Danish organisation	Preferred by Nature
Title of the intervention	Introducing climate-smart cocoa farming among smallholders for ecosystem-based adaptation in Lampung Province, South Sumatra, Indonesia.
Partner name(s)	Rikolto Indonesia
Amount applied for	DKK 3,846,219
Country(ies)	Indonesia
Period (# of months)	July 2023 to June 2026 (36 months)
If re-submission or in continuation of a previous intervention, please insert journal number	N/A

Summary

Farmers in developing countries relying on natural resources and rainfed production systems for their livelihoods are among the most climate change-vulnerable groups in the World. For Lampung Province, Indonesia, studies show that climate change will affect cocoa growing negatively and significantly under a 'business as usual' scenario.

At farm level the project will promote adaptation to climate change via climate-smart farming practices and agroforestry among poor cocoa farmers (Rio Marker 311), also introducing diversification of income sources for women and youth on the back of opportunities generated by the new production systems and practices and linking production to 'green' premium markets.

Moreover, the project builds an advocacy case through the Cocoa Sustainability Partnership and at multiple levels in support of on-farm, as well as a landscape-level ecosystem-based climate change adaptation approach documented to provide long-term adaptation benefits and promoted by the UN.

1. Purpose, relevance, and context analysis

1.1 Purpose of the intervention and climate change related challenges to be addressed

Relevance and context

Indonesia is the World's sixth-largest producer of cocoa beans with up to 90% of cocoa production coming from smallholders (~2 ha farms) and providing livelihoods for 1.6 million households. A growing market for cocoa (3-4%) provides opportunity to improve farmers' livelihoods, but also poses a risk of reinforcing a negative spiral causing further deforestation, degradation and subsequent adverse local climate change impacts.

Studies show that climate change will decrease the area suitable for cocoa production significantly, e.g. by longer dry seasons as in Southern Sumatra. International Centre for Tropical Agriculture (CIAT & Mondelez, 2017) conclude, that unless current cocoa methods of production are changed, cocoa cultivation is unlikely to be possible in South Sumatra in the future, meaning 116,259 farms *must* change their current farming practices to adapt to climate change. Therefore, we find the proposed project well suited for the CISU Climate Change Adaptation Modality (CCAM), as it will facilitate such adaptation and build resilience, not only for the individual farmers, but also the larger landscape, which they depend on for a range of ecosystem services.

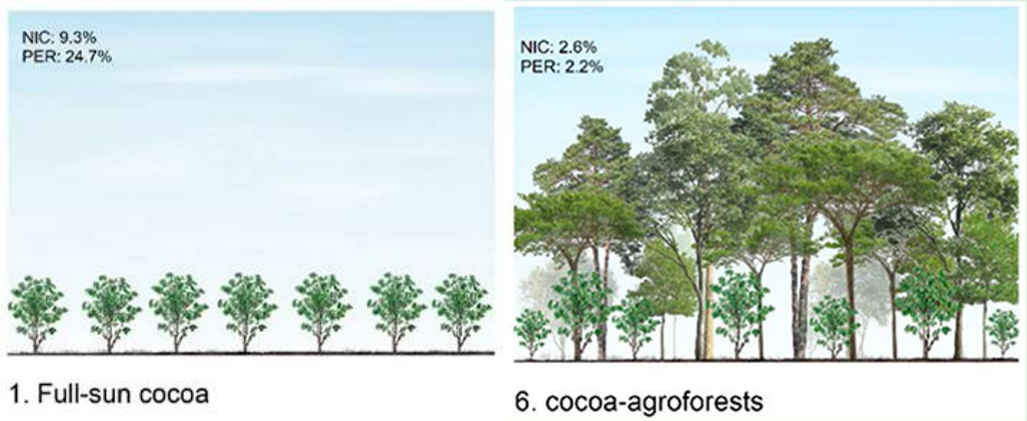
Farmers in the project area will receive support for advocacy and technical transformation from traditional soil-degrading monoculture farming to adaptive agroforestry practices so as to stabilise or improve cocoa yields, while increasing climate change resiliency, and to provide options for additional income beyond cocoa sales. The proposed intervention thus directly helps smallholder cocoa farmers adapt to climate change by:

(i) Establishing an ecosystem-based adaptation advocacy framework to strengthen support for both on- and off-farm adaptation measures (Rio Marker 41030);
(ii) Training cocoa farmers in sustainable climate-resilient farming practices, individual practices as well as an integrated agroforestry production system (Rio Marker for adaptation 311, 43040); and
(iii) A structured approach to agri-business development related to present and future adaption needs and needs of the new production methodology, as well as preparing farmers to access markets for premium products to aid general and specific climate change resiliency (Rio Marker 43040).

The current situation

Extension services in Indonesia largely promote monoculture without shade, with sun grown cocoa not only shown to destroy soil fertility in 2-3 cycles, but also very vulnerable to climate change. This is particularly regretful since cocoa is originally a species growing in open forests and so it thrives best with a degree of shade from other plants/trees – exactly the situation of cocoa grown in agroforestry systems.

Shade-grown vs. Sun-grown



From https://www.frontiersin.org/articles/10.3389/fsufs.2021.635779/full

On top of cocoa being a natural candidate for agroforestry, and opposed to sun-grown cocoa farming methods, an agroforestry approach is 'climate-smart' by reducing ambient temperatures (shade), avoiding soil erosion (softer rain, reduced run-off, more roots, protective soil cover) and reducing evapo-transpiration (soil cover, shade, multiple layers). At scale, it also plays into the wider ecosystem and provides services like soil fertility, water regulation and biological corridors/habitat for beneficial wildlife (e.g. pollination services).

Conversion to agroforestry practices - restoring a minimum degree of tree cover - is thus a potential remedy to return cocoa farmlands to former productivity and at the same time increase the resilience of agricultural production systems, and thus farmer communities. In addition, a surrounding landscape with relatively intact ecosystems provides a number of services, which no farm in isolation can generate; widespread tree-cover influences local rainfall and temperature patterns, soil erosion protection, water flow regulation, pollination services and is generally thought to offer better chances of balance between pests and their predators, as well as a host of products upon which the poorer communities typically rely in times of distress.

