interest in the program is shown by farmers near and far.



Figure 16. Various field photos from the Gula Gula project in West Sumatra (Source: https://gulagula.org/en/).

4. Tackling of known or unknown challenges

- Farmers have experienced that it is challenging to remove *Imperata cylindrica* grasses from the land as it is a strong and tall grass. The Gula Gula project has developed cheap and simple ANR methods to ensure the removal of *Imperata* grasses and other plants considered "weeds".

5. Potential to contribute to the implementation or scaling of agroforestry in Indonesia

- Establishment of a local NGO that actively supports the farmers at the local level has proven to contribute to the success of this project, and can be implemented elsewhere to scale agroforestry.
- The specific ANR method developed by the Gula Gula project is an easy to implement zeroburning method to remove *Imperata* grasses, so that trees and crops can be planted, and regeneration of the land can take place. It is estimated that Indonesia counts 8.5 million ha of *Imperata* grasslands, of which a large share has the potential to be regenerated into climatesmart agroforestry systems in order to achieve Indonesia's climate change mitigation targets⁹³.
- The increasing interest in the program shown by the people in the surrounding villages and villages elsewhere in Indonesia provide much potential for scaling.

Flagship 3. Empowering Robusta Farmers for Coffee Garden Rejuvenation and Enterprise Development to Strengthen and Diversify incomes (EMPOWER) in Indonesia

1. Transparency of the approach and impacts

The EMPOWER project in Pagar Alam in South Sumatra focused on empowering Robusta farmers for coffee garden rejuvenation and enterprise development to strengthen and diversify incomes, and on tackling deforestation in the area. The project invested in capacity building and agroforestry training of about 4,000 farmers over the course of three years (2017-2020). This project is considered a successful agroforestry project. After the establishment of 'the proof of concept' in 2020, IDH retreated from the project. Nonetheless, the other partners, JDE, Sucden Coffee, the local government and farmers continued to scale up the project, for which the Pagar Alam local government freed up funds. Expert knowledge was provided by World Agroforestry (ICRAF).

The farmers were provided with different options of tree species or agroforestry systems, which was built on the knowledge they had themselves combined with additional professional knowledge and information. For example, (smallholder) farmers brought relevant knowledge about certain types of trees that were considered nitrogen fixating and were thus desired in their production systems. Common trees planted in the coffee gardens were durian and other fruit trees.

Overall, farmers were positive about the project. Incomes of farmers increased by 24%. Although the project also aimed at improving incomes for women, this was not observed in their project.

- 2. Positive impact on the (smallholder) farmers involved, the environment and society at large
 - Income of farmers increased, and farmers were positive about the project.

⁹³ https://media.neliti.com/media/publications/325099-climate-change-mitigation-in-practice-ec-f55830b5.pdf

- Tackling of deforestation
- Rejuvenation of coffee gardens by agroforestry with various fruit tree species

3. Success factors

- A range of stakeholders were involved, and the project partners continued scaling the project, even after the project facilitator (IDH) retreated
- The (smallholder) farmers were provided with different options of tree species or agroforestry systems.
- Favorable external conditions:
 - o Multiple outlets for produce were developed.
 - Markets for produce were favorable, which usually cannot be guaranteed.
- They used a holistic approach, in which markets and the production of organic fertilizers were developed as well. Implementing agroforestry goes much further than merely adding trees in a production system.

4. Tackling of known or unknown challenges

- unknown

5. Potential to contribute to the implementation or scaling of agroforestry in Indonesia

- This multi-stakeholder partnership, and the interest of various stakeholders, is beneficial for scaling the project.
- The stakeholders already invested in scaling the project, which is a promising component as well.

Flagship 4. SukkhaCitta: ethically produced fashion from smallholder cotton and dyes⁹⁴

1. Transparency of the approach and impacts

Social-enterprise SukkhaCitta and Rumah SukkhaCitta Foundation work closely together in an integrated program and value chain From Farm-to-Closet. They collaborate with traditional women (agroforestry) cotton farmers who grow cotton, (natural) dyes (plants and agricultural waste) and food crops on previously depleted soils in East Java and East Nusa Tenggara (NTT). There is no use of tillage, chemical fertilizers and pesticides. SukkhaCitta also works together with CO₂Operate on developing a fashion forest in West Timor (in East Indonesia). Additionally, SukkhaCitta works with women in rural areas to produce sustainable clothing from the cotton and dyes, which they sell through their online store <u>https://www.sukkhacitta.com/</u> (4.97/5 star rating out of 384 reviews on Judge.me).

The program is Nest certified⁹⁵, with focus on among others the following indicators: Fair wages, No child labor. Worker rights, Anti-harassment and anti-discrimination policies for all, Workplace safety provisions, First-aid stations, and the highest environmental stewardship.

⁹⁴ https://www.sukkhacitta.com/collections/frontpage

⁹⁵ https://www.buildanest.org/the-nest-seal/ethicalhandcraft/



Figure 17. Cotton cultivation at SukkhaCitta (first photo) (source: <u>https://www.sukkhacitta.com/blogs/journal</u>) and women producing clothing at SukkhaCitta (second photo) (source: <u>https://www.sukkhacitta.com/pages/impact</u>)

2. Positive impact on the (smallholder) farmers involved, the environment and society at large

- Livelihood development for women along the cotton value chain; from cotton and dye cultivation to production of clothing (e.g. from \$2 a day to 2x the regional minimum wage⁹⁶)
- Project is inclusive to women.
- Regeneration of depleted soils in various regions in Indonesia
- Regenerative agroforestry, without tillage, chemical fertilizers and pesticides
- Fair wages and no child labor

3. Success factors

- SukkhaCitta collaborates in multi-partnership programs, including with the Rumah SukkhaCitta Foundation and with CO₂Operate
- SukkhaCitta has developed an integrated program and value chain; From Farm-to-Closet.
- The program is Nest certified and focused on human rights and environmental stewardship.
- They market their own produce through a successful online store.

4. Tackling of known or unknown challenges

- unknown

5. Potential to contribute to the implementation or scaling of agroforestry in Indonesia

The integrated farm-to-closet concept, linking regenerative agroforestry products with producers and buyers of sustainable clothing, thereby respecting human rights and the environment, makes this value chain very successful, also for scaling agroforestry across Indonesia.

⁹⁶ https://www.sukkhacitta.com/blogs/journal/ibu-turs-story

Flagship 5. Public-Private Partnership Towards HCV Area Protection in Ketapang District, West Kalimantan Province⁹⁷

The previous Flagship projects focused on agroforestry development at the plot level. However, agroforestry development can also be seen as integrating forest and agricultural land uses at a landscape scale (see Chapter 2), where patches of agroforestry or forests are integrated within or in between monoculture systems.

This Flagship project focuses on the integration of trees and forest in between oil palm blocks and oil palm plantations through the establishment of High Conservation Value areas (HCVAs); areas with forest cover and high conservation values within production areas that support ecological, economic, social, cultural, religious, and customary needs of the community. Further, through a public-private partnership (PPP), two villages surrounding the Ketapang HCVA/Wildlife Corridor have started diversifying their production by enhancing the production of horticulture, rice and oranges, in addition to oil palm cultivation.

Ketapang HCVA is the inter-connected protection area (HCVA) within four large-scale oil palm plantation concessions outside state forest areas (APL) which are defined voluntarily and protected by private sector parties as part of their compliance to ISPO, RSPO, and Province Regulation No. 6/2018. The Ketapang HCVA aims to function as a wildlife corridor, mainly for orangutans to cross oil palm plantations from the Sungai Putri peatland production forest to the Gunung Palung National Park in Northern Ketapang⁹⁸. One of the key aspects to conserve this HCVA is to provide sustainable deforestation-free livelihoods for village communities living around the HCVA, and the establishment of monitoring working groups consisting of government offices and NGOs.

Agroforestry at the landscape scale is implemented through the requirement that palm oil private sector parties and other land-based businesses must comply with the protection of at least 7% of intact forests within their concession areas for wildlife corridors and other ecological-social use (through West Kalimantan province regulation 6/2018).

⁹⁷ https://www.tropenbos-indonesia.org/news/484/public-

private+partnership+towards+hcv+area+protection+in+ketapang+district,+west+kalimantan+province

⁹⁸ The Gunung Palung National Park is known as the highest orangutan population in West Kalimantan Province with 2,500 orangutans (Wich et. al., 2008).



Figure 18. Aerial view of HCVA wildlife corridor within the concession area of PT KAL's oil palm plantation in Ketapang, West Kalimantan. Photo by Tropenbos Indonesia.

1. Transparency of the approach and impacts

- Through the multi-stakeholder platform, information transparency and integrity have to be ensured between actors. NGOs, private sector parties, local community representatives and the government must present their work plans, to maximize the integration and transparency of targets and interventions.

2. Positive impact on the (smallholder) farmers involved, the environment and society at large

- Ketapang HCVA plays an important role to increase landscape biodiversity because it provides opportunities to protect forest cover outside of state-protected areas, in which 75% of the orangutan (*Pongo pygmaeus*) outside state-land conservation areas live.
- Together with the Village Forest Management Unit, the BGA group (palm oil companies) has established agroforestry plots and rehabilitated village forests through more than 7,000 fruit seedlings across approximately 40 hectares of land. This cooperation with local communities empowers communities in villages surrounding HCVA (wildlife corridor), diversifying their income, preventing forest encroachment, logers and hunters in forested HCVAs.
- Recent literature demonstrates that maintaining forest islands in oil palm plantation landscapes further increases landscape diversity and appears a promising ecological restauration strategy (see Box 7).

Box 7. Tree islands enhance biodiversity and functioning in oil palm landscapes (Article by Zemp et al., 2023, published in Nature ⁹⁹)

In a large-scale 5-year ecosystem restoration experiment in an oil palm landscape enriched with 52 tree islands, indicators of biodiversity (10 assessed) and ecosystem functioning (19 assessed) were higher in oil palm landscapes with tree islands compared to conventionally managed oil palm.

Overall, larger tree islands led to larger gains in multi-diversity through changes in vegetation structure, and tree enrichment did not decrease landscape-scale oil palm yield. The results demonstrate that enriching oil palm-dominated landscapes with tree islands is a promising ecological restoration strategy yet should not replace the protection of remaining forests.

3. Success factors

- Inclusivity through establishing of a multi-stakeholder platform and collaboration of actors with different expertise (e.g., NGO focus on wildlife such as Indonesia Animal Rescue and NGO that focuses governance such as Tropenbos Indonesia).
- Increase of welfare of surrounding HCVA communities, strengthening their involvement.
- The Ketapang HCVA has been legalized by West Kalimantan Governor Decree No. 718 of 2017 and its managing multistakeholder platform has been legalized through the West Kalimantan decree No. 699/2017 that solidified the public-private partnership now known as Ketapang HCVA multi-stakeholder platform and showing the commitment of partners involved including the government.



Figure 19. Cacao and Banana agroforestry plots in development by Bumitama Gunajaya Agro (Ketapang District Large-scale private oil palm plantation) and Communities. Photo by Tropenbos Indonesia

⁹⁹ https://www.nature.com/articles/s41586-023-06086-5



Figure 20. Observation board of the agroforestry plots in development by Bumitama Gunajaya Agro (Ketapang District Large-scale private oil palm plantation) and Communities. Photo by Tropenbos Indonesia

4. Tackling of known or unknown challenges

- HCVA may overlap with the revoked bauxite mining and other potential land use business permit in the future.
- Despite activities and improvements, there remains a low welfare of village communities surrounding the HCVA.
- The Ketapang district government lacked the understanding about HCVA making large HCVA being considered as unproductive idle lands. Thus, more awareness raising, lobby and advocacy is needed.
- Wildlife corridor disconnection.

7.2. Conclusions

The chapter shows that there are already ongoing successful agroforestry projects at the plot level and landscape level, and (elements of) these projects show how certain of the identified challenges (see previous chapter) can be overcome. An example of this, namely to overcome the challenge around lack of market demand, is the development of integrated programs where both buyers and producers of agroforestry are matched.

The projects also show potential for scaling agroforestry across Indonesia; through replication or through embedding certain elements of the projects in other regions (such as the legislation in Flagship 5) or sectors. Further analyses of the development and implementation of these flagship projects could reveal more success factors and lessons learnt for scaling agroforestry.



CHAPTER 8. Solution Pathways

Chapter 8. Solution Pathways

Chapter 5 shows the various benefits of agroforestry, Chapter 6 the challenges and Chapter 7 various Flagship projects. From these chapters, lessons learnt were extracted on how challenges can be overcome and turned into opportunities. Subsequently, these were integrated into solution pathways that can contribute to scaling agroforestry in Indonesia, which are described in this chapter.



Figure 21. Challenge and opportunity to improve underdeveloped agroforestry.

8.1. Solution pathway: Collaboration through a multi-stakeholder approach

Multi-stakeholder partnerships are needed for the **development of integrated projects**, and for the scaling of agroforestry, where each of the partners plays one or more clear roles. Under Flagship 3 (EMPOWER), a range of stakeholders were involved. Also, Flagship 4 (SukkhaCitta) collaborates in multi-partnership programs, including with the Rumah SukkhaCitta Foundation and with CO₂Operate.

Flagship 1 (in Simpang Dua) learns that it is beneficial to **focus on strengthening and capacitating the entire value chain**, from production to marketing, ensuring all issues are tackled. This also implies the involvement of buyers and financial institutions. Similar experiences are shown by Flagship 4 (SukkhaCitta) that developed an integrated program and value chain; From Farm-to-Closet.

Next to that, actors and companies are recommended to **work together in sourcing areas, also to enable the production and marketing of multiple commodities**.

'Companies that need various products need to work together in sourcing jointly in areas where multiple crops are grown. So, they get good products in the long run'.¹⁰⁰

'Multinational companies such as Olam and Cargill engage in the production and marketing of various commodities. Whereas for small companies it might be too complex to focus on multiple commodities, these multinational market players might be able to shift expertise internally and reduce difficulties in marketing'.¹⁰¹

Building collaborative partnerships **requires building trust** between the partners, particularly with the local communities and farmers involved. This takes time and effort. Flagship 2 (Gula Gula project) shows however, that it is beneficial to build long-term and strong relationships between the local partners. This is in contrast to many shorter-term projects that are being implemented over the course of 5 to 10 years, after which finance and project implementation usually stops, and project partners leave the site.

Flagship 5 (Ketapang Wildlife Corridor multi-stakeholder platform) learns that it is beneficial to **make the collaboration official**. Its managing multi-stakeholder platform has been legalized through the West Kalimantan decree No. 699/2017 that solidified the public-private partnership. Through a legalized partnership, actors will be more transparent and have obligations to monitor each other. This is also further emphasized through an action plan that was collectively formulated and implemented by the multi-stakeholder platform.

8.2. Solution pathway: Optimize agroforestry design with local input

When developing agroforestry systems, it is important to build upon local knowledge and local systems, instead of introducing new systems (smallholder) farmers and other stakeholders are unfamiliar with¹⁰².

Flagship 1 (in Simpang Dua) learns that it is beneficial to improve and intensify already existing traditional agroforestry system of which the farmers have experience with. Flagship 2 (the Gula Gula projects) learns that it is beneficial when farmers are central to the decision making in and implementation of the project.

It is recommended to develop an optimum between local variations and 'standardized' services to allow for scaling. Some interviewees indicated the difficulty of scaling up as the strength of agroforestry is in acknowledging the diversity of relevant conditions. With scaling, specific local conditions are often ignored, whilst crucial for success. Scaling up can be done by stimulating many small-scale projects.¹⁰³ Diversity in the facilitation of agroforestry systems (knowledge provision, support, market development and other services) must be limited to keep it feasible.

8.3. Solution pathway: Enhancing policies and governance (alignment)

¹⁰⁰ Based on interview with Social enterprise

¹⁰¹ Based on interview with Knowledge institute

¹⁰² Based on interview with Knowledge institute

¹⁰³ Based on interviews with NGO, Knowledge institute, Social enterprise

With the high-level policy support through the Social Forestry Program, the future of agroforestry development through social forestry should be very promising. It is important that good agricultural practices (GAP) get sufficient attention within the context of social forestry.

This also requires sufficient national government budget allocation for agroforestry development.

More general, it is important that policies and governance move away from a silo approach to bridge the dichotomy between agriculture and forestry and **move towards an integrated policy and governance approach towards agroforestry**, to ensure that policies are aligned and strengthen each other, based on science and practice. A possible approach could be to recommend an agroforestry strategy at the national or regional level that identifies strategic actions to align policies that are collectively more favorable for agroforestry development and its enabling environment. Such a strategy should therefore also address elements such as the legalization and registration of permits, secure tenure rights, incentives, education, research and extension services.

Such a strategy should acknowledge the need for diversified and climate-smart agroforestry systems, so as to contribute to climate change mitigation and climate change adaptation, but also the existing land competition between agroforestry and monoculture cash crops, such as oil palm.

The carbon trading policy is recently in place and can be an interesting opportunity to provide additional incentives for agroforestry development. The next step is to facilitate its implementation, also for smallholder farmers – as the costs for project development is high and expertise on carbon trading is required.



Figure 22. The adoption of traditional and family farming agroforestry by government and its trajectories toward well-developed agroforestry

8.4. Solution pathway: Mobilize business and markets

To create sufficient demand (and income) from the multiple projects generated from agroforestry production, it is important to **connect producers to the buyers in new or niche markets**. This requires collaboration between multiple stakeholders (see opportunity 1), while connecting them with market actors and consumer markets at the local, regional and/or international.

Flagship 2 (Gula Gula projects) learns that it is beneficial to attract companies in Europe to invest in the program, while supporting smallholder farmers with business linkages and marketing of the agroforestry products.

One of the success factors of Flagship 3 (EMPOWER) was that multiple outlets for produce were developed and the markets were favorable. Next to agroforestry production, the marketing of products was also given attention to.

The integrated farm-to-closet concept in Flagship 4 (SukkhaCitta), linking regenerative agroforestry products with producers and buyers of sustainable clothing, makes the value chain very successful. Producers market their own produce through a successful online store.

Actors and companies working together in sourcing areas can explore the offtake of multiple products (as is already happening to some extent) and explore opportunities to (create) local demand. Examples are fruits and vegetables for schools or companies can offtake products for their workers, etc.

Because volumes of the multiple commodities from agroforestry systems are often small, and thus transportation advantages and economies of scale cannot be reached, it is important that farmers work together and organize themselves to increase scale and capacity.

Flagship 1 (in Simpang Dua) shows that the development of a Collective Material Processing and Marketing Unit can be a useful strategy to acquire better prices for produce by ensuring organization of smallholder farmers, improving plantation management, increasing rubber volumes (by selling in bulk), improving quality to meet buyer demands while building linkages to responsible buyers. By developing a portfolio, such a unit will also have better possibilities to access loans in the future.

Agroforestry projects and buyers can better reward their social and environmental services of climate resilient production systems that go beyond deforestation-free and include agroforestry systems.

One option is to make use of carbon credits and PES, as agroforestry projects have the potential to increase carbon sequestration. Carbon credit payments to smallholder farmers can provide additional income, and incentives to the farmers to maintain their agroforestry systems, because of the additional income (Company, interview). Flagship 2 (Gula Gula project) makes for example use of Plan Vivo certified carbon credits, creating an additional income source for farmers.

Also, lessons can be learnt from various schemes, such as CSR, PES and from RaCP, on to what extent the market's resources can be used to additionally pave the agroforestry development pathway.