1.2 Context analysis

The intervention is planned to take place in Lampung Province, which covers the southern tip of Sumatra, Indonesia (Figure 1), where cocoa farming is an important crop and source of income. Thus, the ***Sector*** is **Agriculture,** and the ***Theme*** is **Introducing climate-smart cocoa farming among smallholders for ecosystem-based adaptation in Lampung Province, South Sumatra, Indonesia**.

Lampung Province has five distinct topographical zones: (i) hilly and mountainous, (ii) rolling hills, (iii) alluvial land, (iv) tidal marsh land, and (v) river basins. Tanggamus Regency is a division of the South Lampung Regency and encompasses tropical coastal waters and plains where temperature averages 28° Celsius and extends more than 2,000 masl up Mount Tanggamus with distinctly cooler average temperatures. Rainfall is relatively high, close to 3,000 mm/year particularly in hilly and mountainous terrain.

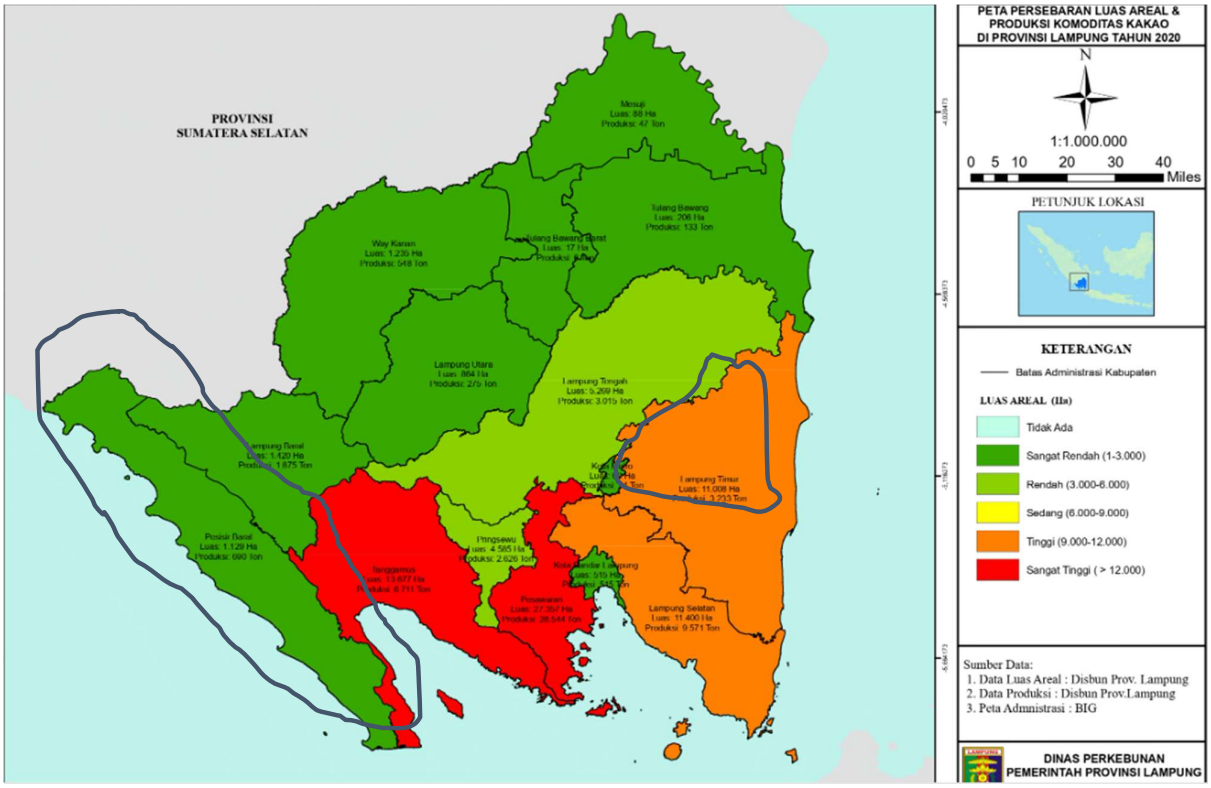


Figure 1: Map of Lampung Province and the two national parks (BBSNP and Way Kambas NP)

There are two national parks in Lampung Province:
(i) Bukit Barisan Selatan National Park (BBSNP, Figure 1 – West), and
(ii) Way Kambas National Park (WKNP, Figure 1 – East).

The BBSNP was first protected by the Dutch East Indies government in 1935, became a national park in 1982, and was designated a UNESCO Tropical Rainforest Heritage site in 2004.

Intervention activities will take place in the buffer-zone of BBSNP; an area where both global climate change causes risk to vulnerable communities, but also ongoing deforestation and increase in monoculture farming and related consequences to local climate patterns pose a risk for both natural ecosystems and farming.

The Tanggamus Regency is the highest cacao producing area in Lampung. The total cocoa area is 78,701 ha, total production is 56,671 ton/year (= 0.73 ton/ha/year), all from smallholder farms. Data from the Plantation Office of Lampung Province (2016) states the number of smallholder plantation farmers for all types of commodities in Lampung as 877,056, and total number of smallholder cocoa farmers as 116,259 households (potential target group). Tanggamus Regency is home to approximately 12,000 of the 116,259 HHs with an average area/HH of 1.13 ha. Cocoa planting began in Lampung Province in the 1980s as an alternative to coffee, which at that time experienced crop failure. Cocoa beans have now become one of the region's leading export commodities. Unfortunately, productivity of cocoa in this area is still low.

Low productivity is caused by several factors. In general, cocoa plantations in Tanggamus are based on traditional household plantations dominated by the 'mixed crop plantation scheme', where cocoa plants are planted with other crops (not trees), which is not optimal, both in terms of seed sources (varieties), planting design, cultivation practices and post-harvest management capacity. Another factor is the age of the cocoa plants in Tanggamus; most plant are over 15 years old and productivity per plant is on the decrease. This is exacerbated by pest and disease attacks coupled with low technical and financial capacity of farmers to practice good pest and disease management on their farms. Rejuvenation of old trees is perceived – opposed to documented best practice – as an expensive and counterproductive process. So, cocoa farmers tend to clear new land, replant cocoa on the new land, rather than rejuvenating old cocoa trees that are still yielding.