Learning from Tropenbos Indonesia experience, working with large scale oil palm companies, the Remediation and Compensation Procedure (RaCP) and Performance Based Payment for Ecosystem Services (PES) incentives could for example be an incentive for large-scale oil palm companies who apply or hold ISPO and RSPO certification to integrate trees on their land. An important condition is that these companies start allocating HCVAs in their concession and fulfill other sustainability compliances.

Another option is that projects are certified and/or receive an additional premium because they meet certain requirements. Flagship 4 (SukkhaCitta) is for example Nest certified.

When exploring this opportunity, it is important that the access to carbon credits and/or certification is facilitated and organized in such way that it is also accessible for smallholder farmers.

8.5. Solution pathway: Mobilize (access to) innovative finance

Firstly, if farmers develop or enhance agroforestry on already productive agricultural or forestry plots, agroforestry development or diversification could be more productive and less risky on the short term, and **this would need to be clarified to financial institutions in order to decrease the stigma around agroforestry finance**.

However, if farmers aim to build their agroforestry plot from scratch, for example when it is to be developed on degraded lands, low-cost, innovative and adaptive finance is needed to bridge the upfront costs during the first 4-8 years of agroforestry development, when trees are still maturing. **This requires the development and support of innovative financial mechanisms**.

Next to that, it is interesting to identify already existing promising capital sources and financial mechanisms and inform agroforestry projects about their existence.

A case study from Tropenbos International shows for example that national banks with various scales in cities or district administrative areas provide more tolerable interest loan schemes, including a Micro Credit Program¹⁰⁴. Another safe capital source and access to finance is the Badan Pengelola Dana Lingkungan Hidup (BPDLH)/Indonesian Environment Fund which translates to Indonesian Environment Fund (IEF). BPDLH was officially formed in September 2019 and launched in October 2019 to bring multiple sources of funding together to be deployed through a variety of instruments across a number of different sectors (including forestry, energy and mineral resources, carbon trading, environmental services, industry, transport, agriculture, marine and fisheries). More information about the BPDLH can be found in Annex .

At the same time, it is essential that (potential) business plans for agroforestry projects get support to meet the financial requirements to get access to funding, including the legal status. This means that

¹⁰⁴ Farmers in Ketapang City peatlands facilitated by Tropenbos Indonesia are able to access a one-year loan with 3 to 5% interest for their oil palm intercropping plots. This scheme is usually known as Kredit Usaha Rakyat (KUR) which translates to Micro Credit Program. KUR is a government-sponsored subsidy credit that is offered to Micro, Small and Medium Enterprises and Cooperatives in the field of business, productive and viable but not yet bankable. With a maximum five years of loan time frame provided by national banks, agroforestry-based businesses will have a better chance to return loans safely. One of the most significant national bank with KUR is Mandiri Bank.

projects must be economically viable (see other opportunities). It also means that projects need to meet the administrative and legal requirements.

The combination of data collecting in the field for relevant data, modelling (e.g., with service provider and knowledge institute), and capacity building can support the development of viable business cases. NGOs can assist in getting farmers organized to achieve advantages of scale and develop a proper business case (interview).

A case study from Tropenbos Indonesia shows that registration to agricultural offices to have a legal standing should be one of the first efforts for a sound agroforestry-based business, also entitling them to receive government support. Registered agroforestry-businesses receive supervision from district governments, being enlisted in government development program and invited to cross district workshops. Farmer groups or agricultural community-based business units, such as the Rubber Collective Marketing Unit¹⁰⁵, should be registered at the agricultural office and will be recorded in the *Sistem Informasi Manajemen Penyuluh Pertanian* (Simluhtan) which translates to Agricultural Extension Worker Management Information System.

8.6. Solution pathway: Mobilize knowledge and research

It is important to promote **research and innovation in agroforestry to develop new techniques and innovations** that can improve productivity, increase resilience, and reduce risks – also in collaboration with projects in the field. Important research questions are how to increase productivity, tackle pests and diseases or which crops are most suitable.

One example of field-based innovation is the specific Assisted Natural Regeneration method developed by the Gula Gula project (Flagship 2), which is an easy to implement method to remove *Imperata* grasses, so that trees and crops can be planted, and regeneration of the land can take place.

Next to that, it is also important to increase the knowledge and innovation about development of (niche) markets and how to create access to these markets.

Data collection and improvement about agroforestry systems is important to increase the availability of quantified data on the benefits, productivity and economic performance of agroforestry systems. Data support regarding formal and informal agroforestry practices, inside and outside forest zones which are scattered in various regions, has so far tended to be unavailable. The only data on agroforestry practices available is for the 5 million hectares of formal agroforestry supported by a social forestry program. Beyond that, family farming agroforestry practices have not been documented and consolidated.

Data collection is beneficial for multiple purposes including (a) as input for developing a business plan, (b) increasing the awareness about (the benefits of) agroforestry systems or (c) monitoring, adapting, and adjusting agroforestry systems and policies. Next to that, it is also important to collect data and

¹⁰⁵ Referencing Tropenbos Indonesia's case with Rubber Agroforestry in Simpang Dua Sub-District

information about (new) markets. This includes creating access to market and finance information to producers.

Improved data source support is also needed to improve alignment of social forestry policies with existing demands at the field level. The Carbon Trading policy (Regulation No. 7/2023) can play a role to improve the availability of larger agroforestry land use data.

8.7. Solution pathway: Create awareness, outreach and capacity building

One of the indicated challenges is that agroforestry is considered complex especially compared to monoculture systems, because of various reasons, e.g., knowledge of multiple crops is needed. Next to that, making the transition to (alternative) crops and markets, also requires a change in capacity in other skills, including on marketing the products.

It is therefore important to **improve the capacity of (smallholder) farmers on various elements that link to agroforestry**, including:

- Agroforestry practices and management
- the financial literacy and business skills of (smallholder) farmers to market the products and develop viable business cases with return on investments.

Extension services can play an important role to increase the capacity of agroforestry practices and management by providing a technical package including on germplasm management, tree management, pest, and disease management– while also providing access to seed.

It is recommended to **build on existing structures and best practices**, such as the Farmer Field schools or the presence of a local NGO or by strengthening farmer organizations and networks.

The Farmers Field School (FSS) approach (see Flagship 1, in Simpang Dua) can be implemented elsewhere to improve farmers' practices while developing a curriculum based on the identification of on-site agriculture problems and challenges combined with objectives of the project to mitigate and adapt climate changes.

Flagship 2 (Gula Gula project) learns that a local NGO that actively supports the farmers at the local level has contributed to the success of this project and can be implemented elsewhere to scale agroforestry.

Flagship 5 (Ketapang Wildlife Corridor multi-stakeholder platform) showed that co-managed HCVAs can be regarded as idle lands by the local/regional government, who could re-contract the land to other private companies. This shows that creating awareness among all stakeholders is important.

Capacity building of agroforestry goes beyond (smallholder) farmers and also includes stakeholders that are more indirectly involved in the agroforestry value chain, including:

- Extension workers and researchers in agroforestry.
- Financial institutions: to increase the understanding on how agroforestry production systems work to be able to estimate the risks and returns from investments in agroforestry.

Global concern to find production systems that are socially, economically, and environmentally fit for the climate crisis, could also be considered as a **new opportunity in developing agroforestry which is proven to have positive impacts in all aspects; and awareness can be increased on all different levels – from international, to national, to local level.**

Flagship 2 (Gula Gula project) learns experiencing the benefits on the ground increases the interest of people in the surrounding villages and villages elsewhere in Indonesia to participate in similar projects, providing potential for replication and scaling.

8.8. Solution pathway: Share knowledge and collective learning

Collective learning is of added value in the realm of agroforestry development due to the multifaceted capacities it requires, ranging from ecological knowledge to innovative agricultural techniques or business development. The (perceived) complexity of agroforestry systems call for the cross-sharing of lessons learned—both successes and setbacks—amongst practitioners and stakeholders. This mutual exchange not only accelerates the learning curve but also safeguards against repeated mistakes.

Communities of practice are needed to share lessons learnt and best practices and increase the awareness and knowledge about agroforestry production systems. These communities of practice can take place at different levels, and focus (if desired) on different stakeholder groups:

- Agroforestry practitioners in general
- Between farmers at the local to regional level
- Between companies and social enterprises at the national and international level
- Between financial institutions at the national and international level
- Between knowledge organizations (knowledge networks)

The SustainPalm program is an example on how this can be organized. The program is executed in Communities of Practice (COPs) and in geographically based Living Labs (LL). The COPs serve to facilitate the sharing of experiences between Living Labs, capacity building of local service providers, joint assessments, and as a vehicle of joint actions to assure conducive enabling environments, needed for scaling at a national and international level.

Create, maintain, and support platforms which can be organized per subcategory topic, and later all be brought together to

- Share knowledge and technology
- Matching markets (get multiple purchasers involved for the variety of produce)
- Stimulate agroforestry practices.



Figure 23. One example of collective learning toward scaling agroforestry – from a policy perspective

8.9. How Can Different Stakeholders Contribute?

As shown in this report, many stakeholders already play a role in agroforestry development and/or projects in Indonesia, either through buying commodities from (smallholder) farmers and/or cooperatives or through projects involving private and public partners and the (smallholder) farmers and their families. These projects often take place at the village or regional level.

The question is though; how can the different stakeholders contribute and in what way can they collaborate, so as to support the upscaling of agroforestry? And what can be the role of the Dutch Embassy and the "Dutch diamond"¹⁰⁶?

8.9.1. Building strategic partnerships is key

The development of unproductive and unsustainable family farming agroforestry-systems to welldeveloped, sustainable and productive smallholder agroforestry requires support from all stakeholders: knowledge centers, consultancy firms/service providers, NGOs, social enterprises, companies, financial service providers and multi-lateral organizations. As seen in the table below, all stakeholders have their role to play in the identified solution pathways.

Table 11. The role of different stakeholders in the solution pathways

¹⁰⁶ The "Dutch Diamond" involves the Government, business community, knowledge institutes and NGOs

Solution pathway	Farmer (organizations)	Market	NGOs	Govern- ment	Knowledge organizations & service providers	Financial institutions	Multi-lateral organizations / others
Developing a national strategy on agroforestry through a multi-stakeholder approach	*	**	*	***	*	*	**
Enhancing policies and governance (alignment).			*	***	*		*
Mobilizing business and markets	*	***	*	**	*	***	*
Mobilizing (access to) innovative finance		***	*	**	*	***	**
Mobilize knowledge and research	**	**	**	**	***	*	**
Optimized agroforestry design based on local knowledge and practices	**	*	**	*	***	*	**
Creating awareness, outreach, and capacity building	**	**	***	**	**	*	**
Knowledge sharing (Collective learning)	**	**	***	**	**	*	**

So far, and as discussed earlier, each stakeholder has played a role in partnerships for developing agroforestry, but in a relatively isolated manner and by using limited and segmented resources. Most of the partnerships we have analyzed involved bi-lateral partnerships or involved three to four partners. Often, some key stakeholders were missing.

Key is to build strategic partnerships with all stakeholders involved. In these partnerships, all stakeholders have their role to play. Based on the interviews with the key stakeholders, we have identified the following contribution by the stakeholders or stakeholder groups.

Potential role(s) for the Embassy of the Netherlands in Indonesia

Championing frontrunners:

- Amplify and amalgamate efforts of organizations dedicated to agroforestry advocacy and those curating agroforestry-centric educational resources for farmers.
- Possibly the Embassy could stimulate organizations that are permanently focused on promoting agroforestry, or organizations that develop curricula on agroforestry that subsequently are accessible for farmers (NGOs, interviews).
- This may include linking agroforestry practitioners with market parties (customers), which is largely lacking and could be facilitated by the embassy (Service provider, interview).
- Also, Embassies of different countries in Indonesia could be working together (Company, interview).

Inter-embassy cooperation:

- A specific recommendation is that the Dutch Embassy can also promote the cooperation and exchange between Embassies in Indonesia.

Network development and communities of practice: collective learning.

- Linked to the above, the Embassy is in the capacity to bring stakeholders together to share practices and learn from each other in a more facilitating role.
- The Embassy can bring relevant stakeholders together to address certain barriers, such as government agencies and policy makers together (addressing barriers) (Organization, interview).
 Examples are the Global Platform for Sustainable Natural Rubber (GPNSR), creating synergies between NGOs, local producer organizations, and market stakeholders.
- This may include the introduction of communities of practice (through a program)
- In this role, the Embassy can support 'Continuous learning' and monitoring of organizations that are working on agroforestry development.
- One specific recommendation is that the Embassy should look beyond projects, but developing networks such as SCOPI and support them in their efforts to develop curriculums that are supported by many partners and a secretariat to run these activities. This is often overlooked but this is the bases for scaling up. Thus, setting up and maintaining such platforms. (NGO, interview)

Awareness raising:

- Increase the awareness about the potential benefits, challenges, and solution pathways to develop and scale agroforestry in Indonesia, for example in:
 - International fora and platforms,
 - Meetings with companies or financial institutions,
 - Discussions about related (subsidy) and research programs (NWO, RVO) that are developed for certain topics and/or for Indonesia in general.

Diplomacy and government relations

- The Embassy could facilitate in the relationship with the Indonesian government (both Ministries of Forestry and Environment and the Ministry of Agriculture) (Service provider, interview) and address / discuss some of the solution pathways that are addressed in the report.

Financial mobilization

- The Embassy could use part of its funding to mobilize private financing (Organization, interview)
- Specific projects could be developed that support the solution pathways, i.e., on data collection, innovation, piloting new techniques etc.

Potential role(s) for policy makers

Agroforestry policy support has not been followed by strong cross-sector coordination and consolidation, especially between forestry and agriculture, the two main sectors in agroforestry. The government's strong policy support can be utilized for the development of agroforestry. Various agroforestry policies at different levels are important modalities for preparing a national agroforestry roadmap.

Potential roles for national policy makers are:

- Collaborate with other relevant ministries (all Ministries)
- Explore opportunities for further alignment in policies on agriculture and on forestry
- Provide capacity building (Ministry of Forestry and Environment, Ministry of Agriculture)
- Focus on governance systems/land tenure reform

Potential roles for local governments are:

- Develop infrastructures and markets in agroforestry areas.
- Collaborate and support agroforestry development initiative initiated by other organizations.
- Develop agroforestry systems / markets in certain landscapes in collaboration with other organizations.
- Address legal and policy barriers that hinder the uptake of agroforestry systems

"Local government in collaboration with other organizations: develop certain landscapes in which certain types of agroforestry are relevant. With too many crops and diversity in agroforestry systems there will not be a critical mass to commence viable value chains, or support" (interviews with Service providers, Knowledge institute).

Potential role(s) for forest / farm communities and (smallholder) farmer organizations

Through farmer organization some challenges of scale can be targeted (interviews with NGOs), as was also mentioned in the solution pathways, such as:

- Marketing (transforming single purpose coffee cooperatives to multipurpose cooperatives)
- Access to knowledge
 - Planting distances
 - Interactions between crops (symbiosis and antibiosis)
 - Improve land use efficiency.
 - Finance actual replanting with farmers (interview with NGO), they cannot afford it.

Potential role(s) for knowledge centers

Research and knowledge centers in Indonesia and in the Netherlands can focus their research on entangling the interactions between crops, and the combined interactions with climate, soils, sunlight and nutrients, as well as on related issues such as on marketing.

- For this, the agricultural, forestry and environmental faculties of universities have to collaborate, in order to be able to focus on this.
- Already existing cooperation in research between Indonesia and the Netherlands¹⁰⁷ (through NWO) can further address the research issues and knowledge questions on agroforestry development.
 Potentially, some knowledge exchange can also take place with participating organizations in the "Agroforestry network Nederland'¹⁰⁸

¹⁰⁷ https://www.nwo.nl/en/researchprogrammes/merian-fund/indonesia-merian-fund

¹⁰⁸ https://www.agroforestrynetwerk.nl

- It is important to ensure dissemination of results to the relevant stakeholders, including the (smallholder) farmers, so that they fully understand how to manage multiple crops in one system.

Potential role(s) for NGOs

- Due to their local presence in the field, NGOs can play a central role in capacity building.
- Engagement with (smallholder) farmers, project management on longer term (instead of short-term project duration of 1-3 years because of donor funding) (Service provider, interview).
- Many good NGOs are present in Indonesia to provide support to the (smallholder) farmers (Service provider, interview).
- Awareness raising; to mainstream agroforestry in global issues, such as climate change, carbon trading, and food security.
- Collecting on the ground evidence and data.

Potential role(s) for multi-lateral organizations

- Facilitating Knowledge exchange, research, capacity building, business planning.
- Policy advisory role towards government.
- Capacity building of local partners to manage projects on the ground.
- Awareness raising.

Potential role(s) for consultancy firms/service providers

- Service providers such as FarmTree can assist in modelling agroforestry systems regarding a wide range of variables, and thereby improve the level of discussions on feasibility of agroforestry systems, benefits and trade-offs on various indicators, and required investments. Their tool can assist in decision making about whether it makes economic and ecological sense to start a project.
- Service providers such as Daemeter can provide, for example, capacity building and knowledge brokering.
- NGOs such as Agriterra can play a role in, for example, capacity building, knowledge and research.

Potential role(s) for social enterprises

- Connect smaller social enterprises with larger customers, so as to ease the marketing of commodities.
- Ensure risk sharing between (smallholder) farmers and companies.
- Seedling provision needs to improve; not only for coffee but for all agroforestry crops.
- Improve offtake markets, either locally or international. In Vietnam there are coffee-pepper and coffee-vanilla systems; but these are risky. (NGO, interview).
- To develop an incentive mechanism for trading of the export commodities (such as coffee, cocoa, rubber and spices) produced with an agroforestry system.
- To accelerate the formation of an agroforestry carbon market mechanism, to enable the climax phase of traditional agroforestry models (such as tembawang in West Kalimantan) to receive compensation.

Potential role(s) for companies

- Explore the opportunities of agroforestry and the offtake of its products (main product and niche products).
- Companies working together in sourcing areas can explore the offtake of multiple products and opportunities to (create) local demand.
- Companies can better reward their social and environmental services of climate resilient production.

"Multinational trading companies do not seem to be regularly engaged in agroforestry, certainly at farm level. It seems too complex for them engaging in multiple supply chains, getting different people and departments on their plantations, etc. Whereas this is relevant for many medium-scale companies, multinational companies have experts for different commodities and have markets for different produce. It might be interesting to commence with such companies to explore the opportunities of agroforestry" (Knowledge institute, interview).

Potential role(s) for financial service providers

How can financial service providers contribute to accelerating of and impact (scaling) of agroforestry?

- Provide funding for first (4-5) unproductive years of agroforestry development.
- Developing innovative finance mechanisms. Here, blended finance is an option: first to overcome the unproductive years by public funding, then investments from private funding for the productive years.

Rabobank/ACORN: ACORN can facilitate with carbon finance to support the development of new projects where carbon finance plays a role (based on interview)

- Financial sector needs to understand agroforestry systems; banks often do not understand the concept, so find it complicated to finance.
- Group of committed financial institutions (both local and international) can work in a partnership to explore new financial mechanisms.

8.10. Conclusion

A range of solution pathways are identified, and they cannot be seen separate from each other. Achieving most impact necessitates the incorporation of all solutions, and therefore – implicitly – also the involvement of a wide range of stakeholders involved. Table 12 provides a summary of the solution pathways.