The Government of Indonesia and many *Cocoa Sustainability Partnership* (CSP) members still mostly promote '*green revolution*' principles, which are sub-optimal given projected climate change and the resources of farmers (knowledge, skills and funds). At the same time smallholders lack information and sufficient knowledge about sustainable and climate resilient methods and are for this reason and for lack of organisation generally prevented from even trying to exert influence.

In summary, adoption/scaling of agroforestry practices is hampered by:
(i) Insufficient knowledge among farmers and vulnerable communities about climate risks and possible adaptation measures preventing them from advocating for support and alternatives;
(ii) Limited technical capacity of farmers and farming institutions to engage in implementation of agroforestry and development of new, corresponding products and services; and
(iii) Lack of perceived incentives/financial barrier to invest in agroforestry and ecosystem services.

The larger landscape

There are two aspects of climate change adaption and interactions to be considered when working with land-use on a landscape level. Firstly, global climate change affects the large-scale and regional average weather patterns and subsequently the general hydrological cycle. Secondly, it is known (see e.g. IPCC/AR6, 2021; UN Land Report, 2022) that changes in the regional/local land-use can change the local climate. The last decade or two of research have increased the understanding of the role forests play in recycling and transporting valuable water resources toward continental interiors. In fact, with significant tree, forest and vegetation cover loss, downwind areas are likely to suffer the consequences of declining rainfall and water availability, reinforcing global climate change effects, and further heightening the threat of drought and wildfire (*Figure 2*).

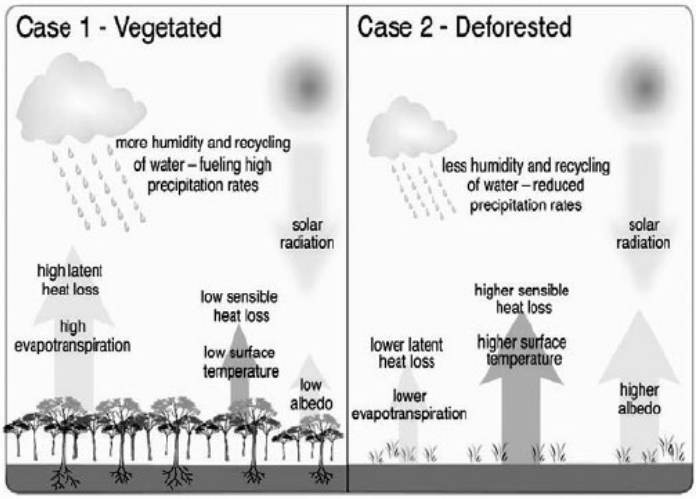


Figure 2: Changes in local climate patterns as a result of change in land-use (after Marengo, J.A., On the hydrological cycle of the Amazon Basin: A historical review and current state-of-the-art, 2006).

As large-scale/global weather patterns change, it leads to higher temperatures and increase in floods and/or droughts, and farmers are likely to experience reduced crop yield and crop failure some seasons (see e.g. *Atmosphere-biosphere interactions: https://scied.ucar.edu/learning-zone/earth-system/climate-system*). This is likely to induce a negative spiral starting with reduction of farm income, which endangers decent livelihoods and reduces household/community capacity to operate the farms. Farmers may then be forced by circumstances to expand into new areas (typically forests) to increase cocoa production. Deforestation and monoculture, however, changes local weather patterns (temperature, evapo-transpiration and rainfall), which in turn have negative effects on farming conditions (soil degradation, erosion, floods/droughts, pests), adding another layer of climate variability on top of the impact of global climate change. As recommended by e.g. UN, the project will tackle both levels as farmers depend on their surrounding landscape for provisioning services and resilience – and the shift to agroforestry will in turn support that landscape in a positive feed-back loop.

Landscape-level approach is broadly defined as a framework to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change. It also aims to balance competing demands on land through the implementation of adaptive and integrated management systems.

Climate vulnerability context

In 2017, International Centre for Tropical Agriculture (CIAT) assessed climate change impacts on Indonesian cocoa areas (see *Figure 3*). Anticipated climate changes by year 2050 for the current cocoa production zones in Sumatra are of such a character and magnitude, that a transformation of traditional farming practices is required to adapt to the expected future climatic conditions. Unchanged, cocoa cultivation will most likely not be possible in South Sumatra. This study, however, does not include assessment of the potential secondary local climate effects should the current increase in deforestation and monoculture farming continue. These would exacerbate the effects predicted by CIAT.

A recent study done by *Institut Pertanian Bogor* (*Pre-Feasibility of Project on Sustaining Livelihoods through Inclusive Climate Adaptable Rice Production, 2022*) shows that flood risk during the wet season (December-March) is expected to increase and reports that although total rainfall during the dry season (June-October) may increase, time between rainfall occurrences is expected to increase as well. So in addition to increased temperatures, frequency of floods is expected to increase during the wet season as is the risk of droughts during the dry season.

In conclusion, to maintain an economically and environmentally viable cocoa production in South Sumatra, there is a local need for climate adaptive measures and farm practices to be introduced and growing cocoa in the shade of agroforestry-systems has been shown to be a suitable approach.