Solution pathway	Sub-recommendations
Develop a national strategy on agroforestry through multi- stakeholder approach	 Multi-stakeholder partnerships are needed for the development of integrated agroforestry development. Focus on strengthening and capacitating the entire value chain. actors and companies are recommended to work together in sourcing areas, also to enable the production and marketing of multiple produce. Build trust and make the collaboration official
Optimize agroforestry design with local input	 When developing agroforestry systems, it is important to build upon local knowledge and local systems. It is recommended to develop an optimum between local variations and 'standardized' services to allow for scaling. Improving entrepreneurship of community-based agroforestry
Enhancing policies and governance (alignment)	 It is important that good agroforestry practices (GAP) get sufficient attention within the context of social forestry. sufficient national government budget allocation for agroforestry development. Move towards an integrated policy and governance approach (mainly forestry and agriculture) towards agroforestry. The carbon trading policy and payment for environmental services can be an interesting opportunity; the next step is to facilitate it implementation, also for smallholder farmers. Promote and mainstream the policy of community-based agroforestry enterprise.
Mobilizing	- connect producers to the buyers in new or niche markets.
business and markets	 Actors and companies working together in sourcing areas can explore the offtake of multiple products and opportunities to (create) local demand. farmers work together and organize themselves to increase scale and capacity. Agroforestry practices and buyers can better reward their social and environmental services of climate resilient production. Develop the market scheme of rewards and incentives to good practices of community-based agroforestry.
Mobilizing (access	 development and support of innovative financial mechanisms. identify already existing promising capital sources and financial mechanisms and inform
finance	 agroforestry practices about their existence. (potential) business plans for agroforestry practices get support to meet the financial requirements to get access to funding, including the legal status. Initiate specific credit schemes to promote and mainstream community-based agroforestry business.
Mobilize knowledge and research	 promote research and innovation in agroforestry to develop new techniques and innovations. Data collection and improvement about agroforestry systems. Promote and mainstream flagship agroforestry practices to a wider audience. Improve data and mapping of agroforestry practices that align with local agroclimatology (region) as a baseline for further improvement. Develop pilot projects of sustainable and entrepreneurship community-based agroforestry in each region.
Creating	- improve the capacity of (smallholder) farmers on various elements that link to
awareness,	community-based agroforestry.
capacity building	agroforestry practices and management (technical package)

Table 12. Summar	v of solution	pathwavs	with sub-re	commendations.

Solution pathway	Sub-recommendations
	 Replicate and scale the existing infrastructures and best practices (farmer field schools, presence of local NGO, farmer networks) Capacity building of agroforestry also includes stakeholders that are indirectly involved in the agroforestry value chain (financial institutions, extension workers) Increase awareness about the impacts and (potential) benefits of agroforestry at all levels
Knowledge sharing (Collective learning)	 Communities of practice are needed to share lessons learnt and best practices and increase the awareness and knowledge about agroforestry production systems. Create, maintain, and support platforms which can be organized per subcategory topic to share knowledge and experiences

Solution pathways have been identified, also showing the roles that all stakeholders can fulfill. This includes organizations within the Netherlands and Indonesia, along with the Dutch Embassy, each possessing significant potential contributions. Central to the success is collaboration.

Initiating this process involves convening stakeholders to collectively identify priorities and pathways for advancement, potentially culminating in the formulation of communities of practice or even in a roadmap. Within this context, the Dutch Embassy can take a key role, by taking the lead in this first step.

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ANNEXES
Annex 1. Summary of sustainability, international standards and regulations for each of the commodities

Sustainability and certification in the cocoa sector

Worldwide, Europe is the most important market for certified cocoa due to a growing consumer interest, sustainability programs by chocolate companies and government policies¹⁰⁹. The Dutch cocoa and chocolate industry set the goal to reach a 100% sustainable cocoa consumption by 2025¹¹⁰, and leading companies such as Nestlé and Mondelez have developed their own sustainability programs and policies regarding their relationship with farmers, transparency in the value chain, and their social and environmental impacts upstream.

Certification standards related to environmental, social and/or economic aspects are generally a part of the sustainability strategy of companies, for example Rainforest Alliance/UTZ, which is the most commonly used mainstream certification scheme for cocoa. Additionally, the certification schemes Fairtrade¹¹¹ and organic are growing on the specialty markets.

The "Cocoa Beans: Chocolate & Cocoa Industry Quality Requirements" guide¹¹² developed by The European Cocoa Association (ECA), the Chocolate, Biscuits and Confectionery of Europe (CAOBISCO), and the Federation of Cocoa Commerce (FCC) (CAOBISCO/ECA/FCC) provides recommendations on cocoa growing (planting material, pest and disease control, cadmium uptake mitigation), harvesting, post-harvesting practices and quality evaluation methods. However, there is no mention at all about agroforestry in their recommendations.

The EU Deforestation Regulation (EUDR) also includes cocoa, since cocoa is considered a risk commodity for deforestation.

CBI¹¹³ describes further that European consumers want to have more information about the context of cocoa production and impact of their consumption. Examples of more demand for information involve:

- 1. Single-origin chocolate makes it to mainstream markets in Europe
- 2. <u>Storytelling increasingly important on the cocoa and chocolate market</u>
- 3. Demand for bean-to-bar chocolate on the rise
- 4. Direct trade is shortening the cocoa chain
- 5. Health and wellness increasingly influence chocolate consumers
- 6. <u>EU regulation on cadmium continues to impact the industry</u>
- 7. Multinationals increase their influence on the global cocoa market
- 8. <u>Cocoa sustainability has high priority on the international agenda</u>
- 9. <u>Sustainability programmes are commonplace in the private sector</u>

¹⁰⁹ <u>https://www.cbi.eu/market-information/cocoa-cocoa-products/certified-cocoa</u>

¹¹⁰ https://www.cbi.eu/market-information/cocoa-cocoa-products/netherlands/market-entry

¹¹¹ <u>https://www.fairtrade.net/</u> and <u>https://www.fairtradenederland.nl/het-keurmerk/</u>

¹¹² CAOBISCO/ECA/FCC Cocoa Beans: Chocolate and Cocoa Industry Quality Requirements. September 2015 (End, M.J. and Dand, R., Editors)

¹¹³ <u>https://www.cbi.eu/market-information/cocoa/trends#single-origin-chocolate-makes-it-to-mainstream-markets-in-europe</u>

Cocoa requirements, international standards and common quality assessment methodologies¹¹⁴:

- ISO's Standards on classification and sampling for cocoa beans;
- The Fine Cacao and Chocolate Institute (FCCI);
- Heirloom Cacao Preservation's genetic evaluation of cocoa;
- Equal Exchange/TCHO's quality assessment and tasting guide to assess the quality of cocoa along the value chain;
- The main standard for good agricultural practices (GAP) is provided by GLOBALG.A.P.¹¹⁵, a voluntary standard for certification of agricultural production processes that provide safe and traceable products. Certification organizations (such as Rainforest Alliance/UTZ¹¹⁶) often incorporate GAP in their standards;
- Implementation of a quality management system (QMS, based on Hazard analysis and critical control points (HACCP); is often a minimum standard required at the level of storage and handling of cocoa beans. If you export semi-finished cocoa products, some buyers will also expect you to have certification, such as International Featured Standards: Food (IFS), Food Safety System Certification (FSSC 22000) or British Retail Consortium Global Standards (BRC) certificates for your manufacturing facilities.

¹¹⁴ <u>https://www.cbi.eu/market-information/cocoa-cocoa-products/netherlands/market-entry</u>

¹¹⁵ <u>https://www.globalgap.org/</u>

¹¹⁶ https://www.rainforest-alliance.org/business/certification/

Annex 2. Relevant Dutch, European and global agreements and regulations

EU Deforestation (-free) Regulation (EUDR)

The recently approved EU Deforestation Regulation¹¹⁷ (EUDR) requires companies to ensure that the products they place on the EU market or export from it are not associated with deforestation. The regulation affects seven specific commodities (cocoa, coffee, soy, palm oil, wood, rubber, and cattle) and their derivatives, as well as products made from these commodities. The land use change associated with these seven commodities are considered responsible for 90% of the deforestation across the tropics, including in Indonesia.

According to the EUDR, these commodities and the derived products shall not be placed or made available on the market or exported, unless all the following conditions are fulfilled: (a) they are deforestation-free; (b) they have been produced in accordance with the relevant legislation of the country of production; and (c) they are covered by a due diligence statement. This due diligence process¹¹⁸ includes the requirement to collect evidence that the product is traceable to the plot of land, deforestation-free, and legal.

The Regulation defines a product as deforestation-free when the product itself, its ingredients or its derivatives are not produced on land subject to deforestation or (in the case of wood products) to forest degradation¹¹⁹ after the cut-off date of December 31st, 2020.

The Paris Agreement

In 2015, the Paris Agreement was adopted at Conference of the Parties (COP) 21 in Paris in 2015 and entered into force in 2016. The Paris Agreement is a legally binding international treaty on climate change with the goal of limiting global warming well below 2 (preferably 1.5) degrees Celsius, compared to pre-industrial levels¹²⁰. The UN's Intergovernmental Panel on Climate Change (IPCC) indicates that crossing the 1.5°C threshold "risks unleashing far more severe climate change impacts, including more frequent and severe droughts, heatwaves and rainfall"¹²¹.

The Paris Agreement Article 6.4.¹²² states that it is a mechanism to contribute to the mitigation and reduction of GHG emissions by public and private entities, also to fulfil the NDCs of the host country, and to support sustainable development. The Paris Agreement provides financial, technical and climate-related capacity building support to countries who need it.

¹¹⁷ See: REGULATION (EU) 2023/1115 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 31 May 2023 on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010

¹¹⁸ The due diligence process for companies consists of 3 steps: First, to collect evidence that the product is traceable,

deforestation-free, and legal. Second, to assess risks of non-compliance and, third, if risks have been identified, take action to mitigate them

¹¹⁹ forest degradation' under the EUDR means structural changes to forest cover, taking the form of the conversion of: (a) primary forests or naturally regenerating forests into plantation forests or into other wooded land; or (b) primary forests into planted forests

¹²⁰ <u>https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement</u>

¹²¹ <u>https://unfccc.int/process-and-meetings/the-paris-agreement</u>

¹²² https://unfccc.int/sites/default/files/english_paris_agreement.pdf

The 2030 Agenda for Sustainable Development

The 2030 Agenda for Sustainable Development was launched in 2015 by a UN Summit. It aimed at ending poverty in all forms globally by 17 Sustainable Development Goals (SDGs) and in total 169 targets¹²³.

The 2030 Agenda for Sustainable Development includes relevant goals to which agroforestry can contribute, including: **Goal 1.** End poverty in all its forms everywhere; **Goal 2.** End hunger, achieve food security and improved nutrition and promote sustainable agriculture; **Goal 8.** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all; **Goal 11.** Make cities and human settlements inclusive, safe, resilient and sustainable; **Goal 13.** Take urgent action to combat climate change and its impacts¹²⁴ and **Goal 15.** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss; **Goal 17.** Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Convention on Biological Diversity (CBD) targets: Kunming-Montreal Global Biodiversity Framework

The CBD is an international treaty adopted in 1993 for "the conservation of biodiversity, the sustainable use of the components of biodiversity, and the equitable sharing of the benefits derived from the use of genetic resources"¹²⁵.

In December 2022, the CBD biodiversity summit adopted the "Kunming-Montreal Global Biodiversity Framework" that includes four goals and 23 action-oriented targets for achievement by 2030 and four long-term goals for 2050 to reduce threats to biodiversity and restoring natural ecosystems.

The Kunming-Montreal biodiversity agreement includes key global targets including for example:

- Restore 30% degraded ecosystems globally (on land and sea) by 2030.
- *Reduce risk from pesticides* by at least 50% by 2030.
- *Prevent/reduce the rate of introduction and establishment of invasive alien species* by 50% in 2030, and control or eradicate such species.
- Sustainably manage areas under agriculture, aquaculture, fisheries, and forestry and substantially increase agroecology and other biodiversity-friendly practices.
- Tackle climate change through nature-based solutions.

Zoonoses Policy in the Netherlands

Zoonotic diseases (or zoonoses) are infectious diseases that can be transmitted between animals and humans via direct and indirect contact, such as Campylobacteriosis, Salmonellosis and COVID-19. The Netherlands has a strong Zoonoses Policy to reduce the risks of the occurrence and spreading of

intergovernmental forum for negotiating the global response to climate change." ¹²⁵ https://www.cbd.int/article/cop15-final-text-kunming-montreal-gbf-221222

¹²³ https://www.coe.int/en/web/programmes/un-2030-

agenda#:~:text=The%202030%20Agenda%20for%20Sustainable,equality%20and%20non%2Ddiscrimination%E2%80%9D. ¹²⁴ "* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international,

zoonoses ¹²⁶, but also internationally, countries are collaborating intensively to prevent, monitor and combat/fight zoonoses. Particularly with in mind the negative impacts of climate change on the occurrence of zoonoses and their vectors (e.g. mosquitos), the Dutch Government has developed the National Action Plan for Zoonoses, which also focuses on infections and outbreaks arising from abroad.

¹²⁶ <u>https://www.rijksoverheid.nl/actueel/nieuws/2022/07/06/nationaal-actieplan-</u> zoonosen#:~:text=Om%20de%20risico's%20op%20het,van%20Lyme%20en%20COVID%2D19

Annex 3. Agroforestry projects in Indonesia developed by organizations in the Netherlands, Europe or worldwide

Project or program	Period	Initiators and implementers (and weblink)
Agroforestry: Our Natural Climate	Since 2014	Nespresso, OLAM (since 2016) and PUR Projet (since 2020)
Solution		······································
		https://www.sustainability.nespresso.com/climate-
		resilience-through-agroforestry
Fairventures Social Forestry		Fairventures, LDN Fund, IDH, Mirova
,		https://www.idhsustainabletrade.com/publication/ldn-
		insights-fairventures-social-forestry/
		https://fairventures.earth/agroforestry-expert-
		fairventures-social-forestry-closes-impact-loan-for-its-
		showcase-project-in-borneo-indonesia/
Green Villages program in		Solidaridad and diverse stakeholders in business,
Indonesia		government and the local communities
		https://www.solidaridadnetwork.org/news/small-farmers-
		protect-unique-forests-of-indonesia/
IDH and Unilever project in Aceh		IDH and Unilever
Tamiang, Indonesia		
		https://www.idhsustainabletrade.com/news/unilever-and-
		idh-commit-1-5m-euro-for-sustainable-sourcing-in-
		indonesia/
		https://www.unilever.com/files/92ui5egz/production/42cc
		4b98f04b9cdf072dd3e24dfd1ec285e6a53b.pdf
Increase Earnings Capacity for	2017-2020	Jacobs Douwe Egberts (JDE), Louis Dreyfus Commodities
Indonesian Coffee Smallholders in		(JDC)
Indonesia		
		https://www.jacobsdouweegberts.com/asia/indonesia/pro
		ject-5/
KADIN Regenerative Forest		Indonesian Chamber of Commerce and Industry (KADIN)
Business Sub Hub (RFBSH)		
		https://kadinregforest.com/events/new-york-climate-
		week-dialogue/
Kopi Lestari: Agroforestry project	Established	PUR Projet
in Indonesia	in 2013	
		https://www.pur.co/project/kopi-lestari/
Landscape Approach to	Initiated in	United States Agency for International Development
Sustainable and Climate Change	May 2023	(USAID) in partnership with <u>Olam Food Ingredients (ofi),</u>
Resilient Cocoa and Coffee		<u>Rikolto, Hershey's</u> , and the Government of Indonesia
Agroforestry (LASCARCOCO)		
		https://www.usaid.gov/indonesia/fact-sheets/lascarcoco-
		sustainable-agrotorestry-cocoa-and-coffee-smallholders

Table 13. Agroforestry projects in Indonesia developed by organizations in the Netherlands, Europe or worldwide

Project or program	Period	Initiators and implementers (and weblink)
		https://id.usembassy.gov/united-states-invests-in-
		indonesian-coffee-and-cocoa-producing-communities/
Nescafé Plan 2030		Nestlé
		https://www.nestle.com/media/pressreleases/allpressrele
		ases/sustainable-coffee-nescafe-plan-2030
		https://www.nestle.com/sites/default/files/2022-
		<u>10/Nescate-Plan-2030-Infographic-en.pdf</u>
Program: Transforming the Cocoa		Implemented by Kalimajari (a local Ball-based NGO),
Addition for Smallholders		Rainforest Alliance and Rikolto
		https://magazines.riiksoverheid.pl/lpv/agrospecials/2023/
(TRACTIONS)		01/indonesia
Project To Advance Regenerative		Danone L'Oréal Mars Incorporated The Livelihoods
Agriculture		Funds, And SNV, Musim Mas
		https://www.musimmas.com/danone-loreal-mars-musim-
		mas-have-partnered-on-regenerative-agriculture-in-
		indonesia-regenerating-8000-hectares/
Regenerative Robusta in Indonesia	Initiated in	Social enterprise Coffee (project partners: 100 farmers
	2020	from Flores, Indonesia, Social enterprise, MVO, Asnikom,
		Preta Terra, CCF, and Progreso
		https://thissideup.coffee/regenerativerobusta
Siak Pelalawan Landscape	Initiated in	Proforest and Daemeter (the Consortium of Resource
Program (SPLP) in Indonesia	2018	Experts)
		Coalition Members: Cargill, L'Oréal, Musim Mas, Neste,
		PepsiCo, and Unilever and Coalition supporters: Danone
		and Sinar Mas
		Supported by Switzerland's State Secretariat for Economic
		Affairs (SECO)
		https://www.siakpalalawap.pat/
Smallholder replanting finance		<u>Inttps://www.slakpelalawan.net/</u>
and support program		Musim Mas
		https://www.facsglobal.com/financial-access-bank-sumut-
		livelihoods-funds-13f-and-musim-mas-sign-mou-to-
		strengthen-collaboration-in-oil-palm-smallholder-finance-
		in-indonesia/
The Sugar and Steam Project:		AidEnvironment, Dutch Ministry of Foreign Affairs (SDG
Sustainable Intensification of		Partnership facility), RVO
Agroforestry Production Systems		
in Indonesia		https://aidenvironment.org/project/improving-climate-
		resilience-farmers-indonesia/

Project or program	Period	Initiators and implementers (and weblink)
White pepper Agroforestry in	Initiated in	Verstegen, ReNature and Preta Terra
Indonesia	2019	
		https://www.renature.co/projects/agroforestry-indonesia-
		bangka/
Working Landscapes Program	2019-2023	financed by the Netherlands Ministry of Foreign Affairs
		https://magazines.rijksoverheid.nl/lnv/agrospecials/2023/
		<u>01/indonesia</u>

Working Landscapes Program

2019-2023 financed by the Netherlands Ministry of Foreign Affairs <u>https://magazines.rijksoverheid.nl/lnv/agrospecials/2023/01/indonesia</u>

Program: TRACTIONS

Transforming the Cocoa Sector in Indonesia Through Value Addition for Smallholders

program funded by RVO through the Sustainable Development Goals Partnership (SDGP) Facility project

implemented by Kalimajari (a local Bali-based NGO), Rainforest Alliance and Rikolto <u>https://magazines.rijksoverheid.nl/lnv/agrospecials/2023/01/indonesia</u>

KADIN Regenerative Forest Business Sub Hub (RFBSH)¹²⁷

The Indonesian Chamber of Commerce and Industry (KADIN) has prioritized building a forest-based economy through reducing deforestation, restoring ecosystems and promoting social forestry. To this purpose, KADIN has established a Regenerative Forest Business Sub Hub (RFBSH) through intensive consultation with the Ministry of Environment and Forestry to support its forestry members. Through this hub, KADIN aims to increase knowledge and commitment of member companies to sustainable forest management through three main activities, namely increasing knowledge, dialogue processes, and readiness for implementation.

KADIN, through the RFBSH initiated the Multi-business Forestry (MUK) pilot project, which is focused on strengthening the implementation of Sustainable Forest Management (SFM) activities through the integration of multi-commodity businesses to increase their added value towards (i) the protection of and increasing the capacity of forest ecosystem functions, including protecting biodiversity and forest cover, and increasing carbon sequestration, (ii) increasing social roles, and (iii) increasing added value to financial performance for communities and PBPH entrepreneurs.

Goods and services from agroforestry and PES systems are included in the pilot projects.

The overall pilot project will involve 5 pilot projects, including:

¹²⁷ https://kadinregforest.com/events/new-york-climate-week-dialogue/

- 1. strengthening the sustainability of Multi-business Forestry management in productive natural forests;
- 2. development of the potential for sustainable management of Multi-business Forestry in nonproductive natural forests;
- 3. collaboration on conflict resolution towards sustainable Multi-business Forestry management;
- 4. sustainability of Multi-business Forestry management based on the diversity of forest resources (use of water for bottled drinking water) and;
- 5. sustainability of Multi-business Forestry management for carbon sequestration and storage.

The Multi-business Forestry piloting model is in the developmental phase, and will be followed by seeking support and endorsement from the government, recruiting companies to participate and develop a monitoring and evaluation plan.

The Sugar and Steam Project: Sustainable Intensification of Agroforestry Production Systems in Indonesia

- Initiated by: AidEnvironment, Dutch Ministry of Foreign Affairs (SDG Partnership facility), RVO
- Improving income and climate resilience for female farmers, the program intervention is the first of its kind in Indonesia. Serving as a 'light tower project' and 'game changer', it provides innovative and climate adaptive on-farm technologies as part of a sustainable and profitable model for farmers.
- In order to further sustained and inclusive economic growth, the project supports the poorest and most disadvantaged farmers (70% women) across 5 villages, in the Kulon Progo District through training on resilient farming practices that are developed and validated by on-farm participatory research, which enables a sustained intensification of rain-fed production systems. Farmers are supported in adapting their farms to become resilient to the adverse effect of climate change in the region. They are trained to adhere to the principles of organic agriculture and to operate as part of the circular economy.
- The project will stimulate wealth and economic and social prosperity for vulnerable groups across Indonesia. Partnering with Aliet Green, a producer and manufacturer of organic coconut sugar and other organic food products located in Yogyakarta, allows farmers to capitalize on opportunities such as those created by rising consumer and corporate demand for alternative natural sweeteners in international markets.
- https://aidenvironment.org/project/improving-climate-resilience-farmers-indonesia/

Increase Earnings Capacity for Indonesian Coffee Smallholders in Indonesia

- Initiated in 2017-2020 by: Jacobs Douwe Egberts (JDE), Louis Dreyfus Commodities (JDC)
- Regions: Tanggamus, North Lampung, West Lampung in South Sumatra
- The project objective is to increase the earning capacity on a long-term perspective. The focus will be on training and agroforestry:
 - Agricultural practices in respect with environment and safety while working in the fields
 - Economic topics on coffee market and finance
 - Social conditions; specific training for women
 - Collect and analyze soil samplings cross project area to help fertilizer management
 - Invest hand testers to check pH and moistures of the soil to promoters who will facilitate directly in local and farmers

- Improve responsible use of pesticides and fertilizers to reduce toxic loading into environment (water, soil) by training for local facilitators and farmers, practicing technical application in farms
- Dedicated training to women only with women and if possible, provided by women.
- Joined training with both husband and wife.
- https://www.jacobsdouweegberts.com/asia/indonesia/project-5/

Regenerative Robusta in Indonesia

- Initiated in 2020 by: Social enterprise Coffee (project partners: 100 farmers from Flores, Indonesia, Social enterprise, MVO, Asnikom, Preta Terra, CCF, and Progreso)
- Region: Flores, Indonesia
- To design and implement an agroforestry system to improve coffee yield in close collaboration with farmers from Flores and offer alternative sources of income.
- To develop written resources that can aid in the development of the regenerative project in Flores and further foster agroforestry projects in other regions. This includes: a species profiles of durian, avocado and pepper; a technical guide on how to create an agroforestry system for coffee as well as one for Carbon Foundations, and a technical summary of the key.
- Maintaining and optimization of Agroforestry Coffee capacity through a demo-plot that will serve as a proof of the benefits of the system and inspire farmers to further develop it.
- https://thissideup.coffee/regenerativerobusta

Nescafé Plan 2030

- Initiated by: Nestlé.
- Focus countries: Mexico, Côte d'Ivoire and Indonesia.
- To help drive regenerative agriculture, reduce greenhouse gas emissions and improve farmers' livelihoods.
- Nescafé will pilot a financial support scheme to help farmers accelerate the transition to regenerative agriculture. Through this scheme, Nescafé, together with coffee farmers, will test and learn the best approach in each country.
- Investment: over one billion Swiss francs (US\$1.01 billion) by 2030 in the Nescafé Plan 2030.
- Nescafé broader targets include achieving 100% responsibly sourced coffee by 2025 and 20% of coffee sourced from regenerative agricultural methods by 2025 and 50% by 2030.
- <u>https://www.nestle.com/media/pressreleases/allpressreleases/sustainable-coffee-nescafe-plan-2030</u>
- https://www.nestle.com/sites/default/files/2022-10/Nescafe-Plan-2030-Infographic-en.pdf

Landscape Approach to Sustainable and Climate Change Resilient Cocoa and Coffee Agroforestry (LASCARCOCO)

- Initiated in May 2023 by: United States Agency for International Development (USAID).
- a new project to promote sustainable cocoa and coffee production in Indonesia in partnership with <u>Olam Food Ingredients (ofi)</u>, <u>Rikolto</u>, <u>Hershey's</u>, and the Government of Indonesia.
- LASCARCOCO will train 6,500 cocoa and coffee farmers in North Sumatra, South Sulawesi, and East Nusa Tenggara in sustainable agroforestry practices.
- Involving training with approximately 6,500 coffee and cocoa farmers in North Sumatra, South Sulawesi and East Nusa Tenggara, the LASCARCOCO project is in partnership with the Indonesian

government, multinational raw ingredients company Ofi (formerly Olam Food Ingredients), Belgiumbased international nonprofit Rikolto and United States-based food giant Hershey's.

- The project is specifically designed to promote agroforestry-based crop production in Indonesia. In coffee applications, agroforestry may be loosely defined as a land use system that integrates coffee plants with shrubs and trees, resulting in increased biodiversity, shade cover, soil health and long-term plant health. It is a foil to the kind of monocrop land use systems involving widespread deforestation and full-sun growth that are prevalent throughout the global coffee sector.
- The project will tie into Ofi's/Olam's Farmer Information System for transparent and traceable supply chain data, while Rikolto will lead the farmer community engagement efforts. Hershey's has agreed to purchase cocoa butter produced through the project for use in its chocolate products.
- <u>https://www.usaid.gov/indonesia/fact-sheets/lascarcoco-sustainable-agroforestry-cocoa-and-coffee-smallholders</u>
- <u>https://id.usembassy.gov/united-states-invests-in-indonesian-coffee-and-cocoa-producing-communities/</u>

White pepper Agroforestry in Indonesia

- Initiated in 2019 by: Verstegen, ReNature and Preta Terra.
- Location: island of Bangka.
- This project focuses on the development of an economically viable Regenerative Agroforestry system: redesigning the cultivation of pepper. The system also provides multiple by-products, generates ecosystem services and positively influences farmer livelihoods. As part of reNature's long-term transition strategy, this project serves as a first pilot initiating the adoption of agroforestry practices by more than 500 local pepper farmers in the area.
- https://www.renature.co/projects/agroforestry-indonesia-bangka/
- https://renature.pr.co/171613-verstegen-spices-starts-white-pepper-food-forest

Solidaridad's multi-year Green Villages programme in Indonesia

- Initiated by: Solidaridad
- Collaboration with: diverse stakeholders in business, government and the local communities.
- The Green Villages programme encourages farmers to adopt a sustainable lifestyle throughout their communities, while the landscapes programme in the Merapi region helps small farmers conserve the unique and fragile volcanic forests found in Indonesia.
- Solidaridad guides farming businesses situated near these agroforestry frontiers in avoiding further poverty-driven deforestation. In its approach to sustainability, Solidaridad seeks to bundle solutions, such as climate-smart agriculture, local agroforestry business, community-based and democratic management, blended finance, local governance, local IT, to reach out to poor villagers, while also reducing pressure on tropical forests.
- The goal of these guided agroforestry communities is to mitigate and adapt to climate change by:
 - increasing carbon storage through forest replanting with economic-benefitting trees
 - improving clean water accessibility with innovative renewable technology
 - increasing livelihood with smart oil palm farming and bee-farming activities
 - enhancing adaptive capacity through soil management & conservation
 - embedding climate change awareness in the culture through education at schools
- https://www.solidaridadnetwork.org/news/small-farmers-protect-unique-forests-of-indonesia/

Kopi Lestari: Agroforestry project in Indonesia

- Initiated by: PUR Projet.
- Established in 2013, this project supports small-scale coffee farmers producing arabica coffee in Aceh and robusta coffee in Lampung.
- Agroforestry and reforestation with coffee farmers from the #KBQB Baburrayan cooperative in Indonesia.
- In Aceh and Lampung, PUR designs and implements agroforestry activities, seeking to address erosion and the loss of soil fertility, while also ensuring optimal production of coffee by regulating microclimatic conditions and improving farmers' self-sufficiency.
- Regular environmental training is delivered to improve farmers' knowledge of agroforestry. This training covers the benefits of trees in coffee-producing landscapes, planting models and tree species, tree planting techniques, and tree maintenance.
- https://www.pur.co/project/kopi-lestari/

Agroforestry: Our Natural Climate Solution

- Initiated by: Nespresso, OLAM (since 2016) and PUR Projet (since 2020).
- Since 2014, Nespresso has been working with AAA coffee farmers to reintroduce trees in and around coffee farms to strengthen the resilience of communities to climate change. A nature-based agricultural approach known as agroforestry.
- A key principle followed across all our agroforestry operations is that only native trees are planted. Experience tells us that, during the transition of farming practices from one model to another, the trust and bond built between our partners, agronomists and the farmers helps ensure success.
- In our efforts to not only preserve but also restore coffee ecosystems and reduce our operational carbon footprint, we have planted 5.9 million trees in and around coffee farms since 2014. These efforts span 9 countries: Brazil, Colombia, Costa Rica, Ethiopia, Guatemala, Indonesia, Kenya, Nicaragua, and Uganda.
- <u>https://www.sustainability.nespresso.com/climate-resilience-through-agroforestry</u>

IDH and Unilever project in Aceh Tamiang, Indonesia

- Initiated by: IDH and Unilever.
- To ensure forest protection, especially the buffer zone of the Leuser Ecosystem, Unilever and Leuser Conservation Forum, locally known as FKL, facilitated by IDH, will implement a restoration pilot project. This project will use agroforestry-based models to offer local communities alternative livelihood options to oil palm farming, in order to prevent encroachment into the forest and Leuser Ecosystem. The model would advocate for a social forestry model to ensure local communities obtain appropriate land tenure for this area.
- At least 500 hectares are planned to be rehabilitated through an agroforestry approach. Continuous training on agroforestry, planting seedlings and GAPs will be provided to communities living around the restoration areas. It is expected that at least 100 community members will receive training and continuous assistance for the agroforestry approach. The training will be conducted at a nursery facility and aims to reach at least 50 women.
- <u>https://www.idhsustainabletrade.com/news/unilever-and-idh-commit-1-5m-euro-for-sustainable-sourcing-in-indonesia/</u>

<u>https://www.unilever.com/files/92ui5egz/production/42cc4b98f04b9cdf072dd3e24dfd1ec285e6a</u>
 <u>53b.pdf</u>

Fairventures Social Forestry

- Initiated by: Fairventures, LDN Fund, IDH, Mirova.
- This project is demonstrating such a scalable commercial model for landscape restoration with community participation on land issued through social forestry permits and is preparing to attract additional (impact) investment.
- The project aims to initially rehabilitate 4,000 hectares of degraded lands through planting fastgrowing tree species and cash crops in agroforestry systems and increasing the value of secondary forests through enrichment plantings with non-timber forest products (NTFPs). This project is a good example of a potential innovative restoration finance case that was initiated by an NGO and turned into a for-profit social venture. The operation is currently looking to secure financing to implement a successful showcase at significant size, followed by initial private investment for scaling impact on LDN and creating income opportunities for local communities.
- https://www.idhsustainabletrade.com/publication/ldn-insights-fairventures-social-forestry/
- <u>https://fairventures.earth/agroforestry-expert-fairventures-social-forestry-closes-impact-loan-for-its-showcase-project-in-borneo-indonesia/</u>



** Innovative financing structure of grants, soft loans and (patient) equity

Figure 24. Schematic Fairventures Social Forestry

Siak Pelalawan Landscape Programme (SPLP) in Indonesia

- In 2018 SPLP is facilitated by Proforest and Daemeter, known together as CORE (the Consortium of Resource Experts)
 - *Coalition Members*: Cargill, L'Oréal, Musim Mas, Neste, PepsiCo, and Unilever and *Coalition supporters*: Danone and Sinar Mas
 - Supported by Switzerland's State Secretariat for Economic Affairs (SECO)
- This private sector-driven initiative aims to achieve sustainable palm oil production in Siak and Pelalawan districts in Riau, Indonesia. Home to more than 200 villages, the districts spread over 2 million hectares. These major palm oil-producing districts have significant numbers of independent (smallholder) farmers. SPLP supports and builds on existing government led initiatives, in particular the Green Siak District Roadmap and the District Action Plan for Sustainable Palm Oil in Pelalawan.
- SPLP brings together a coalition of eight companies working together to halt and reverse historical rates of deforestation, degradation of forests and peatland, while mitigating risk from fire and agricultural expansion. There are many land and labour-related issues – with many of the district's mills lacking engagement or awareness relating to NDPE (no deforestation, no planting on peat, no exploitation) production.



Figure 25. Schematic Siak Pelalawan Landscape Programme (SPLP) in Indonesia

Smallholder replanting finance and support program

- Financial Access, Bank Sumut, Livelihoods Funds (L3F) and Musim Mas
- DESCRIBE Project
- <u>https://www.facsglobal.com/financial-access-bank-sumut-livelihoods-funds-l3f-and-musim-mas-</u> <u>sign-mou-to-strengthen-collaboration-in-oil-palm-smallholder-finance-in-indonesia/</u>

Project To Advance Regenerative Agriculture

- Danone, L'Oréal, Mars, Incorporated, The Livelihoods Funds, And SNV, Musim Mas
- DESCRIBE Project
- <u>https://www.musimmas.com/danone-loreal-mars-musim-mas-have-partnered-on-regenerative-agriculture-in-indonesia-regenerating-8000-hectares/</u>

Annex 4. Detailed description of stakeholders interviewed

Interview no.	Type of organization	Name organization	Contact person	Focus
1	Community	Mekar Raya village	Community member	Tembawang agroforestry
2	Community	Mekar Raya village	Community member	Tembawang agroforestry
3	Government	Ministry of Environment and Forestry	Director General of Sustainable Forest Management (PHL)	Industrial agroforestry policy
4	Government	Ministry of Environment and Forestry	Director General of Social Forestry and Environmental Partnership (PSKL)	Social forestry policy and family farming agroforestry
5	Government	Ministry of Environment and Forestry	Director of PKPS	Social forestry licensing family farming agroforestry
6	Government	Ministry of Environment and Forestry	Director of PKPS	Extension services for social forestry and agroforestry
7	Government	Ministry of Environment and Forestry	Direktor of PKTHA	Adat forest and traditional agroforestry
8	Knowledge center	IPB University	Professor in Social Forestry, Faculty of Forestry	Agroforestry status and the challenges
9	Knowledge center	IPB University	Doctoral student, FAO-BAPPENAS consultant for food security	Food security in agroforestry
10	Knowledge center	Gadjah Mada University	Professor in social forestry, Faculty of Forestry, The Indonesian Network of Agroforestry Education (INAFE)	Strategic issue in agroforestry development
11	Knowledge center	Gadjah Mada University	Professor in forest policy, Faculty of Forestry, SEBIJAK Institute	Forestry policy and its impact on agroforestry
12	Knowledge center	Gadjah Mada University	Professor in Faculty of Forestry	Agroforestry from agriculture perspective
13	Knowledge center	STIPER Institute	Professor in agribusiness, Faculty of Agriculture	Business opportunity in agroforestry

 Table 14. Overview of stakeholders interviewed for the semi-structured interviews.

Interview	Type of	Name organization	Contact person	Focus
no.	organization			rocus
14	Knowledge center	STIPER Institute	Professor in Ecology, Faculty of Forestry	Agroforestry principles
15	Knowledge center	University of Lambungmangkurat	Professor in forest management, Faculty of Forestry	Tembawang agroforestry in West Kalimantan
16	Knowledge center	University of Lambungmangkurat	Professor in peatland ecology	Tembawang agroforestry and peatland in West Kalimantan and
17	Knowledge center	WUR/ SustainPalm*	Associate professor at plant Production Systems Group working on Sustain Palm project	Oil palm
18	Knowledge center	WUR	Assistant Professor, Forest Ecology and Forest Management	General
19	Knowledge center	ICRAF/CIFOR*	Senior Fellow at ICRAF	General
20	NGO	Biodiversity Foundation	Program Manager on Agroecosystem, Biodiversity Foundation	Family farming agroforestry and coffee production
21	NGO	Kemitraan	Social Forestry expert	Social forestry progress in the field level
22	NGO	WARSI	Social Forestry expert, WARSI	Social forestry and family rubber agroforestry
23	NGO	JAVLEC	Executive Director	Tree crop, food crop, and pekarangan agroforestry
24	NGO	SCF	Board of SCF	Cocoa agroforestry
25	NGO	Tropenbos Indonesia	Facilitator	Good agriculture practices
26	NGO	Tropenbos Indonesia	Facilitator	Tembawang agroforestry

Interview	Type of	Name organization	Contact person	Focus
no.	organization			Tocus
27	NGO	Tropenbos Indonesia	Facilitator	Cocoa agroforestry
28	NGO	Tropenbos Indonesia	Facilitator	Rubber market in West Kalimantan
29	NGO	Agriterra	Employee, Indonesia	Coffee
30	NGO	Hanns R. Neumann Stiftung*	Country Manager Indonesia	Coffee, starting with cocoa and other commodities.
31	NGO	Progreso (NL)	Program Manager ProClimate and Asia	Coffee, bit of cocoa
32	NGO	Rainforest Alliance*	Coffee Team Manager	Coffee
33	NGO	IDH* (NL)	 Cocoa Coordinator Program Manager Landscape Governance Director Landscape Finance 	Сосоа
34	NGO	IDH* (NL)	Coffee Coordinator; involved in the EMPOWER project (see Flagship projects)	Coffee
35	Multilateral Organization	UNEP*	Senior regional advisor Asia-Pacific on Green Economy	Carbon credits/ policy
36	Consultancy firm/ Service provider	FarmTree	Employee at FarmTree	Oil palm/ general
37	Consultancy firm/ Service provider	PT Daemeter Consulting	Regional Manager	Oil palm/ general
38	Company	Association of Indonesian Forest Concessionaires (APHI)	Head of Operations	Industrial agroforestry
39	Trading company	Verstegen (NL)*	Employee (Indonesia)	Spices
40	Social enterprise	CO ₂ Operate *	Owner	Spices
41	Social enterprise	PT. Forestwise*	Founder and CEO	Miscellaneous
42	Social enterprise	This Side Up (NL)	Founder and CEO	Coffee

Interview no.	Type of organization	Name organization	Contact person	Focus
43	Financial service provider	Rabobank ACORN*	Employee (Indonesia)	General
44	Financial service provider	Rabobank ACORN	Employee (Vietnam)	General

*Suggested by the Embassy

The following sections provide a description of key-stakeholders selected for this study (*Suggested by the Embassy).