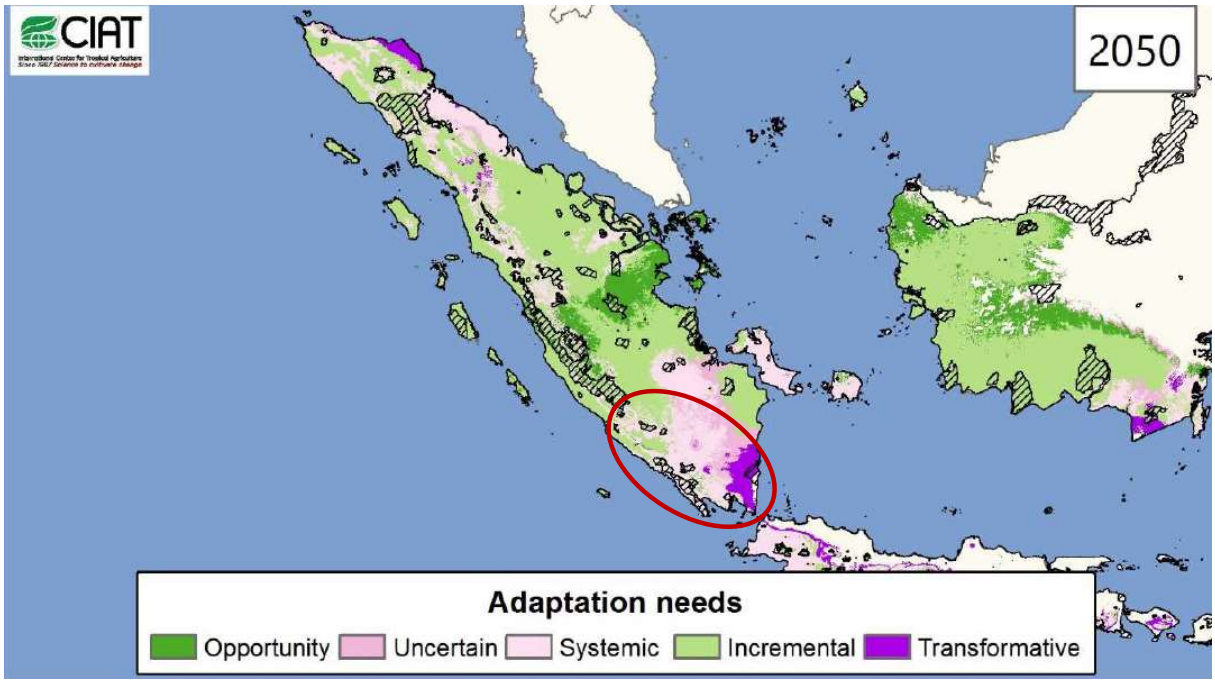


Figure 3: Estimated climate change impacts and proposed adaptation strategies in the RCP 6 scenario in 2050 (Climate change impacts on Indonesian cocoa areas, CIAT & Mondelez, 2017). Red ellipse marks the project area.

Climate change, risk, vulnerability and local adaptation needs

Vulnerability is generally defined as the combination of exposure and sensitivity (to climate impact in this case), and adaptive capacity (see e.g. *Vulnerability and Risk Assessment Training Manual*, Communities for Resilience (CORE), 2017). Here, the subjects of exposure (socio-economic assets) refer to the presence of people, livelihoods, environmental services and resources or infrastructure in places that could be adversely affected by physical events (induced by increased temperature, rainfall, drought etc.) and which, thereby, are subject to potential future harm, loss or damage (IPPC/AR 5 2014). A rocky desert area without people and infrastructure has a very low exposure. An area that supports the livelihood of many people with few alternatives, has a high exposure. Farmland and ecosystems (and related assets) are the cornerstones of the poor farmers and smallholder communities in the project area, their whole livelihood depend on them, and the exposure to climate change, and the related stressors, is consequently substantial.

Sensitivity describes the susceptibility of the communities (and associated environmental systems) to the foreseen effects of climate change. At present, cocoa farmers meet various barriers in form of lack of information on climate change, awareness of adaptation measures, access to markets and credits and alternative job/income opportunities; all increasing food insecurity and general sensitivity to any external shocks, be they to health, safety or income. In these aspects, women are typically in a weaker position than men, mainly because they are proportionally more dependent on threatened natural resources. Generally, women have less access than men to resources such as land, credit, decision-making structures, technology, training and extension services that would otherwise enhance their capacity to adapt to and buffer effects of climate change. In addition, sensitivity to risk lowers incentives to invest in production systems, often with negative impacts on long-term planning and productivity, returns and sustainability. Reductions in agricultural income have also been shown to have effects on household willingness to spend on health and education. The sensitivity of poor farmer communities, especially women, to the effects of climate change is therefore considerable and places the cocoa farmers in Southern Sumatra at a high level of *vulnerability* and need of *adaptive interventions* to neutralise the increased vulnerability.

Expected effects related to climate change are higher temperatures, increased rainfall during the wet season (flood risk and soil erosion) and longer periods between rainfall during the dry season (drought risk). Higher humidity increases the probability of pests and disease. Based on the above-mentioned effects, cocoa farmers are likely exposed to climate change related hazards on two fronts, namely on-farm and off-farm:

(i) reduced farm yield and degradation of soil, increased risk of pests, disease, floods and droughts; and
(ii) degraded local/regional forest ecosystems, and environmental conditions in general, further increasing run-off/soil erosion, exposure to wildfires, greater variability in rainfall and reduction of biodiversity (e.g. pollination services).

Given that these climate change related hazards are very likely to materialise, combined with the high vulnerability of the farmer communities, the climate change risk level is correspondingly high and therefore also the need for increasing the adaptive capacity. As indicated above, there are certain barriers preventing farmer communities to engage actively in such climate adaptation measures to reduce vulnerability and thus risks. These identified barriers are organised in three categories and detailed in the following table:

(iii) threatened environmental/ecosystem capacity and limited awareness, information and knowledge about climate change impacts and adaptation strategies,
(iv) lack of technical capacity; and
(v) lack of possibilities for diversification & off-farm income sources due to limited access to finance and market information.