Indonesian key stakeholders in Indonesia

Policy makers

<u>Director General of PSKL, Ministry of Environment and Forestry:</u> The Director General of PSKL of the Ministry of Environment and Forestry plays a role as the main stakeholder in the national Social Forestry Program which since 2014 has been targeted to cover 12.7 million hectares. The Social Forestry Program serves as an umbrella for the development of national agroforestry which is economically expected to create a total transaction of IDR 8 trillion. Social forestry is also expected to be able to make a significant contribution to achieving NDC targets, increasing forest cover, biodiversity, and protection, and improving the welfare of local communities whose life have been depending on forest resources.

Social forestry no longer works in sectoral nature, but instead is has been directly related to several policies in other ministries /institutions, such as the Ministry of Home Affairs, Ministry of Villages, and Ministry of Finance. Besides, it now also finds support from policies at a higher level, such as presidential regulations and government regulations. At the sub-national level, it is also endorsed by various regulations at governor and regional levels. Thus, as one of the national strategic programs, the social forestry has a strong legal framework base.

The Director General of PSKL is also one of those in charge of implementing the *Jangka Benah* for community oil palm plantations (not company plantations) located in forest areas. The Secretary General of the Ministry of Environment and Forestry is also responsible for accelerating the implementation of the *Jangka Benah* which so far is in the stage of identification cases involving the community and company oil palm plantations. Lack of data and financial resources pose common obstacles to the process in accelerating the *Jangka Benah* implementation.

In addition, social forestry entrepreneurial models can also be developed more broadly and massively, so that the social forestry economic volume target of 8 trillion IDR can be achieved. It is also hoped that this project will be able to make a maximum contribution to national carbon absorption and increase biodiversity, through expanding and strengthening agroforestry practices under the Social Forestry Program.

The Ministry of Environment and Forestry since 2020 has been implementing the Social Forestry Strengthening (SSF) project in four provinces (West Sumatra, Lampung, West Nusatenggara and North Maluku) for five years with the support of funds from GEF and WB channeled through the Director General of PSKL. It is hoped that this project helps achieve the national social forestry target will accelerate. In addition, the social forestry entrepreneurial models can also be developed more broadly and massively, so as that it can yield its economic target of IDR 8 trillion. It is also hoped that this project— through expanding and strengthening agroforestry practices under the Social Forestry Program — will succeed in making a maximum contribution to national carbon absorption and increase biodiversity.

<u>Director of PKPS:</u> PKPS is one of directors under the Director General of PSKL whose job is to prepare areas for the social forestry. An indicative map of social forestry areas with a total area of more than 13 million hectares earmarks one of the PKPS Director's achievements. This map serves as a guideline for the development of national social forestry areas. Currently, at least more than five million hectares of social forestry areas have been operated by the community, and more than 8,000 social forestry permits have been issued to at least over one million beneficiary groups. An area of over five million hectares is potential for the development of household-based farming agroforestry. Various technical and financial supports for agroforestry development will be delivered by other directorates. The PKPS Directorate merely prepares the land needed for agroforestry development through the Social Forestry Program.

<u>Director of PUPS:</u> PUPS is one of the directorates under the Director General of PSKL whose task is to develop entrepreneurial models for household-based farming agroforestry having already been involved in the social forestry programs. This directorate provides various technical assistance schemes, strengthening business institutions, and developing market access. Currently, more than 10 thousand of social forestry business groups have been established, with a total economic volume of more than IDR 400 billion. They implement the agroforestry practices by relying on family labor; some have started to receive financial support from several banking institutions, some still rely on internal capital systems. Various kinds of commodities have been produced— coffee, cocoa, rubber, spices, honey, and various other non-timber commodities. Several social forestry business groups— among others is the social forestry business group in Gunungkidul Regency (Yogyakarta)— also manage to develop household-based farming agroforestry models with the main commodity includes timber.

<u>Director of PKTHA:</u> PKTHA is another directorate under the Director General of PSKL responsible for handling tenure conflict resolution in forest areas and developing customary forest practices. So far, at least an indicative map potentially for national customary forest of approximately 600 hectares has been determined, and about 200 hectares of forest with each stipulation letter have been issued. Most customary forests are generally developed using agroforestry techniques. While the social forestry areas generally tend to be lands with low vegetation cover, the forest land has denser cover. Traditional agroforestry practices— such as *tembawang* (West Kalimantan), *simpukng* (East Kalimantan), *parak* (West Sumatra), and repong (westtern Lampung)— are implemented in the form of customary forests (instead of social forestry). Therefore, apart from social forestry, customary forest is another umbrella program for the development of agroforestry.

Forest / farm communities and (smallholder) farmer organizations

Forest and farm communities and (smallholder) farmer organizations are involved in the development and implementation of agroforestry (projects). They implement agroforestry for their livelihood and local food production.

<u>Mr. Apen (villager of Mekar Raya):</u> Apeng is a resident of Mekar Raya Village, Simpang Dua Sub-district, Sintang District (West Kalimantan). For generations he develops a traditional agroforestry model (*tembawang*) as a family livelihood. The traditional agroforestry produces arious commodities *tengkawang* fruit, rubber latex, coffee, durian fruit, langsat fruit, various mushrooms and forest vegetables— as a source of dietary fiber and hunted animals such as wild boar as a source of protein. Currently people can no longer rely on the *tengkawang* as a source of family income because the market has withered. Rubber latex, which has been the mainstay of revenue, has also experienced a decline in price in the last few years. Meanwhile, coffee has been out of production for a long time, and the durian fruiting season has also started to turn irregular (perhaps due to climate change), and its price is very low during the harvest season. Apen explained, currently many traditional agroforestry practices in Mekar Raya were abandoned by the residents, since there is nothing else for them to harvest.

The *tembawang* systems alongside the main road have mostly been dismantled and replaced with monoculture oil palm plantations which offer better profits. Meanwhile, those growing inside forest areas and away from road networks are left uncared without any economic benefit. Currently, the the people of Mekar Raya have turned away from *tembawang* to other off-farm sources, such as laborers in oil palm plantations, mining, and other off-farm jobs for source of income. Apen described that currently there are barely young people interested in growing new *tembawang* that they considered unproductive and out of date. The person who is currently actively participating in Tropenbos Indonesia activities declares that he does not have intention to rejoice the move to dismantle his *tembawang*.

Tembawang itself seems to be in the-last-bastion-standing phase of the farming cycle of the Dayak people in West Kalimantan where only timbers are still growing and yielding, generally durian, tengkawang, and some rubber (despite the poor products now). Other plants such as coffee are difficult to grow properly. Therefore, in this phase, the *tembawang* agroforestry is actually unproductive, except for the purpose of storing carbon stocks. The most productive phase is semi-climax, where all types of commercial crops are in their capacity produce best. It is in this phase that the community enjoys the maximum benefits of agroforestry. Meanwhile, in the previous phase, the pioneer phase, the community deliberately used it as a source of food (rice and corn). In this phase, commercial crops have not yet been planted.

<u>Ms. Manis (Villager of Mekar Raya Village)</u>: Ms Manis is a teacher living at Mekar Raya Village. Her husband works as a labourer of a palm oil plantation company. Her family still preserve the *tembawang*; some her husband has grown, some she inherited from her parents. Ms Manis's family believe that—having long been feeling economically beneficiated with the *tembawang*'s yields— they do not have to bother with the falling price of rubber and the increasingly difficult market for *tengkawang* fruit. The family perceive the *tembawang* for its long-term benefit and as a saving rather than a source of daily and monthly income. She feels sorry to find young people crazing the *tembawang* and replacing it with monoculture oil palm plantations.

She sees the *tembawang* a noble agroforestry characterizing of the Dayak community in West Kalimantan, and it needs to be preserved. Losing its former role of becoming a main economic resource as it is, the *tembawang* does not necessarily mean to be wiped out. The community needs to work together to find a way out of how to make the *tembawang* productive again. The younger generation also needs to be taught how to preserve various local wisdoms such as the *tembawang*. What Tropenbos Indonesia has done in Simpang Dua District — trying to empower the community and to provide training on environmentally friendly agriculture— can be a good example. The village authorities must promote such a program to preserve the *tembawang*. She is actively involved in Tropenbos Indonesia program in improving tembawang agroforestry.

Knowledge centers

<u>Faculty of Forestry (IPB University)</u>: Faculty of Forestry (IPB University) conducted agroforestry case studies in many locations as part of the documentation and development strategy. One of them is the study of sengon agroforestry in Garut (West Java) and agrosilvopastural tourism in Lumajang (East Java). The major commodity of agroforestry in Garut is timber and the major commodity of agrosilvopastoral in Lumajang is non-timber, such as cow's milk and its derivatives, as well as various environmental tourism services.

Agrosilvopastura in Lumajang District, East Java Province, is classified as one of the agroforestry models that has reached the industrial scale. With the support of several international dairy industries, the Agrosilvopastura model under the Social Forestry Program successfully integrates the management of forest landscapes, food crops, animal feed and livestock areas. Through cooperative institutions, the community manages the production process of various commodities, especially cow's milk, funded by financial institutions, and getting technical support from international companies who involved as a business partner, as well as from national and regional NGOs.

<u>Didik Suharjito (Faculty of Forestry IPB):</u> Agroforestry is an old agricultural technique and it makes a significant contribution socially, economically and environmentally, at the local, regional and national levels, but so far it has not yet developed optimally: it is still based on traditional management models, relying on household organizations, with low productivity, and it fails to become an entrepreneurial or agribusiness models. Under these conditions, agroforestry will easily turn into a monoculture system once there are new types of plants with more promisingly better profits, such as oil palm.

The government's various programs, such as social forestry, fail to reach traditional agroforestry models, as they have been more focused on the process of rehabilitating the open, critical and abandoned forest lands. Meanwhile, traditional agroforestry sites in the form of *tembawang, simpukng, parak* and *repong* located inside forest zones can no longer be categorized as an open, critical and abandoned forest land. Social forestry programs are still more focused on tenure security issues rather than agroforestry development. Perhaps that is why the traditional agroforestry that the indigenous peoples and local communities run remains undeveloped even no matter how the Social Forestry Program has been promoted and endorsed within the national strategic programs.

Agroforestry develops by not solely relying on forestry programs such as social forestry. This is because it not only takes place inside the forest area, but also outside. Its development will only be effective if it is wrapped within the framework of a rural industrialization program. Industrialization of rural areas —

mostly in the form of dry land and therefore agroforestry production systems will naturally develop must be utilized as an approach for agroforestry development in the future. The involvement of stakeholders from various sectors— agriculture and plantations, industry and trade, rural areas, finance, and forestry— is highly required.

David Ardian (Faculty of Human Ecology, IPB University): So far, agroforestry has been promoted for sectoral interests, namely the forestry sector, where in fact agriculture and plantation practices are predominant. Most of the commodities that agroforestry produces are mostly that of agricultural and plantation commodities, such as coffee, rubber, cocoa, spices and so on. Not all agroforestry practices are located inside forest areas, but also outside forest areas or APL, areas that have been the domain of the agricultural sector. Policies on agroforestry, such as social forestry for example, have so far been consolidated with various other sectors such as finance, rural and domestic; still it is not consolidated with policies in agriculture and plantations, the sector most closely related to the issue of agroforestry. That is likely why within the Ministry of Agriculture, the term of agroforestry is less popular, and policies directly related to agroforestry are hard to find. Agriculture and plantation sector acknowledges a term of mixed gardening or mixed farming for mixed agricultural practices such as agroforestry. Such practices can be commonly found in dry land farming areas which in Indonesia cover more than 50% of the total national agricultural land area. Many stakeholders in the agricultural and plantation sectors have been developing various agricultural and plantation programs to improve models of mixed gardening or agroforestry outside forest areas. It is necessary to notice that agroforestry inside forest areas — the domain of the forestry sector — gives priority to the issue of sustainability of forest resources more than increasing the productivity of agricultural and plantation commodities; whereas the mixed gardening or agroforestry outside forest areas which are the domain of the agricultural sector prioritizes the productivity of agricultural and plantation crops more than the sustainability of timber plants which in the long run may help establish forest formations.

When it comes to the adaptation and mitigation of the climate crisis, models of mixed farming and gardening are increasingly becoming mainstream in the agricultural sector. In addition, the household-based farming models are also increasingly being promoted since they are believed to be more sustainable than corporate agroforestry models. This kind of agricultural model is framed as the Climate Smart Agriculture program. However, this mainstreaming mechanism does not directly refer to the agroforestry model which the stakeholders of forestry sector frequently promote. Models of family-scale mixed gardening or household-based farming give more emphasis on the aspects of reducing the use of chemical fertilizers, efficient use of water or irrigation, and developing multi-commodity production models.

In order to develop and mainstream the agroforestry as a production system that at the same time can support social, economic and environmental interests, including climate change adaptation and mitigation, it requires consolidation of policies in the agricultural and forestry sectors. The promotion of agroforestry should also be more inclusive, not only for the benefit of the forestry sector, but also for the benefit of other related sectors.

<u>Faculty of Forestry, Gadjah Mada University</u>: Faculty of Forestry, Gadjah Mada University, together with the Biodiversity Foundation, under the support of the SPOSI project, funded by UKCCU, has initiated the

development of agroforestry as a tenure resolution for oil palm plantations located in forest areas. This kind of resolution model is then called the *Jangka Benah*. The main goal of *Jangka Benah* is to restore the function of forest ecosystem because of monoculture oil palm expansion and encroachment to state forest lands.

The intervention was carried out from the formulation of the concept, the internalization of the concept into policy, the development of pilot project, to its evaluation. At the concept level, UGM developed the experts pool from various disciplines, such as agriculture, forestry, sociology, and anthropology. At the policy level, the *Jangka Benah* team works closely with stakeholders at the government level, especially the Ministry of Environment and Forestry. Meanwhile for the development of a pilot project in the field, team is collaborating with NGOs such as JAVLEC and the provincial government (Jambi and Central Kalimantan Provinces).

Oil palm agroforestry pilot projects were developed in Central Kalimantan and Jambi. The development of oil palm agroforestry in the two locations was carried out by removing some oil palm trees which were indicated no longer productive to be replaced with tree crops, such as *sengon (Falcataria sp.)*, durian (*Durio sp.*), *petai (Parkia sp.), jengkol (Archidendron pauciflorum)*, and so on. At first the community was worried that the agroforestry model would significantly reduce palm oil production. However, the evaluation show that the inter cropping of palm oil with various tree crops within a certain distance does not have a negative impact on oil palm productivity.

Budiadi (Faculty of Forestry UGM):

The genealogical-academic viewpoint believes that the concept of agroforestry is indeed originated from the forestry sector. In agroforestry, the presence of timber plants has the most significance than other vegetations. The concept of agroforestry constitutes a win-win solution approach in order to improve the sustainability of forest resources while at the same time increasing people's income. Therefore, it is not really wrong to say that agroforestry is a sectoral concept, since it is conceptually designated for the benefit of increasing the sustainability of forest resources, in addition to increasing the income of those who adopt it.

Even so, it does not necessarily mean that productivity issues in agroforestry management lose their importance. Unfortunately, the policies on agroforestry in the forestry sector, such as social forestry, have neglected the issue of increasing agroforestry productivity. As a result, to this day, no matter how long it has been brought to practice, the agroforestry which mostly develops inside forest areas remains stagnant. Meanwhile, agroforestry outside the forest area turns to prioritize the productivity of agricultural and plantation crops rather than timber plants.

So far, the agroforestry has undeniably been dominated by household-based farming practice. In Indonesia, the intercropping practice by Perhutani in Java proves to be the only industrial-scale agroforestry practice. Nevertheless, Perhutani's intercropping is temporary agroforestry, where after lasting only for four or five years the plantation forest falls to be managed in monoculture manner. The only long-term agroforestry models in the form of complex agroforestry can be found in the traditional agroforestry models that local communities develop inside and outside forest areas, explaining from which the concept of agroforestry was developed academically.

How to increase productivity poses an unsolved challenge of agroforestry to this day. Inadequate productivity will harm the sustainability of agroforestry. Such unsolved problem has led to the condition where there are increasing number of models of rubber agroforestry to be annihilated in Sumatra and Kalimantan and cocoa in Sulawesi— to be replaced with monoculture oil palm plantations. This problem requires an immediate solution, otherwise traditional agroforestry practices will sooner or later be displaced by monoculture plantation with new varieties of plants that people consider to be better off promisingly profitable.

One option to increase productivity is to promote the industrialization of traditional agroforestry practices which have been in a transitional stage. It is necessary to prepare packages to develop agroforestry to become climate-friendly agribusiness models. Agroforestry research on campus needs to be directed not only for publication purposes, but also for the development of packages of practical knowledge and applied technology for those who adopt the agroforestry. Policies intended to help develop the agroforestry also need to adopt recent academic studies of several campuses in Indonesia. With the BIODIVERSITY foundation, we have started with the *Jangka Benah* project.

<u>Ahmad Maryudi (Faculty of Forestry UGM):</u> Our agroforestry has not developed much because there is no policies on forestry that seriously can help develop it. Policies such as social forestry is aimed at rehabilitating and protecting forest resources rather than developing agroforestry practices. The budget for social forestry is inadequate, and the availability of human resources is limited, whereas the target to reach is way up high by 12.7 million hectares. Those limitations give only few to be expected from the Social Forestry Program for agroforestry development.

Various global anti-deforestation policies, and climate change adaptation and mitigation policies across the European Union also have the potential to exclude models of household-scale production processes such as traditional agroforestry to develop in many places. A great deal of schemes that the global policies promote mostly simply discuss about industrial-scale production processes, forcing the household-scale production practice such as agroforestry to fail to catch up.

To develop and to mainstream the traditional agroforestry within the framework of climate change adaptation and mitigation, it requires a specific trajectory which should encourage agroforestry actors to be able to fulfil. It is necessary to give a chance to policies in national level on social forestry and the *Jangka Benah* to start. The mechanism of timber harvesting in social forestry should have no longer been based on that in industrial scale, so should the requirements for implementing the *Jangka Benah* for community oil palm plantations inside forest areas where industrial standards remain in effect. With such an obsolete approach, the future development of agroforestry will face big challenges.

<u>Eka Tarwaca (Faculty of Agriculture UGM):</u> Agroforestry is not quite new in the agricultural sector; it has a nickname "mixed gardening". In particular, the Faculty of Agriculture of UGM has developed a concept similar to agroforestry called "multipurpose agriculture" based on the concept of *pekarangan* or *karangkitri*, a traditional agricultural model in Java, which seeks to maximize the production process on a narrow plot of land, with the support of limited resources. This type of farming is an ideal model for its ability to compromise resource limitations by optimizing productivity; to compromise economic interests with the environment; to compromise a subsistence economy with the market economy.