MAIN BARRIERS IDENTIFIED	RELEVANT FOR COCOA FARMERS + APPLICABLE FOR THE PROJECT AREA
LIMITED AWARENESS ABOUT CLIMATE CHANGE IMPACTS AND ADAPTATION STRATEGIES	• Lack of awareness of climate change and possible consequences • Lack of simple information technology to exchange with others • Small cocoa producers, local/regional government officers, universities and local CSO initiatives often lack appreciation of next level of adaptation of climate-adaptive farming practices • Degradation of forest areas & environmental conditions, biodiversity and ecosystem services threatening long-term community livelihoods
LACK OF TECHNICAL CAPACITY TO CONVERT TO AGROFORESTRY PRACTICES	• Limited knowledge of CC-smart farming, reliance on traditional methods/gov extension promoting 'green revolution' techniques • Production compromised due to expected changes in climate patterns, global as well as local deforestation effects • Studies in Indonesia has estimated that 30-40% of the coca crop is lost to pests and disease, a loss that is expected to increase • Soil fertility levels degrade over time. Increased use of fertilisers to compensate for reduced yield and quality affects downstream water bodies and community water use
LACK OF POSSIBILITIES FOR DIVERSIFICATION, AGRI-BUSINESS DEVLEOPMENT AND/OR KNOWLEDGE/ SKILLS TO PURSUE THESE	• Smallholders lack skills to collect and control production data, incl. ownership protection and commercialisation • Lack of women farmer participation in the cocoa sector • Limited access to markets and finance without which encroachment is seen as only alternative to compensate for reduced crop yields • An ageing farmer population, which curbs investments in innovation. Young people are increasingly abandoning rural areas • Limited exposure to innovation and search for solutions and new potential income sources

2. The partners

Preferred by Nature (PbN)

Preferred by Nature is a Danish NGO, established in 1994, working on development and implementation of solutions to ensure that human choices lead to a sustainable future, i.e., nature protection, ecosystem restoration, better land management and responsible production. PbN is governed by an annual general assembly and has a statutory commitment to benefit nature, people and the climate. We have 300+ employees, 28 country offices and activities in more than 100 countries. PbN has had offices in Indonesia since 2018, and presently employs 23 Indonesia staff across 3 offices working within sustainable agriculture, nature protection, ecosystem services, ecosystem restoration, supply chain management and projects.

Deforestation-related commodities or those with a direct climate effect are strategic priorities for Preferred by Nature, so our focus is on cocoa, palm oil, cattle, coffee, rubber, and rice. The organisation has significant experience from working with and certifying cocoa production under the Rainforest Alliance standard in several parts of the World, most notably Ghana and Ivory Coast. Also, a significant part of activities are donor-funded projects, e.g. CISU (sustainable rice production) and EU (sustainability in rice supply chain). In process is also a prequalified concept note for a USD 15-17 million rice-focused project in Indonesia with the Green Climate Fund (and Rikolto), which will further strengthen our focus on Indonesia and SE Asia. Rikolto is also a strategic partner for PbN on rice, cocoa and coffee – not only in Indonesia, but also in Ghana, where we have just won a sustainable cocoa-related project together.

Rikolto

Rikolto is an international NGO with 40+ years' experience in partnering with farmer organisations and food chain stakeholders across Africa, Asia, Europe, and Latin America. We run programmes in 14 countries through seven regional offices. A sustainable income for farmers and nutritious, affordable food for everyone: this is what Rikolto works for. We reach our goals by building bridges between smallholder farmer organisations, companies, and authorities across rural and urban areas. Through our global network, we wish to inspire others to tackle the inter-related challenges of food insecurity, climate change, and economic inequality. With 50+ years working in agriculture in Indonesia, Rikolto has in-house expertise in each commodity.

Rikolto in Indonesia works with cocoa in 4 different provinces: East Nusa Tenggara, South Sulawesi, West Sulawesi, and North Sumatra, which are some of the main cacao production areas in Indonesia. Currently, Rikolto supports cocoa farmers through partnerships with 5 farmer organizations (FOs) in 5 districts of the mentioned provinces, targeting support to more than 8,000 farmers in 2026. Building on decades of work in rural development and our well-established expertise in creating inclusive business relationships, our strategy sets out our systems approach for working with diverse partners to strengthen selected commodity sectors (rice, cocoa, and coffee) and to address the wider food system challenges of cities.

The Cocoa–Coffee program has formulated intervention strategies such as 'Sustainable Crop Production' focusing on climate-smart production, productivity improvement, income diversification and FO professionalization. Value chain actors are facilitated to extend choices and opportunities to the poor and other marginal groups e.g., producers, consumers and wage earners thus creating jobs and affordable goods and services needed by the poor.

To transform the cocoa sector, governments and other value chain actors have to step in to make sustainability and inclusivity the norm at global, regional, and country level. Policy changes are required to scale innovations and sustainability in the food systems. Therefore, Rikolto's approach on influencing policy will be the focus of this intervention. Rikolto is one of the initiators of Cocoa Sustainability Partnership (CSP) establishment and remains as the board member of this strategic national multistakeholder platform. The project partners both have long-term strategy components covering sustainable cocoa production and working with climate change resilience. With in-depth knowledge of the Indonesian cocoa sector, Rikolto brings solid knowledge and experience in working directly with farmers to the partnership, using their legitimacy as a local organisation and the trust they have built with communities and stakeholders to deliver successful training on sustainable cocoa farming. In addition, hereto they have very strong networking abilities and contacts at district and national

levels, including working with the private sector to ensure market access for our farmer beneficiaries.

Relative to Rikolto, Preferred by Nature brings knowledge of ecosystem restoration and ecosystem services, as well as delivering training and innovation within agriculture and forestry. Further, we bring expertise on sustainable supply chain management and can help prepare farmer organisations for a future where the market requires more transparent supply chains. We understand international standards for sustainability and management of supply-chains, and have significant experience in leveraging market mechanisms to increase pro-poor, and climate- and biodiversity-related impact on the ground.

Finally, we are leading the development – in collaboration with our local NGO partners – a landscape level approach to multi-layer project interventions to ensure as comprehensive and effective projects as possible.

2.1 Strengthened capacity to address climate change adaption and resilience for poor & vulnerable groups
For both partner organisations the project will further strengthen the experience and capacity to work with farmers and CSOs on introducing of climate-smart agricultural systems and building resilience among smallholders. The capacity can and will be brought into future projects and activities, both common and individual, and is in the project documented by University partners and shared among participating CSOs, government agencies and commercial companies organised under the Cocoa Sustainability Partnership (CSP). The project outcome related to advocacy will help harmonise and build momentum towards better climate change adaptation practices and better livelihoods for poor and vulnerable groups beyond the present project. Involving representatives from all kinds of members in the CSP in training where appropriate and in results sharing and field visits is expected to increase climate adaptation support – in human resources and funding to communities – by demonstrating the effectiveness of the solutions included in the project.

For both partners the geographical area is also new(ish), and therefore we will be adding knowledge about specific local conditions and expanding our possible area of operation in indonesia. Whereas the two partners in the recent CISU-funded projects (and one EU project) focused on climate-smart rice cultivation, which is primarily climate mitigation, this project offers the opportunity for Preferred by Nature and Rikolto to employ an ecosystem, landscape-level perspective to adaptation, that is being called for by UN, and embark on a mutual learning exercise on best-practice for climate change adaptation and agroforestry.

3. Target groups

3.1 Composition of the target group(s) and their benefit from the intervention
The main focus of the intervention are small-holder cocoa farmers and farmer associations in Tanggamus District in the buffer zone of the Bukit Barisan Selatan National Park (BBSNP), more specifically:

(i) Cocoa farmers, farmer organsations (FOs-FFSs) and agricultural extension officers (AEOs) in the district (3,300 farmers in total, 120 FOs and 50 AEOs. Farmers and FOs are chosen as primary targets as they are highly affected by the climate change impacts. The other primary target group is the AEOs in the district areas, as they hold responsibility to assist and coach the farmers/farmers related agricultural practice and skills, and so are a means to the end of reaching more farmers beyond the project scope & duration.

(ii) Women, youth, and farmers' family without land access (a total of 500 women and youth). Innovation and agri-entrepreneurship activities will be developed and implemented in collaboration with women, youth, and TVET-colleges. These directly aim at generating additional household income thus supporting adaptation capacity and generation of additional capital that can be invested in improving farming.

The project will intensively train 100 model farmers from 10 farmers groups, working closely to develop model farms and action plans to train additional farmers in their local village and monitoring the training schedules, with the help/support from agricultural extension officers, who will in the process become trained themselves in new climate-smart and agroforestry practices. In year 2 and 3 the model farmers (with AEO support) will train at least 15 farmers each/year – in total min. 3,000 farmers. The notion is to have groups loosely formed around a model trainer and model farm initially, but subsequently encourage more independence

as self-contained Farmer Field Schools (FFS) with whatever number and composition works for the members.

With regards to diversification the intervention goal is to train and establish minimum 10 teams of 5 persons (women & youth), who can act as innovation and business development ToTs, assist further exploration of alternative income sources and train business groups in the 'how to' of establishing and running a business.

50 agricultural extension officers (AEOs) in the district will be trained together with model farmers. AEOs are tasked with assisting farmers in cocoa cultivation to increase sustainable production, facilitating training to farmer groups and providing advice on climate-smart cocoa cultivation. Each government AOE has a working area of 1-2 villages. With the skills developed though the project, trained AEOs will provide reinforcement to other farmers and farmer groups in their working areas and reach the secondary target groups. It is hoped that the trained AEO also will train other AEO available in district, encouraged, hopefully by government agencies which have seen the light via our evidence-based advocacy. It is also expected that each trained AEO can assist a minimum of 2 farmer groups, with approximately 20 farmers per group.

The secondary target group consists of farmer family members, alliances of FOs, village authorities, buyer companies, the CSP, colleges and local CSOs focusing on cocoa sustainability (a total of 9,000). These are actors that also influence/shape the cocoa sector and landscape in the area and drive the sustainability of this intervention. They will participate primarily through multistakeholder workshops in which the potential social and environmental benefits of sustainable climate-smart cocoa cultivation will be discussed. Also, the intervention will employ active information campaigns directed at stakeholders. In this way, they will benefit from gaining a better understanding of how this can be directly relevant to their own work and target audiences, and what potential role they can play in developing the sustainable cocoa sector in Indonesia.

3.2 Relevant target group numbers

Target groups	# males	# females	# other	Total
Primary target groups 1. On-farm activities 2. Diversification/I&E	2,400 (96) 40 250	900 (24) 10 250		Farmers: 3,300 Farmer groups: 120 AEO: 50 Women and youth: 500
Secondary target groups 1. On-farm activities 2. Diversification/I&E	 4,500 600 (Youth)	 2,500 900		Family members of farmers: 3,000 AEO: 300 5,000 other farmers Balai Penyuluh: 10 Poktan: 100 Gapoktan: 10 Village authorities/ bodies: 10 CSO members and others: 70 TVET college students: 500
Primary and secondary target groups expected to become more resilient to effects of climate change				
Primary 1. Farmers (all) 2. Diversification **Secondary** 1. Farmers 2. Diversification	 2,400 125 2,000 250	 900 125 500 250		100 champion farmers 10 champion AEO Family members: 200 trained in I&E Balai Penyuluh: 5 Poktan /gapoktan: 5 Village (bodies): 5 10 I&E training teams of 5 persons Expected 2,500 (farmers) 500 women/youth

3.3 Expected resilience of target group due to the intervention

Decreasing impact and vulnerability can be achieved by reducing exposure and sensitivity, plus increasing adaptive capacity, for each type of risk and the associated hazards/impacts, in this case climate change risk. Actions can be taken across biophysical, economic, or social domains. It is theoretically possible to reduce exposure, but that would require moving away assets and infrastructure (houses, roads/transport, markets, irrigation systems) from the actual area thus leaving less assets to be exposed. Ecosystems and natural resources/assets, however, cannot be moved. Likewise, farmland is immobile, but could be abandoned. So for all practical purposes, alteration of climate change exposure level is not an option. That leaves sensitivity (increasing resilience) and adaptive capacity as potential areas of action. FAO suggests several generic options for adaptation to climate change at farm level. The set of risk factors and responses relevant to the present intervention context is shown in the following table (a subset of the generic FAO recommendations), and was selected, based on Rikolto's hands-on experience, to fit the concrete context, as specifically as we know it at this stage. They will form the basis of the intervention activities as a 'mix & match' menu (to increase ownership and uptake) for farmers and be included in awareness and training programs.