The Faculty of Agriculture of UGM has introduced various packages of multi-purpose agricultural development for farmers to adopt in several regions across the country that promisingly yielded productions of various export commodities— coffee, cocoa, rubber and spices— through the multi-purpose farming model. The community produces these commodities by developing mixed gardens with other plants. The packages that the UGM initiates seek to help improve management, especially to increase productivity and resilience to climate change.

The government's policies on agriculture may not have powerful enough in mainstreaming this multipurpose agricultural model, still the multi-purpose agricultural packages have proved to be distributed and brought to practise. In the agricultural sector, the production process made in independent manner, unlike that in the forestry sector where such process is strictly controlled by the ministry. Therefore, it would be more strategic to mainstream and to develop the agroforestry system as a climate-smart production system by starting from models of agroforestry or multi-purpose farming outside forest areas, as it is more flexible, innovative, and independent. In that way, we will start with the cocoa agroforestry development project in Sulawesi with HIVOS.

<u>Faculty of Agriculture, INSTIPER:</u> To mainstream the models of agroforestry, the Faculty of Agriculture of INSTIPER has invested some resources to strengthen the intercrop family farming models in several locations, by transforming them into agribusiness model. The main challenge is how to encourage financial institution, such as banks, to provide specific schemes of credit as an incentive for community initiatives.

<u>Purwadi (Faculty of Agriculture INSTIPER)</u>: Agroforestry is considered a sectoral program. The government's agroforestry program mostly focuses on the forestry sector and for the sector's concerns. Meanwhile, there are in fact many agroforestry practices outside forest areas and therefore beyond the forestry sector. Almost all family farming is developed using the agroforestry model. However, sectors outside of forestry have never referred to it as agroforestry. There are other terms to which the practices of agroforestry refer— namely mixed farming, multi-purpose farming, inter-cropping, and so on.

Such agricultural models have long been a concern for the agricultural and plantation sectors because the fact is that production in Indonesia, even in the world, has always been dominated by family farming models, most of which are in the form of mixed farming. Models of mixed farming outside the forestry sector do not aim directly at developing and preserving forests. The goal is to improve people's welfare while maintaining environmental sustainability and the production process.

It is undeniable that agroforestry currently remains undeveloped. Our records indicate that agribusiness models in Indonesia have been left behind by agribusiness development in neighboring countries such as Vietnam, Thailand, and Malaysia. The financing industries and the government policies have not completely provided total endorsement to help the household-based farming, which is generally in the form of mixed farming or agroforestry, to improve and become important pillars of the production process— and to be honest, that is true. The growing global concern for models of mixed farming and plantations or agroforestry should be treated as an opportunity for the development of household-based farming models; in the sense that the agroforestry should not lose its meaning— model of mixed farming to develop and protect forests.

<u>Sumardi (Faculty of Forestry of STIPER Yogyakarta):</u> The agroforestry is ideally a production model that replicates natural forest ecosystems, within which there is a closed cycle of plant nutrients. Therefore, in the agroforestry production models, the use of production inputs from outside, such as chemical fertilizers and pesticides, is very minimal, and should not even be required. An ideal agroforestry will automatically become an organic production system, such as a natural forest— through which the agroforestry was adopted by local communities with obvious limited resources in practicing the production process.

Such an ideal agroforestry can be found in production models by rural communities who still practice shifting cultivation, where the agroforestry is only part of the secondary forest formation cycle. However, in the end this kind of agroforestry cannot turn into a productive agroecosystem, especially when it reaches its climax where agroforestry has become a secondary forest ecosystem. In that phase, commercial crops cease yielding produces due to the shading of timber vegetations which already reach the climax phase.

In general, the agroforestry models in Java are no longer part of the shifting cultivation system, but instead a sedentary farming. Therefore, agroforestry will never reach a climax, since it is deliberately maintained in semi-climax phase, where all commercial crops can produce optimally. In an agroforestry like this usual production inputs coming from outside, such as fertilizers, have started to be applied. When agribusiness interests are concerned, this is the kind of agroforestry that needs to be developed. The agroforestry models that have reached the climax phase, when being developed as a business, are most likely to adopt businesses of carbon and environmental services. In the context of developing agroforestry, the Faculty of Forestry of STIPER prefers the development of the first agroforestry model as it is more realistic. Various applied research has been carried out in some places in Java, in private forests and garden and *talun* systems.

<u>Faculty of Forestry, Tanjungpura University:</u> Faculty of Forestry, Tanjungpura University, in recent years has conducted many studies on social forestry and has attempted to relate it to the management of *tembawang* which is currently in transition. The Social Forestry Program has great potential to save *tembawang* from community economic pressures. This needs to be mainstreamed into social forestry policies, especially at the regional level. The local government's concern for the future of *tembawang* is very much needed.

<u>Farah Diba (Faculty of Forestry, Tanjungpura University):</u> Agroforestry in West Kalimantan is mostly in the form of *tembawang*, which is popularly associated with *tengkawang* fruit, rubber, and durian. Whereas in the past, *tembawang* comprised of more kinds of cultivations, including coffee that has long been one of the important commodities in *tembawang*. Several places in Sintang Regency, in the past, even served as the centres of coffee production. Coffees were produced from traditional community agroforestry models (*tembawang*). Several coffee shops in Pontianak that are still successful today, such as Kopi Aming for example, were established on the heyday of coffee in West Kalimantan.

Eventually, coffee could no longer be produced, especially in old t*embawang* that had thrived and turned into forests. In *tembawang* like this coffee is hard to growth. Only forest rubber manages to survive in the old *tembawang*, but since the last few years the price of rubber dived. What is worse, *tengkawang*

fruit has also long failed to enter the market. Only durian fruit can still be expected from *tembawang*. Unfortunately, durian prices are very low during the harvest season; and again, lately the durian harvest season is also erratic (very likely due to climate change). There is no more benefit to be expected from the *tembawang* agroforestry model. People turned away from *tembawang* in search of a new source of income. Some dismantled their *tembawang*, turning it into monoculture oil palm plantations which they believe to be more profitable.

Social forestry is a good policy as it tries to open people's access to forest utilization. It is hoped that those who are no longer able to earn income from *tembawang* will eventually be able to find a new alternative income. However, the Social Forestry Program simply serves to strengthen and secure the tenure system; failing to reach the stage of developing new businesses and new sources of community income.

<u>Gusti Anshari (Faculty of Agriculture, University of Tanjungpura):</u> Our current agroforestry problem is the market. On average, the access of the community managing agroforestry, especially traditional agroforestry such as tembawang, to markets is very weak. Therefore, even though agroforestry products have been managed in a socially and environmentally friendly production system, they still do not receive adequate incentives. In addition, the problems faced are also related to small and scattered plots of land. The development of agroforestry towards entrepreneurship or agribusiness in this situation is faced with big challenges. Because of this, professional extension services are needed. Social forestry as one of the development opportunities needs to be pushed in that direction. So far, social forestry has only focused on strengthening tenure.

My studies are not directly related to agroforestry development. It focuses on community-based peat ecological management. Most of local communities manage peatlands for the benefit of family income by applying agroforestry techniques. Our intervention for them is to provide extension services packages related to the sustainable management of resources in peatlands. So far, our intervention has not reached the stage of agroforestry entrepreneurship. The challenges are too big to mainstream agribusiness on peatlands agroforestry.

Consultancy firms/service providers

(Interviews conducted with government service providers, see PUPS Director)

NGOs

<u>Biodiversity Foundation:</u> The Biodiversity Foundation facilitates the development of coffee agroforestry in the East Nusa Tenggara region. Various interventions were carried out to promote GAP to Robusta and Arabica coffee farmers there, from upstream to downstream. In the upstream sector, the Biodiversity Foundation intervenes from nursery to harvesting and processing post-harvest products. Meanwhile in the downstream sector Biodiversity strengthens marketing and introduces Geographic Index (IG) certification. Various coffee festivals were initiated to open wider coffee market opportunities.

To strengthen the financial capital of agroforestry coffee farmers, Biodiversity Foundation cooperates with non-bank funding institutions, such as church-managed credit unions. Coffee farmers in NTT so far have received a lot of financial assistance from non-bank institutions such as credit unions to improve

the production process. In collaboration with churches and credit unions, Biodiversity Foundation focuses on developing NTT coffee production in the downstream sector on expanding marketing and developing certification. The target is to increase the volume of community-managed agroforestry coffee exports.

Coffee has long been a source of livelihood for people in several areas in NTT. Coffee was introduced to NTT since the colonial period. Local people produce coffee by applying agroforestry technic. Apart from coffee plants really needing shade to grow well, the development of agroforestry coffee production models in NTT was also triggered due to limited resources. With agroforestry, people could be involved in the production process even with limited resources.

Apart from that, through the SPOSI project, together with the Faculty of Forestry Gadjah Mada University, and JAVLEC, the Biodiversity Foundation also initiated the *Jangka Benah* concept and pilot project for the settlement of smallholder oil palm plantations in forest areas. The *Jangka Benah* pilot project is in two locations: the Provinces of West Kalimantan and Jambi. Through the *Jangka Benah* System, monoculture oil palm plants are transformed into agroforestry by intercepting various tree crops. Currently, the initiation of *Jangka Benah* pilot project in the two locations has been running for 3 years. Oil palm agroforestry has started to take shape and from the results of studies so far, the concern that palm oil production will decrease is not proven.

<u>Partnership</u>: The Partnership has facilitated to strengthen social forestry practices in various regions in Indonesia, one of which is Central Kalimantan. The focus is strengthening community organizations to be able to make social forestry programs an opportunity to increase income and improve environmental quality. Agroforestry is one of the production schemes that is mainstreamed, as a strategy to strengthen sources of livelihood while simultaneously protecting forest resources. Various non-timber forest product products from social forestry groups facilitated by the Partnership include honey, coffee, and other non-timber forest products such as spices.

Java Learning Centre (JAVLEC): Javlec facilitated the development of teak agroforestry in Gunungkidul Regency (Yogyakarta), developed community-based environmental tourism in Kulonprogo Regency (Yogyakarta), and initiated the Jangka Benah pilot project with the UGM Faculty of Forestry and the Kehati Foundation in Sungai Jernih Village (Jambi). The agroforestry development in the three projects is under the Social Forestry Program.

Teak wood production in Gunungkidul has long been carried out by local communities on private land by operating agroforestry system. Teak wood production in the agroforestry system is also carried out on state forest lands through the Social Forestry Program. The community mixes tree crops (teak trees) with various food crops, such as corn and cassava. So far, the marketing of teak wood produced by family farming agroforestry in Gunungkidul has not succeeded in obtaining good prices because it is monopolized by middlemen. To overcome this problem, with the support of the MFP4 project, JAVLEC is involved in the market mechanism to promote fair market mechanism.

In Kulonprogo together with the DAMAR Foundation, Javlec facilitates community based eco-tourism under the Social Forestry Program. Agroforestry management in protected forest areas is carried out by

taking advantage of the booming ecotourism market opportunities. Javlec's intervention is carried out by strengthening community ecotourism business institutions, including the development of its business plan. Now the agroforestry ecotourism model in Kalibiru (Kulonprogo) has become one of the best social forestry ecotourism models at the national level.

Together with the Faculty of Forestry Gadjah Mada University and the Biodiversity Foundation, Javlec was involved in initiating the pilot project of *Jangka Benah* in Central Kalimantan and Jambi. Javlec provides some technical assistance at the field level to farmers who are about to start building oil palm agroforestry. In addition, Javlec also bridges communication at the policy level between farmers at the field level and policy makers at the local and regional levels.

<u>WARSI:</u> WARSI works at the agroforestry policy level to its implementation, especially in the Jambi and West Sumatra regions. Various regional policies at the provincial level related to the development of agroforestry, especially those within the framework of the Social Forestry Program, have been initiated by WARSI together with actors at the regional level. Meanwhile, at the field level, WARSI is one of the national NGOs that is aggressively expanding agroforestry practices through social forestry programs. The various facilitations carried out include strengthening community organizations, preparing community plans, developing entrepreneurship, and marketing agroforestry products, such as coffee, honey, cinnamon, and so on.

WARSi also develops other non-timber products such as carbon and environmental services in agroforestry practices. The pilot projects for carbon trading and environmental service have been initiated at various social forestry locations in Jambi and West Sumatra. Through the development of agroforestry products, which are not limited to conventional products such as coffee and honey, but also contemporary products such as carbon and environmental services, WARSI has indirectly attempted to transform traditional into modern agroforestry.

Agroforestry development is also carried out through customary forests. WARSI facilitates the management of customary forests in Jambi, such as strengthens its tenure system and develops the management, by mainstreaming agroforestry models. Various agroforestry projects in customary forest areas have been initiated and formally recognized by national and sub national authorities.

<u>Sulawesi Community Foundation (SCF):</u> SCF is an NGO that has developed many agroforestry and social forestry models in Sulawesi, both at the policy level, especially regional policies, as well as its implementation in the field. Various agroforestry projects, including the development of timber agroforestry with the support of various donors have been initiated. Interventions are carried out through strengthening community organizations, developing models of management, processing, and marketing of products. One of SCF's important agroforestry strengthening projects is the provision of a wood processing industry for community wood products that is mainly produced through agroforestry systems. The activities is funded by the MCI project.

SCF has also initiated the development of oil palm agroforestry through various approaches, both the *Jangka Benah* system and the Regional Action Plan for Sustainable Palm Oil Management (RAN KSB), especially in West Sulawesi. With the support of the SPOSI project and the Biodiversity Foundation, and in collaboration with the local government, SCF initiated the development of community-based oil palm

agroforestry. The learning process is carried out by building networks with similar practices elsewhere, especially in Jambi and Central Kalimantan, facilitated by JAVLEC.

<u>Tropenbos Indonesia:</u> Tropenbos Indonesia is strengthening the tembawang rubber agroforestry in Simpang Dua District (West Kalimantan) which is currently in transition because of falling rubber prices and oil palm expansion pressures. Tropenbos is developing facilitation packages for strengthening agroforestry in both the upstream and downstream sectors. The main objective is to increase the productivity of the Tembawang agroforestry, while maintaining its sustainability.

In the upstream sector various Good Agriculture Practices (GAP) packages have been developed and disseminated, starting from selecting the right plant species, developing the nursery, improving the management, to harvesting system. In addition, various practical and pro environmental technologies were also introduced, especially in the context of reducing land clearing with fire which is prone to forest and land fires. The learning mechanism of GAP packages is carried out using a "farmer field school" approach, in which the community is actively involved in the process of observing and discussing their own cases. To carry out this learning mechanism, Tropenbos Indonesia provides experienced field facilitators.

In the downstream sector, Tropenbos Indonesia is intervening by rearranging the marketing strategy for rubber, the main product of the tembawang agroforestry, which is for last couple of years facing a price drop. Tropenbos Indonesia is trying to increase the direct access of rubber farming communities to rubber processing industries, by forming the UPPB institution. With this institution, the community could sell rubber directly to the processing industry (not through intermediaries), so that the price level can be better.

Companies

<u>Association of Indonesia Forest Concession Holders (APHI):</u> Through APHI, companies holding forestry concessions have so far started to develop industrial-scale agroforestry pilot projects, as a response to the multi-business forestry policy issued by the Ministry of Environment and Forestry. In APHI's view, agroforestry business is a new scheme for forestry entrepreneurs. Therefore, various stimulus and incentive schemes are needed.

To develop stimulus and incentive schemes for industrial-scale agroforestry development, APHI has developed various policy dialogues intensively with various other ministries, such as the Ministry of Industry and Trade, and the Ministry of Finance. Some of the expected stimulus and incentives are simplifying business licensing, tax and banking interest relief.

Dutch key stakeholders working on agroforestry in Indonesia

Knowledge centers

<u>ICRAF</u> (World Agroforestry Centre)/CIFOR (Center for International Forestry Research): CIFOR-ICRAF is more than a research institute: it is a union of the best minds working to find nature-based solutions for forest and tree landscapes. Under the oversight of the Board of Trustees, our leadership is harnessing the decades of expertise and diverse skills of our over 700 staff. ICRAF/CIFOR works in partnership with governments, academia, civil society and private companies to deliver solutions to five major global challenges: deforestation and biodiversity loss, the climate crisis, unsustainable food systems, unsustainable supply and value chains, and extreme inequality¹²⁸.

Universities and applied universities in the Netherlands (i.e. <u>WUR, Van Hall Larenstein</u>) are already focusing on many subjects related to agroforestry in Indonesia, including intercropping/multi-cropping, sustainable value chains, sustainable planting on peat and local development of agroforestry.

<u>NWO</u> plays a fundamental role in research in the Netherlands and in support of research in Indonesia: <u>https://www.nwo.nl/nieuws/hbo-versterkt-onderzoek-en-onderwijssamenwerking-met-indonesie and</u> <u>https://www.nwo.nl/onderzoeksprogrammas/merian-fund/indonesie-merian-fund</u>

Consultancy firms/service providers

<u>FarmTree</u> is a Software as a Service (SAAS) company based in Wageningen, the Netherlands. Agroforestry planners - including farmers - need figures to compare Agroforestry layouts, allocate investments, manage repayments, and report on environmental performance. Measuring such figures is expensive and cumbersome. Moreover, some Agroforestry benefits take place years after projects close. Therefore, Agroforestry promotion is difficult to defend against interventions with short-term benefits. The FarmTree® Tool is the instrument that provides insight in Agroforestry performance. Simple interfaces allow planners submit a scenario with annual crops and trees, and review costs and benefits. The FarmTree Tool reports on different SDG-indicators¹²⁹.

<u>Agriterra</u> is a company based in Arnhem, The Netherlands, and it has a country office in Indonesia. As an international specialist in cooperative development, Agriterra works by using a three-track approach. Agriterra makes cooperatives bankable and create real farmer-led businesses. Agriterra improves extension services to members and enhances farmer-government dialogues. Agriterra uses Agripool which is a knowledge broker agency; a unique pool of hundreds of agricultural experts from the Netherlands and other countries. Agriterra builds on the know-how and experience of experts in agribusiness. Agripool experts speak "the language of agribusiness" and work from farmer to farmer¹³⁰.

NGOs

<u>Progreso Foundation</u> supports sustainable business development for coffee and cocoa producer organizations by, together with them, improving their internal management and producer capacities, access to markets and finance, agroforestry and responsible land use¹³¹. They are based in Amsterdam, the Netherlands, and have an office in Indonesia as well.

<u>Hanns R. Neumann Stiftung</u>* is a German foundation, with an office in Indonesia which is managed by a Dutch director. HRNS' work develops solutions in the context of important megatrends such as climate change, fighting poverty, equal chances for girls and women and their empowerment, and counteracting migration, and degradation of natural resources. Right in the center of that, HRNS is

¹²⁸ https://www.cifor-icraf.org/about

¹²⁹ <u>https://www.farmtree.earth/approach</u>

¹³⁰ <u>https://www.agriterra.org/</u>

¹³¹ <u>https://www.progreso.nl/</u>

working with (smallholder) farmer families and youth in coffee growing regions to shape thriving rural communities and with the integration of youth with and without migration background in Germany¹³².

<u>IDH</u> convenes, co-creates, and co-finances inclusive and sustainable market-driven solutions that create value for people and planet. To catalyze change at scale, IDH empowers people within businesses, the global financial sector, and governments. IDH Indonesia runs 8 different sector programs (including: palm oil, pulp & paper, tropical timber, coffee, cocoa, spices and aquaculture) and 3 landscape programs (Aceh, West Kalimantan and South Sumatra). The Pulp & Paper, Palm Oil and Tropical Timber programs were recently integrated into the landscape program. The IDH Head Office is in the Netherlands¹³³.

<u>The Rainforest Alliance</u>* engages in many activities related to agroforestry. Crops with which they work related to agroforestry are mostly coffee, oil palm, cacao and a landscape and community program, which are funded by donors, for example, the Ministry of Enterprises from the Netherlands, RVO. Also with the oil palm program, they have long-term projects. Intan works for the landscape and community team, but another team within Rainforest Alliance works on certification. They certify mostly coffee, coccoa, and tea. Their members need to comply with the certification requirements, which are monitored by third parties. These criteria also include agroforestry, in which they must plant 12 species of trees and at least 40% of their farm should be covered by shade trees in coffee. In cocoa the percentages are slightly lower. They mostly work with farmers who are in the forest areas, but they have licenses from the government to work in these areas but are required to maintain a certain number of trees. These farmers are obliged by the law to apply agroforestry. Rainforest Alliance helps these farmers in developing agroforestry systems and proper production.

Social enterprises

<u>CO₂Operate</u>* a Dutch social enterprise, implementing the Gula Gula Forest Programs in Indonesia¹³⁴.

<u>This Side Up</u> is established in 2016, and provides direct trade between (smallholder) coffee farmers in Flores, Java, Sulawesi and West Papua in Indonesia, and coffee roasters in the Netherlands. They work with local partners, who speak the language and know the farmers. The goal of Social enterprise is to maintain traceability from farm to shelf. The farmers decide the price for their coffee; payment is being done based on quality and the implementation of regenerative practices¹³⁵.

PT. Forestwise* Wild Keepers are based in Sintang, West Kalimantan¹³⁶.

Companies

<u>Verstegen</u>* (trader), founded in the Netherlands in 1886, is a company importing herbs and spices from different countries, particularly across the tropics. They import among others pepper, cinnamon and nutmeg from Indonesia. Verstegen sees agroforestry as "Agroforestry is a sustainable agricultural

¹³² https://www.hrnstiftung.org/work-we-do

¹³³ <u>https://www.idhsustainabletrade.com/teams/indonesia/</u>

¹³⁴ <u>https://co2operate.com/</u>

¹³⁵ <u>https://thissideup.coffee/</u>

¹³⁶ <u>https://www.forestwise.earth/about-us</u>

system that ensures more biodiversity, healthier plants, better harvest quality, and better soil conditions. It simulates the natural process of nature, where food is grown in different layers."¹³⁷ Verstegen is off-taking agroforestry-based commodities from Indonesia, India and Costa Rica. The company's target for 2025 is to offtake 10% of their total offtake from agroforestry systems. Verstegen has a local office/team/contact person in Indonesia.¹³⁸

Financial service providers

<u>ACORN/Rabobank¹³⁹</u> is active in more than 10 countries across three continents, and empowers (smallholder) farmers to turn the tide of climate change through advanced agroforestry, tracking technology, and carbon offsetting. ACORN does this by providing a platform for smallholder farmers to monetize carbon sequestered on their land. ACORN also supports local partners with developing the business case, providing carbon estimations and pitching business cases to impact investors. ACORN does not provide funding nor guarantees funding. The ex-post character of the Carbon Removal Units (CRU) certified by Plan Vivo implies that CRU revenues will gradually flow in after 2-3 years while investments in new agroforestry must be made now.

<u>Rabobank Foundation</u> is a provider of impact funding and operates worldwide to achieve continuous positive change: economic, social and ecological change¹⁴⁰.

Multi-lateral organizations

UNEP*:

UNEP works on programs focusing on climate, nature, pollution, sustainable development and more. In Indonesia, the local UNEP team supports various agroforestry projects¹⁴¹.

¹³⁷ <u>https://www.verstegen.co.uk/wp-content/uploads/2020/08/Verstegen-Corporate-mission-vision-presentation-ENG-19-aug-2020.pdf</u>

¹³⁸ <u>https://algemeen.verstegen.nl/en/sustainability/spiceup/</u>

¹³⁹ https://acorn.rabobank.com/en/

¹⁴⁰ https://www.rabobank.nl/over-ons/rabofoundation

¹⁴¹ <u>https://www.unep.org/</u>

Annex 5. Existing collaborations and main multi-stakeholder platforms involved in promoting sustainable practices/agroforestry in Indonesia

General

- **Sustainable Agriculture Initiative (SAI) Platform**: a global organization created by the food and drink industry to communicate and to actively support the development of sustainable agriculture.
 - Members: 170 small to large multinational companies and organizations
 - The Sustainable Agriculture Initiative (SAI) Platform has developed a **self-assessment tool** through which companies can assess how sustainable their production practices are; no mentioning of agroforestry as a cultivation practice.
 - <u>https://saiplatform.org/</u>

Сосоа

- The Dutch Initiative for Sustainable Cocoa (DISCO): a public-private partnership active in the Dutch cocoa and chocolate sector working to sustainably improve the livelihoods of current and future cocoa farming families.
 - Members: *Traders and processors*: Barry Callebaut, Cargill Cocoa & Chocolate, Export Trading Group (ETG), JS Cocoa, Olam Food Ingredients (OFI); *Manufacturers and brands*: Friesland Campina, MARS Netherlands, Mondeléz, Nestlé Netherlands, Tony's Chocolonely, Vereniging voor de Bakkerij- en Zoetwarenindustrie (VBZ (signed only on their behalf)); *Retail*: Albert Heijn, Jumbo, Superunie; *Government*: Ministry of Foreign Affairs of The Netherlands, Ministry of Agriculture, Nature and Food Quality of The Netherlands, RVO; *Certification*: Fairtrade Netherlands, Rainforest Alliance; Civil Society: Care Netherlands, Fairfood, Farmgate Cocoa Alliance (FCA), International Cocoa Initiative (ICI), Oxfam Novib, Save the Children, Solidaridad Network, Tropenbos International, UNICEF Netherlands; *Service providers & Knowledge institutes*: Agriterra, AgroEco, Equipoise, Koninklijk Instituut voor de Tropen (KIT), Meridia, Port of Amsterdam; *Secretariat*: IDH, the Sustainable Trade Initiative.
 - <u>https://www.idhsustainabletrade.com/initiative/dutch-initiative-on-sustainable-cocoa-disco/</u>
- **VOICE network**: a global network of NGOs and Trade Unions working on sustainability in cocoa, tackling issues such as poverty, deforestation and child labor.
 - Members: ABVV/Horval (Belgium), Action against Child Exploitation (ACE) (Japan), Be Slavery Free (Australia), Be Slavery Free Netherlands, EcoCare Ghana, Fern (Belgium), Freedom United (Global), Global Labor Justice International Labor Rights Forum (USA), Green America (USA), IDEF (Côte d'Ivoire), Inkota Netzwerk (Germany), Mighty Earth (USA), Oxfam America (United States), Oxfam Belgium, Oxfam Ghana, Oxfam Novib (Netherlands), ROSCIDET (Côte d'Ivoire), Rikolto (Belgium), Solidaridad (Europe), Südwind Institut (Germany), Tropenbos Ghana, Tropenbos International, WWF France; Observers: European Federation of Food, Agriculture and Tourism Trade Unions (EFFAT), Public Eye (Switzerland).
 - <u>https://voicenetwork.cc/</u>

- The Cocoa Origins Program¹⁴² (ran from 2018-2021): supported companies using relatively small volumes of cocoa to become involved in sustainability projects at the origins of their cocoa supply chain and contribute to the overall sustainability of cocoa products linked to the Dutch market.
 - <u>https://www.idhsustainabletrade.com/initiative/cocoa-</u> origins/#:~:text=The%20Program%20supported%20eight%20projects,to%20the%20Dutch%20c onsumer%20market.

Coffee

- International Coffee Organization (ICO) is engaged in assisting its members with the development, fund mobilization, implementation, monitoring and evaluation of coffee sector development projects aiming to promote sustainable growth for the benefit of all stakeholders, from coffee farmers to consumers.
 - http://www.ico.org//https://icocoffee.org/
- Sustainable Coffee Challenge (SCC) is a collaborative effort of companies, governments, NGOs, research institutions and others to transition the coffee sector to be fully sustainable. The Challenge is facilitated by Conservation International, with the agenda and actions led by Challenge partners.
 - Partners: 170 partners (producers/co-ops, traders, roasters, retailers) in total in 45 countries
 - <u>https://www.sustaincoffee.org</u>

Spices

- **European Spice Association (ESA)** is a non-profit association that brings together the expertise of a wide group of people to promote the use of pure, safe and wholesome herbs and spices that are true to name and provide the quality and safety that is expected by the consumer.
 - **Members:** Ordinary members are national federations of the spice industry in the Member States of the EU, Switzerland and Turkey as well as individual companies involved in the processing and distribution of spices.
 - <u>https://www.esa-spices.org/</u>
- The Royal Dutch Spices Association (Koninklijke Nederlandse Specerijenvereniging/KNSV) is a member of the European Spice Association (ESA), and strongly supports sustainable sourcing of spices. It consists of 70 members¹⁴³.
 - Members: Arasco Food BV, Arva Specerijen B.V., AVS Spice, Bapa Trading & Services BV, BCFoods Europe BV, Blok Specerijen B.V., Cardamom Global B.V., C. Steinweg Handelsveem B.V., Cassia Co-op SCE, Catz International B.V., CTCS Europe // Culinary Taste, Dani Food Ingredients BV, De Monchy Natural Products, De Vrij Quality Solutions, De Weerd Specerijen B.V., Dutch Organic Company, Dutch Protein Spices & Services B.V., E.H. Worlée & Co. B.V., Epos Specerijen B.V., Eurofins Food Testing Rotterdam BV, Evans & Watson, Food Ingredients Service Center Europe, Greenspice, Hela-Thissen B.V., High Quality Organics B.V., Holland Trade Net B.V., Jacob Hooy & Co N.V., Keijzer & Company, Kipkruiden.nl, Koninklijke Euroma B.V., Korf Food Products B.V., Laboratorium Dr. A. Verwey, Lenersan Poortman B.V., M.P. van Jinnelt B.V., Mulder Marne,

¹⁴² https://www.idhsustainabletrade.com/initiative/cocoa-origins/

¹⁴³ <u>https://www.specerijenvereniging.nl/leden/</u>
Natural Spices B.V., Nedspice EMEA B.V., Niche 4 Food, Nidegro International Trading Company B.V., Nofalab B.V., Olam Europe B.V., Organic Flavour Company, P. de Vrij Moerkapelle BV, Pacific SpiZes, Pepperdesk BZV, QTI Services BV, Royal Polak Spices, SGS Nederland BV, Solina Nederland, Spicemasters, Thyssen Trading, TLR International Laboratories, Toget-R, Unispices Wazaran B.V., Vanille BV, Van Beekum Specerijen, Van der Does Spice Brokers BV, Verstegen Spices & Sauces, VNK BV.

- https://www.specerijenvereniging.nl/
- The Sustainable Spices Initiative (SSI) is a sector-wide consortium established in 2012 by IDH, bringing together an international group of NGOs and spices and herbs companies, who aim to sustainably transform the mainstream spices sector, thereby securing future sourcing and stimulating economic growth in producing countries.¹⁴⁴
 - Members: Many, including ICCO, Rainforest Alliance, Royal Tropical Institute (KIT), Unilever, Verstegen.
 - https://www.idhsustainabletrade.com/initiative/sustainable-spices-initiative/

Rubber

- Global Platform for Sustainable Natural Rubber (GPSNR) brings together companies, (smallholder) farmers, academia and civil society to transform the natural rubber supply chain into a sustainable, equitable and fair one.
 - Members: Many
 - <u>https://sustainablenaturalrubber.org/</u>

Palm oil

- SustainPalm is a joint implementation program between Indonesia and The Netherlands to support sustainable palm oil production in synergy with the Sustainable Development Goals (SDGs). The program will be executed in Communities of Practice (COPs) and in geographically based Living Labs (LL), where multiple stakeholders are responsible for local implementation of interventions with (smallholder) farmers, company plantations and mills, and for addressing barriers to implementation. The COPs serve to facilitate the sharing of experiences between Living Labs, capacity building of local service providers, joint assessments, and as a vehicle of joint actions to assure conducive enabling environments, needed for scaling at a national and international level¹⁴⁵.
 - **Partners:** Wageningen Food & Biobased Research Wageningen University & Research, IPB (Institut Pertanian Bogor Bogor Agricultural University) Indonesia, VHL (Van Hall Larenstein University of Applied Sciences) NL, Lambung Mangkurat University
 - <u>https://www.wur.nl/en/project/sustainpalm-sustainable-oil-palm-indonesia.htm</u>

¹⁴⁴ https://www.idhsustainabletrade.com/initiative/sustainable-spices-initiative/

¹⁴⁵ <u>https://www.wur.nl/en/project/sustainpalm-sustainable-oil-palm-indonesia.htm</u>



Figure 26. Approach SustainPalm

- Roundtable on Sustainable Palm Oil (RSPO) is a not-for-profit multi-stakeholder platform that brings together stakeholders across the supply chain to develop and implement global standards for producing and sourcing certified sustainable palm oil.
 - Members: over 5,200 members in 2022
 - https://rspo.org/

Annex 6. Additional information about the flagship projects

Flagship 1. Managing Agroforestry Transition in Simpang Dua (West Kalimantan)

Tembawang is a traditional agroforestry of the Dayak people in West Kalimantan, whose development refers to the process of natural forest formation, starting from the pioneer phase, semi climax and climax. It is a practice that combines agricultural crops with forested areas to provide economic, ecological, and social benefits while ensuring the conservation of local biodiversity and natural resources. The system involves planting various crops such as coffee, cocoa, and rubber, along with timber trees and fruit trees. This approach provides farmers with multiple sources of income, as well as food security. The agroforestry model also helps to prevent soil erosion, reduce water run-off, and increase biodiversity. *Tembawang* agroforestry has proved to be a livelihood system for farmers in the region.



Figure 27. Map of Mekar Raya Village Land Use identified through Participatory Mapping in 2020 (Simpang Dua Sub-District of West Kalimantan Province)

1. Formation Phase

a. Pioneer

In this phase the community clears natural forest in a very measurable area, for the benefit of family food production. The pioneering phase lasts for a maximum of 4 years, with the main crops including rice and various dry land vegetables. This phase is intended to support family food security. The ownership status is individual (private).

b. Semi climax

The semi-climax phase begins once the pioneering phase is accomplished. Food production cannot be continued because soil fertility is decreasing. The former fields are then enriched with wood saplings, especially tengkawang (*Shorea sp.*) and various fruit trees such as durian, duku and langsat (*Lansium sp.*), as well as commercial crops such as rubber and coffee. The semi climax phase lasts quite a long time, around 20-25 years. Economically, the semi-climax is the most productive phase where the community obtains continuous yields from various cash crops (rubber, coffee, and fruits). The status of agroforestry ownership in this phase is the same as that in the pioneering phase, namely individual (private). In both the pioneering and semi-climax phases, economic interests still play as the main orientation. The pioneering phase is for food purposes, while the climax phase is for income purposes.

c. Climax

The establishment process of the pioneering and semi-climactic phases heavily involves human intervention, while the formation of the climax phase is completely nature driven. The climax phase usually begins to develop after the 30th year, when giant plants such as tengkawang and durian reign over the top canopy, and the growth of cash crops such as coffee and rubber begins to slow down. In this phase a decline in economic function occurred, where rubber and coffee fail to optimally yield. However, during this phase there is an increase in ecological functions where carbon stocks increase rapidly in the form of giant plants that grow naturally (the economic value of *tembawang* in this phase will increase again if carbon stocks can be traded on the carbon market). The status of agroforestry ownership in this phase also changed from individual to communal, as the function of agroforestry also changed from economic to ecological.



Figure 28. Formation phase of tembawang agroforestry, from pioneer, semi climax, and climax (clockwise).

2. Tembawang in transition

Now the formation cycle of the *tembawang* agroforestry was no longer able to support household income. On the one hand, there was a change in the orientation of the community's economy, those who have begun to integrate themselves with the market economy (no longer subsistence) where the economic scale already increased. On the other hand, the price of rubber, one of *tembawang's* main commodities in the semi-climax phase, fell since the last few years. Some communities no longer depend on *tembawang* agroforestry for their livelihood. They tried to turn to becoming laborers on oil palm plantations or other informal economic models. Others tried to change the *tembawang*

agroforestry into mixed oil palm plantations, or even monoculture plantation. The youths even realize that there is no need to maintain and continue *tembawang* agroforestry as a source of income.

3. Tembawang transformation

To maintain the *tembawang* agroforestry as a production system for local communities, Tropenbos initiated to transform the *tembawang* agroforestry from originally as an extensive agroecosystem (minimum maintenance and management) to an intensive agroecosystem (increasing the maintenance and management). The transformation process was made in the upstream (production) to downstream sector (market). It is expected to be able to increase its productivity, as well as sustainability, especially in the semi-climactic phase. The semi-climax phase is regarded to be very important in the *tembawang* agroforestry cycle, due to the very high level of productivity. Several important components in the *tembawang* transformation as follows:

a. Upstream sector: Farmer Field School

Since April 2021 until now, Tropenbos Indonesia has operated Farmers Field School (FSS) approach to improve farmers practices and develop climate friendly livelihoods. FFS curriculum is developed based on the identification of on-site agriculture problems and challenges combined with objectives of the project to mitigate and adapt climate changes.

It was conducted through every two weeks face-to-face training at the field level, and held until each group completed 14 meetings, ranged from April/May to December 2021. The 14 serial trainings are preceded with pre-test and concluded with post-test then facilitation on the development of follow-up actions plan. Based on the pre and post-test, it was known that 15 % of farmer capacity (knowledge and skills) has been increased.

The FFS has been conducted in Simpang Dua Sub-district, which is located in the upstream watershed of the Ketapang District, dominated by Dayak community in mineral soils, who long been engaged with rubber-based agroforestry, that about a decade ago are gradually abandoned or converted into smallholder oil palm plantation due to the declining price of rubber. There are four villages as the beneficiaries' target, i.e., Gema, Mekar Raya, Kamora and Batu Daya Villages, the targeted farmers are those who still cultivated and tapped rubber or rainfed rice. The total participants are 95 persons with 45 % women.

The objective of FSS in Simpang Dua Sub-district is to improve productivity of the existing rubber agroforestry by improving Good Agricultural Practices (GAPs) and raise the yield of traditional rubber agroforestry (*tembawang*), enhance spirits of local famers to be back on their abandoned rubber plantation and reduce rubber conversion into oil-palm plantation. This has been conducted through: (a) Mainstream the use of organic decomposers (bio-starters), mixture of bio-fertilizers, and *Trichoderma sp.* for plant disease management and fluid organic fertilizers to naturally enhance nutrients; (b) Improve tapping technique to increase latex yield and to avoid bark infection; (c) Widen living space among rubber to allow solar radiation to reach at the forest floor to enhance middle layer with coffee and pepper and ginger on the ground and (d) Initiate and stimulate permanent agriculture to go against slash and burnt agriculture that are still being practiced by local farmers up until now.

b. Downstream sector: Rubber Raw Material Processing and Marketing Unit

Tropenbos Indonesia has started initial step to encourage farmers group(s) in Simpang Dua Sub-district to establish UPPB (*Unit Pengolahan dan Pemasaran Bokar*) or Rubber Raw Material Collective Processing and Marketing Unit as one of the strategies to get better prices for rubber produce by ensuring sustainable rubber production and processing and building more inclusive natural rubber value chain and linkage to responsible buyers.