RISK AND BARRIERS	RESPONSE
CHANGING CLIMATE CONDITIONS AND CLIMATE VARIABILITY AND SEASONALITY	• Alter agronomic practices and use intercropping/ integrated systems (agroforestry). • Optimization of planting schedules such as sowing dates. • Plant different varieties, species, or cultivars of crops. • Increased diversification of varieties or crops to hedge against risk of individual crop failure. • Participate in monitoring schemes when available. • Change post-harvest practices.
CHANGE IN RAINFALL AND WATER AVAILABILITY	• Participate in monitoring schemes when available. • Change irrigation practices. • Adopt enhanced water conservation measures. • Use marginal and wastewater resources. • Make more use of rainwater harvesting and capture. • Reduced tillage to lessen water loss, similarly the incorporation of manures and compost.
INCREASED FREQUENCIES OF DROUGHTS, FLOODS, WILDFIRE EVENTS	• Participate in monitoring schemes when available. • General water conservation and retention measures are particularly valuable at times of drought. • Use flood, drought resistant varieties. • Improved drainage, improved soil organic matter content and farm design to avoid soil loss and gullying. • Consider (if possible) increasing insurance cover against extreme events.
PESTS, WEEDS AND DISEASES, DISRUPTION OF POLLINATOR ECOSYSTEM SERVICES	• Participate in risk monitoring and preventing schemes when available. • Use expertise in coping with existing pests and diseases. • Build on natural regulation and strengthen ecosystem services.

When adopting the shade-grown cocoa farms will become more resilient to both drought and changes in rainfall patterns. This means a better yield compared with traditional methods over time. Further the integrated production method comes with a range of other benefits like improved soil, resistance to pests. We also know from experience, that the best practices we show farmers on the model farms, can help save (expenses for) pesticides and fertilizers. Consequently, in this intervention it is planned to introduce climate-

smart agroforestry practices based on solid R&D, training, and resources to increase adaptation capacity by increasing stable, primary production, plus dedicated activities to increase diversification of income sources to reduce overall community sensitivity and thus vulnerability, incl. facilitating the conservation of stable local ecosystems founded in an evidence-based landscape approach**.**

3.4 Partners' relationship to the target group

The project has been developed in collaboration between the two main partners, which both have cocoa and South Sumatra experience. It is further based on research, previous studies and communication with local CSOs, one cocoa buyer active in South Sumatra, and members of the CSP. To further detail the intervention model, a mapping assessment of each target group will be conducted. In doing so, the project team will seek to involve local CSOs e.g., Kalimajari, Yayasan Way Kambas Seputih and/or Walhi in the awareness raising and training activities to expand the relationship with local CSOs and benefit from their knowledge of the local setting and opportunities. Feedback from and responses to these interactions with target groups will be part of the continuous project adjustments, coordination and monitoring work, since it is imperative for us to ensure buy-in and ownership from cocoa farmers (hence also the 'mix & match' approach as a means to allow a step-wise progress to a full agroforestry system). Also, part of the otherwise broad landscape-level mapping will include needlepoint in-depth participatory assessments of what the target communities themselves see as most urgent and appropriate activities (low hanging fruit – starting point for activities).

To ensure measurability of project effects, establishment of a robust monitoring, evaluation and learning framework, and the recruitment of MEL coordinator is supported. Dissemination activities and communication materials will be produced and made available to direct stakeholders and a wider audience to facilitate sharing of progress, achievements and lessons learned from the project.

4. Description of the intervention

4.1 Results-based Model

The overall purpose of the intervention is to advocate for an evidence-based land-scape level approach to climate change adaptation that will enable poor cocoa farmers communities in the buffer zone of Bukit Barisan Selatan National Park, Lampung Province, to effectively adapt to the negative effects of climate change through introduction of agroforestry and climate-smart farming practices, with associated opportunities for income diversification and necessary capacity building, all supported by a long-term enabling environment ensuring that individual on-farm adaptation and diversification efforts are not cancelled out by destructive practices in the nearby landscape, but rather enhanced through increased investments in an overall climate change resilient landscape.

To respond appropriately to the identified barriers and target groups (see section 3.3), the proposed intervention is designed to deliver three main outcomes:

(i) Evidence-based advocacy towards the Cocoa Sustainability Partnership (CSP) has paved the way for increased investments in agroforestry and local ecosystems to enable climate change adaptation in cocoa production across the landscape.

(ii) Cocoa farmers' livelihoods are improving as a result of on-farm climate change adaptation measures in the form of agroforestry.

(iii) Climate change adaptation measures introduced have generated additional income sources decoupled from direct access to land for women and youth.

Concrete measures of success (indicators) and the level of ambition (targets) are shown in the following table:

OUTCOME	INDICATOR	TARGETS
OUTCOME 1: **EVIDENCE-BASED ADVOCACY TOWARDS THE COCOA SUSTAINABILITY PARTNERSHIP (CSP) HAS PAVED THE WAY FOR INCREASED INVESTMENTS IN AGROFORESTRY AND LOCAL ECOSYSTEMS TO ENABLE CLIMATE CHANGE ADAPTATION IN COCOA PRODUCTION ACROSS THE LANDSCAPE**	1.A Level of CSP support for agroforestry as on-farm CC adaptation measure 1.B Level of CSP support for ecosystem-based planning and investments as best landscape-level practice for CC adaptation 1.C CSP-recognized plans for landscape-level adaptation 1.D Concrete support for implementation of agroforestry and ecosystem adaptation and resilience to climate change	1.A Endorsement of agroforestry as best on-farm practice for CC adaptation by the CSP. 1.B Endorsement of ecosystem-based planning and investments as best landscape-level practice for CC adaptation by the CSP. 1.C A road map for establishment of one *Verifiable Sourcing Area* based on *Cocoa Sustainability Partnership* principles, incl. mapping out landscape-level investments in healthy, climate change resilient ecosystems. 1.D At least one cocoa buyer has invested systematically in agroforestry promotion and/or ecosystem protection/restoration.
COMMENTS Overall, the success criterion for outcome 1 is the persuasive illustration of – via targeted advocacy based on documentation from pilot plots and existing research – how landscape-level promotion of agroforestry is a win-win solution for individual farmers and society at large, offering increased and/or more stable yields, risk and income diversification and climate change adaptation, while restoring, maintaining or improving ecosystem services in a positively reinforcing cycle, plus providing the possibility of access to premium markets and external investments in a sustainable landscape. If indeed persuasive, it will result in increased resource allocations towards these targets.		