The low productivity of existing rubber agroforests, one of the reasons for farmers to switch to oil palm other than the low and unstable price of rubber. Farmers can improve their income from rubber through investments in post-harvest processing and the development of direct linkages with rubber buyers, but this requires that farmers get organized, for example in the form of a Collective Rubber Processing and Marketing Unit (*Unit Pengolahan dan Pemasaran Bokar* — UPPB). Although there is a government program to facilitate the development of such units, at the start of the Working Landscapes program there was no UPPB operating in the landscape.

The lack of organization among rubber farmers was seen as a major constraint to increasing the feasibility of rubber agroforestry. Tropenbos Indonesia therefore facilitated the establishment of a UPPB involving 121 rubber farmers and covering approximately 419 hectares, including a technical division to support farmers' capacity for post-harvest treatment, improving rubber quality to meet the standards of larger buyers. The technical division has also been encouraging members to improve their rubber agroforestry management. In the future, the UPPB is expected to accommodate the agroforest's secondary products, such as spices and fruits.

Tropenbos Indonesia also helped the UPPB with developing an agreement with a rubber factory located in the city of Pontianak, to secure offtake. The UPPB then required capital to purchase the first batch of rubber from the participating farmers, but financial institutions operating in the landscape did not have mechanisms in place that make it possible to provide loans to starting farmers' organizations that do not yet have a track record. To overcome this hurdle, Tropenbos Indonesia used its own finances to provide the UPPB with a zero-interest loan. This enabled them to start buying rubber from the participating farmers.

The UPPB is now up and running, and it is estimated that the individual farmers' income from selling rubber will increase by 30%. By developing a portfolio, the UPPB will have better possibilities to access loans in the future.

Flagship 2. The Gula Gula Food Forests in West Sumatra: Agroforestry products and carbon credits

- Initiated in 2012 by CO2Operate B.V.
- The Gula Gula Forest program is initiated in 2012 by Paul Burgers (**CO₂Operate B.V.**) who has set up a local independent NGO named Yayasan Rimbo Pangan Lestari (RPL) ("sustainable food jungle") to provide the seedlings from their own nursery, other inputs, and logistical and technical support to the smallholder farmers/cooperatives (e.g. with Assisted Natural Regeneration (ANR) method, agroforestry development, good agricultural practices, empowerment of farmer groups/cooperatives, mapping their land, carbon certification and opening a cooperative's bank account).

- CO₂Operate is the EU-based partner of RPL to attract companies in Europe to invest in this program.
 CO₂Operate supports RPL and the smallholder farmers with business linkages and marketing of the agroforestry products and carbon credits.
- The goal of the program is to restore degraded lands (mostly covered with *Imperata* grasslands and ferns) into productive agroforests and its associated local (agro)biodiversity, contribute to a cooler and more predictable climate, and to support the local communities with a more resilient and climate-proof livelihood. Commodities that are being cultivated are a mix of fruit, spices and hardwood for own consumption and for trade, and include avocado, acacia, cinnamon, clove, cocoa, mango, coffee arabica, coffee robusta, jengkol, jirak, glyricidia, lamtoro, mahogany, melinjo, petai and surian. Plan Vivo-certified carbon credits are being sold to sustainable companies and/or social enterprises with a clear climate strategy.
- The farmers choose the composition of trees, and whether they want to be involved in the carbon program through an intensive Free Prior and Informed Consent (FPIC) process. They sign 5-year contracts to plant and grow the trees with yearly performance-based carbon payments. This income is seen as an add-on to the activities and income from the tree products of the smallholder farmers and the communities.
- Criteria for site selection are: 1) original land cover is degraded land (mostly *Imperata* grasslands), the land is located in the other land use category (APL), and the farmers have long-term access to the land to be restored.
- Benefit and risk/cost sharing:
 - Force majeure (agreed on in contract): if natural events negatively impact tree growth, such as extreme weather, fire, flooding, the smallholder farmers receive a compensation by CO₂Operate.
 - Possibly include compost and monitoring of its use for trees in the contract.
 - Compensation to individual farmers for carbon credits was not spent on land management, so farmers decided to keep the carbon funds into cooperative's bank account, so the group can reinvest or use the money for benefiting tree growth.
- Plan Vivo regulations: at least 60% of income from credits has to be invested in the project.
- Value adding: Processing or semi-processing of tree products implemented by CO2 Operate and RPL resulting in a higher income for the farmers.

Collaborations:

- With ministries: Ministry of Forestry and Environment; and Ministry of Backward Regions and Transmigration, so the project can expand to other regions
- BAPPEDAs, BAPPENAS
- Universities: knowledge and monitoring of biodiversity, and socio-economic monitoring
- Plan Vivo Foundation

Challenges:

- Some farmers are more attracted to "easy to grow" horticulture (vegetables: tomatoes, carrots, cabbage) for short-term income. Trees are seen as long-term income.

- If agroforestry site is far from their home and/or if it is the rainy season, or if the roads are steep, it is challenging for the farmers to manage the land.
- Variation across sites in terms of tree growth, presence of pests & diseases, soil conditions: some trees die
- Extreme weather events, including El Nino
- CO₂Operate and RPL offer subsidized compost from their own composting unit, which could benefit the trees more, but only a minority of farmers have bought it due to lack of finance.

Flagship 3. Empowering Robusta Farmers for Coffee Garden Rejuvenation and Enterprise Development to Strengthen and Diversify incomes (EMPOWER) in Indonesia¹⁴⁶

- Initiated in 2017-2020 by: IDH, JDE, Nedcoffee (now Sucden Coffee)
- The EMPOWER program is aimed at capacity building, improving livelihoods, and addressing deforestation. This project intends to target those producers and volumes of coffee that are not yet environmentally, economically and or socially responsible therefore bringing up the conditions of the bottom line of coffee in this region. Such a strategy aims to build the resilience of future generations of farmers, so that they can manage through bad crops and support themselves by nurturing a diversity of income sources and in time a higher quality and quantity production revenue.
- This project invested in capacity building and agroforestry training of about 4,000 farmers during the three years of implementation.
 - Preparing farmers for adapting to and mitigating the effects of climate change.
 - Nurseries to grow appropriate varieties to be able to replace old/ low producing plants.
 - Adoption of coffee agroforestry management practices, improving biodiversity and soil health.
 - Understanding of markets to engage in value chains.
 - Produce more quality, and an overall marketable product.
 - Farmer extension training, key farmers as change agents in adopting agroforestry practices.
 - Produce additional crops as alternative income sources.
- https://www.jacobsdouweegberts.com/asia/indonesia/project-4/

Important success factors:

- Provision of different options for farmers, which usually build on the knowledge have themselves combined with additional professional know-how and information.
 - Farmers do not want to be exposed to completely alien production systems.
 - Farmers brought relevant knowledge about certain types of trees that were considered nitrogen fixating and thus desired in their production systems.
 - They need to be provided with crops which they feel comfortable growing.
- · Favorable external conditions
 - Multiple outlets for produce were developed.
 - Markets for produce were favorable, which cannot be guaranteed.
 - Modelling in advance is necessary, but practice is always different.
- They had a holistic approach, in which markets and organic fertilizers production were developed as well, and a range of stakeholders were involved.
 - Implementing agroforestry goes much further than merely adding trees in a production system.

¹⁴⁶ <u>https://www.jacobsdouweegberts.com/asia/indonesia/project-4/</u>

Other collaborations: these were deemed indispensable for successful project implementation.

- With Pagar Alam local government
- Expert knowledge was provided by World Agroforestry (ICRAF)

Challenges:

- Some farmers are more attracted to "easy to grow" horticulture (vegetables: tomatoes, carrots, cabbage) for short-term income. Trees are seen as long-term income, and in some cases (not all, or completely, the project's income diversification component was met, but the 'forest and tree' component was compromised.
- Experts on agroforestry often do not reside in the area and are only limitedly present in the actual project area.
- Get the right quality and quality of seedlings and access to inputs.
 - Indonesian Coffee and Cocoa Research Institute (ICCRI) is tasked with provision/sales of coffee seedlings, but is understaffed and does not have the capacity to deliver at location on time. This is not only relevant for the primary crop, but also for the secondary crops.
 - Experts often reside far away.
 - Experts are often only trained in monocropping and lack knowledge on the interactions between crops, hence promote traditional ideas.
- Lack of policy:
 - Whereas the Pagar Alam regent was favorable to the project, there is no guarantee the next regent will be.
 - Whereas the current national government may be reasonably favorable to support community forestry and related programs, there is no guarantee that the next government will be.
- Benefit and risk/cost sharing:
 - Long timeframes, not always easy to keep farmers interested.
 - It is risky and unrealistic to ask farmers to completely change their production systems. Therefore, changes can only be made gradually.
 - Diversification by itself may lead to sub-optimal incomes for farmers, certainly when the farmer is unable to cultivate crops optimally.

Flagship 4. SukkhaCitta: ethical produced fashion from smallholder cotton and dyes

- <u>https://www.sukkhacitta.com/collections/frontpage</u> and;
- Rumah SukkhaCitta Foundation (Yayasan RSC) https://www.rumahsukkhacitta.org/ourprogram
- Social-enterprise SukkhaCitta and Rumah SukkhaCitta Foundation work closely together with traditional women cotton (agroforestry) farmers.
- SukkhaCitta and CO₂Operate work together on developing a fashion forest in West Timor (in East Indonesia)
- Success factors:
 - SukkhaCitta has developed an integrated program and value chain; from Farm-to-Closet.

- Nest certified (<u>https://www.buildanest.org/the-nest-seal/ethicalhandcraft/</u>), with focus on among others the following indicators: Fair wages, No child labor. Worker rights, Anti-harassment and anti-discrimination policies for all, Workplace safety provisions, including fire extinguishers, First-aid stations, The highest environmental stewardship.
- All indicators are reviewed and verified on the ground.
- Further, SukkhaCitta repairs broken clothes for free, uses no single-use plastics, upcycles 100% of the offcuts and recycles "old" SukkhaCitta clothes.

Flagship 5. Public-Private Partnership Towards HCV Area Protection in Ketapang District, West Kalimantan Province

Through a public-private partnership (PPP), two villages surrounding the Ketapang HCVA/ Wildlife Corridor (West Kalimantan), have started diversifying their production by enhancing the production of horticulture, rice and oranges – next to oil palm production. As part of the PPP, Tropenbos Indonesia provides cultivation and organizational capacity building through a farmer field school. The district government has deployed agriculture and village governance extension workers. The large palm oil plantation company 'PT. KAL" will purchase the village's enhanced products to fulfil the needs of their staff's 800 household (around 1300 people).

High Conservation Value areas (HCVAs) are areas with forest cover and high conservation values within production areas that support ecological, economic, social, cultural, religious, and customary needs of the community. Ketapang HCVA is the inter-connected protection areas within four large-scale oil palm plantation concessions outside state forest areas (APL) which are defined voluntarily and protected by private sectors as part of their compliance to ISPO, RSPO, and Province Regulation No. 6/2018. The Ketapang HCVA aims to function as wildlife corridor mainly for orangutan (*Pongo pygmaeus wurmbii*) to cross oil palm plantations that have been operationalize since 2010 between Sungai Putri peatland production forest (inhabiting 900 – 1,250 orangutans) in Southern Ketapang to Gunung Tarak Protection Forest in Eastern Ketapang and Gunung Palung National Park in Northern Ketapang.

One of the key aspects to conserve this HCVA is by providing sustainable deforestation-free livelihoods for village communities living around the HCVA and HCVA monitoring working groups consisting of government offices and NGOs.

Company-protected HCVAs together with other ecology-socio-economic initiatives implemented through public-private partnership can be in the form of agroforestry or agroforestry (agro-silvo)-like land uses at the landscape level. Agroforestry at the landscape scale, and not on the plot scale is implemented in the way that palm oil private sectors through West Kalimantan province regulation 6/2018 about sustainable land-based business management, dictates land-based businesses such as industrial forest, plantations and mining sectors to comply to the protection of at least 7% of intact forests within their concession areas for wildlife corridor and other ecological-social use. The Ketapang HCVA¹⁴⁷ has been legalized by West Kalimantan Governor Decree No. 718 of 2017 and its managing multi stakeholder platform has been legalized through the West Kalimantan decree No. 699/2017 that solidified the public-private partnership now known as Ketapang HCVA multi-stakeholder platform.

¹⁴⁷ See also: https://www.tropenbos-

indonesia. org/resources/publications/conservation+outside+of+protected+areas:+lessons+from+west+kalimantaning and the set of the

The Ketapang HCVA multi-stakeholder platform decided to materialize their partnership in the form of Ketapang HCVA Protection 2023-2027 Action Plan¹⁴⁸. The action plan aims to improve all actors' understanding about their respective roles and for government and NGOs to be able to supervise the completeness of action plan targets stated by private sectors/concession holders. Some of the actions are that PT. KAL and BGA Group (palm oil companies) since January 2022 have assisted the development of women farmer groups, involve communities in fire prevention, plantation and HCVA patrol teams, and involve women and elementary students in the restoration and enrichment of HCVA burnt areas. In September 2022 PT. KAL also has completed the rehabilitation (with endemic tree seedlings) of degraded forest due to the impact of forest fire 2019. NGOs have a crucial role as reliable third parties in monitoring, environmental assessment and can provide field conservation and socio-economic contributions.

Few of BGA group's corporate social responsibilities ¹⁴⁹listed in the action plan take forms as agroforestry plots developments, village forest issuance and ecotourism facilitation. These interventions are given for the Village Forest Management Unit (VFMU) of the Simpang Tiga (Sp3) Sembelangaan Village Forest. Apart from their burnt area rehabilitation actions, together with the VFMU, BGA group has established agroforestry plots and rehabilitated village forest through more than 7,000 fruit seedlings in approximately 40 hectares. Agroforestry produces such as cacao, oranges, durian, banana, betel palm (*Areca catechu*), longan (*Dimocarpus longan*), and guava are to be manage, consume, and commercialize by Sp3 Sembelangaan VFMU and Farmers. Together with local community BGA group also assists the monitoring of agriculture input usages and maintenance of the plots. These cooperations with local communities aim to empower communities in villages surrounding HCVA (wildlife corridor), prevent forest encroachment, loggers and hunters in forested HCVAs.

To replicate, mainstream and up-scale this public-private partnership for HCVA protection, interventions to government, private sectors, local community, and NGOs must be done. In the case of government law enforcement in the form of consistent monitoring and a strong legal framework system must be established. Learning from West Kalimantan, a circular letter addressing Province Regulation No. 6/2018 has sent by West Kalimantan Plantation and Livestock Agency (Distanakbun) to companies which run land-based businesses, specifically oil palm plantations in request to report and data on allocated conservation (High Conservation Value/HCV) areas in their concession areas. Similar and separate circular letters can also be done together with environment offices and plantation offices at district level. Circular letters are the result of lobby and advocacy.

¹⁴⁸ See also: https://www.tropenbos-indonesia.org/news/483/2023-

²⁰²⁷⁺ketapang+hcva+protection+action+plan+document+has+been+agreed+by+multistakeholders+to+be+finalized ¹⁴⁹ See also: https://bumitama-agri.com/sustainability/

	Plantation Company Name	Area		
No		Hectares (Ha)	Individual HCVA Percentage of total Corridor (%)	HCVA Percentage of total Concession permit
	HCVA within plantation concessions	11.929	92,35%	
1	PT. Kayung Agro Lestari (KAL)	3.688	28,55%	23.13%
2	PT. Gemilang Makmur Subur (GMS) – BGA Group	1.529	11,83%	28.34%
3	PT. Damai Agro Sejahtera (DAS) – BGA Group	6.095	47,19%	72.48%
4	PT. Ladang Sawit Mas (LSM) – BGA Group	611	4,73%	5,51% (Compensated in PT. DAS)
5	PT. Sawit Makmur Abadi (SMA)	7	0,05%	9,85%
	Outside plantation concessions	989	7,65%	
	Total	12.918	100%	

Table 15. Name of company and HCVA data.

Circular letters that request data collection are highly needed to understand compliance and assessment parameters of HCVA management, since HCVA location differs from one another such as peatland forest and mineral land forest. HCVA data will be important to assess the effectiveness, functionality, and interconnectivity of existing HCV with other HCVA and surrounding forested areas. These assessment and field verification then must be implemented by a verification team with high competence, involving NGOs and governments of different levels and sectors. Forest policy decision making and allocations to govern HCV also has to be socialize by government. To implement the mentioned interventions, government's capacities and willingness/awareness to facilitate forest and HCVA safeguarding plans should be ensured through workshops and training that can be conducted by NGOs.

In the private sector side, assistance to link companies with RSPO and ISPO verification organizations as well as linking uncertified companies to the already RSPO and ISPO certified companies to promote sustainable practices can be done.

Although mostly still not in the form of productive and well-developed agroforestry, but through the management of other village forest business units, palm oil market players who are members of the RSPO have also recently started providing incentive schemes for agroforestry practices. Through the RaCP (Remediation and Compensation Procedure) scheme, a 25-year funding program that is available for the development of agroforestry models, especially those that have been formalized through social forestry. Funding is carried out to support strengthening community institutions, improving entrepreneurship, increasing biodiversity and carbon stocks. Many agroforestry practices that have received social forestry licenses in various places are currently taking advantage of this incentive scheme. Perhaps the RaCP is the only market incentive that is now being widely available from domestic oil palm market players and often assisted by civil society organizations for its implementation for social forestry and agroforestry development.

Annex 7. Additional information about Badan Pengelola Dana Lingkungan Hidup (BPDLH)

BPDLH is an environmental funding (EF) mechanism for channelling and distributing environmental and climate funds to support Indonesia's vision to preserve the functions of the environment and prevent environmental pollution and degradation. This includes efforts to achieve Indonesia's commitment to reduce Indonesia's GHG emissions and to meet the Sustainable Development Goals (SDGs).

The BPDLH is a public service government agency under the Ministry of Finance, a non-echelon unit that is accountable to and structurally operationalized under the Minister of Finance of the Republic of Indonesia. A BLU is a government entity in Indonesia that has the legal flexibility and autonomous authority to manage its operations and is not dependent on the state budget (APBN) but can source funds from it. The BLU structure allows BPDLH to receive grants and loans, and to disburse them alongside several other economic instruments. BPDLH aims to fulfill its vision to be an environmental trust fund that is professional, credible, and trusted by the world.

The purpose of the BPDLH is to channel funds through a variety of instruments to specific projects and activities that support its overall objective to improve management and protection of the environment, support environmentally friendly economic activities and reduce GHG emissions. The BPDLH aims to become a credible and trusted environmental funds management agency that manages, raises and disburses funds to support Indonesia to achieve its environmental and climate commitments.

BPDLH will not only give access to finance but help supervise its utilization with the help of NGO and other facilitators. Facilitators can upload reports in online databases and help with field verification and audit. Due to its establishment near the pandemic years, BPDLH did not operate maximumly in 2022-2021. However currently, BPDLH has increase its significance in solving environmental issues¹⁵⁰ and supporting agroforestry¹⁵¹.

¹⁵⁰ See also: http://ppid.menlhk.go.id/berita/siaran-pers/6948/alokasi-dana-bpdlh-akan-fokus-atasi-satu-persatu-persoalan-lingkungan-hingga-tuntas

¹⁵¹ See also: https://timesindonesia.co.id/indonesia-positif/440762/penguatan-implementasi-agroforestry-banyuwangiarupabpdlh-gelar-lokakarya





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