OUTCOME 2: **COCOA FARMERS' LIVELIHOODS ARE IMPROVING AS A RESULT OF ON-FARM CLIMATE CHANGE ADAPTATION MEASURES IN THE FORM OF AGROFORESTRY**	2.A No of HHs adopting agroforestry practices (introducing more trees) 2.B No of (additional) hectares under agroforestry 2.C Additional shade trees planted) 2.D Yield and amounts of chemical fertilizers + pesticides used in model farms (as a proxy for all farms adopting practices in the project period and beyond)	2.A Approximately 700 HHs (farms). 2.B 800 ha 2.C 9,000 additional shade trees planted 2.D 10% higher crop yield and 30% lower use of fertilisers/pesticides on model farms by end of year 2
COMMENTS With a three-year project duration, we cannot expect to see solid results from conversion of monoculture to agroforestry if this has to be done from scratch. Some best agricultural practices will show results sooner, though, such as pruning and stumping of older cocoa plants, providing a step-wise approach to persuading and convincing farmers to go the whole way towards full-fledged agroforestry systems, and so a gradual improvement is likely.		

Still, some famers are likely to have trees in their plots and these will be chosen for pilots/model farms and their practices optimised. The model farms will be monitored for changes in yield and in factors conducive to plant health (e.g. ambient temperature, soil fertility, moisture, incidents of pests and disease). Success will therefore be measured by proxy at two levels: (i) in the shape of how many farmers are persuaded by model farm results to adopt similar practices of pruning, stumping, mulching; and (ii) how many are persuaded to start introducing an increasing number of shade trees.		
OUTCOME 3: **CLIMATE CHANGE ADAPTATION MEASURES INTRODUCED HAVE GENERATED ADDITIONAL INCOME SOURCES DE-COUPLED FROM DIRECT ACCESS TO LAND FOR WOMEN AND YOUTH**	3.A Number of supporting agribusinesses established 3.B Cash income generated by each new agribusiness by end of project	3.A 10 new agri-businesses 3.B 1,500 USD/year
COMMENTS Converting from monoculture cocoa to either better agricultural (climate-smart) practices initially, and hopefully agroforestry eventually, creates a need and thus market for a new set of supporting inputs, skills and services, e.g. organic fertilisers and pesticides, recycling of waste products (e.g. briquettes from organic waste), nurseries to supply tree saplings, groundcover crops and potentially advisory services on the establishment and management, services related to diagnosis of pest and disease, application of remedial measures, specialised pruning/stumping services, and may also offer opportunities to add value or process new crops from a diversified production systems. Not necessarily being coupled to direct access to land provides a window of opportunity for youth and women, who traditionally disadvantaged in this regard, either by not owning or not deciding over land (use).		

Outputs and main activities

Advocacy (towards decisionmakers) and awareness raising (among farmers) under Outcome 1 will lay the ground for the two "technical" Outcomes 2 and 3 given that preparation, awareness raising, and advocacy is necessary for the farmer communities to understand and realise the need and suitable ways of transforming current farming practices – and for the district officers, regional government and commercial actors to provide the essential support for that transformation. The planned outputs and main activities are presented in the following three tables (one for each output), including the what, how and why, and Rio-Markers.

OUTCOME 1: EVIDENCE-BASED ADVOCACY TOWARDS THE COCOA SUSTAINABILITY PARTNERSHIP (CSP) HAS PAVED THE WAY FOR INCREASED INVESTMENTS IN AGROFORESTRY AND LOCAL ECOSYSTEMS TO ENABLE CLIMATE CHANGE ADAPTATION IN COCOA PRODUCTION	
OUTPUTS	**MAIN ACTIVITIES**
OUTPUT 1.1 **A landscape assessment allows for monitoring of project results and consensus-building on priority landscape-level interventions** **(RM 14082.M+A1) (2)**	**What** • Collection of existing and relevant maps on climate change impacts, existing ecosystems and cocoa farm infrastructure • Conduct a simple spatial Risk & Vulnerability assessment • Evaluation of ecosystem services baseline and potential in the intervention area • Establish baseline conditions and outline plan for location of demo-plots and training activities • Socio-economic data collection (farmers, production, land, income) **How** • Combine the collected basic GIS-data: climate change effects (CIAT, IPB), socio-economic plus farming data • Involvement of communities and key informants through workshops and interviews • Application of a systematic risk and vulnerability analysis (map layer/indicator approach)
Why A landscape level assessment serves several purposes; (i) to qualify a detailed delineation of 'the landscape'; (ii) to allow for data collection at beginning + end of project to determine effects; and (iii) allow spatial planning of land-based interventions (social, environmental, other) based on evidence of land use trends and impacts in view of climate change. Based on the cumulative documentation, a strong(er) case can be made to lobby for increased support from the public and private sector to climate adaptation, as well as concrete guidance as to the nature of and where such support should be directed with priority.	
OUTPUT 1.2 **Collaboration between project partners and two universities is established to support data collection, methodology, monitoring & documentation of climate change adaptation methods and results** **(RM 14082.M+A1)**	**What** • Identification of two relevant and interested universities (Indonesia/Denmark) • Jointly prepare a collaboration program, incl. scope and student exchange **How** • Meetings • Formulate, agree and sign a MoU between the two universities • Joint field visits to set up sample plots, monitoring tools/methodology & joint monitoring visits (not all visits, but enough to harmonise and learn mutually)
Why In Indonesia, and many other places, there can be resistance to 'outsiders' telling authorities what to do, especially if these don't have solid information to base their recommendations on. Having universities, especially Indonesian, put their name and reputation behind findings and recommendations based on an Indonesian context and pilots not only adds to the credibility of data, but also the legitimacy of the recommendations for altering business as usual. Also, appearances aside, academic rigour does add value to results, and anchoring of results monitoring (merits of agroforestry in local climate change adaptation	

and benefits of diversification to livelihoods) with local institutions provides an increased likelihood of continuity beyond project life. It is also intended that the output will be a joint initiative between Danish and Indonesian students, which will add an inter-cultural and inter-personal component to the output, and the student experiences are intended to form part of the popular engagement activities in Denmark.	
OUTPUT 1.3 **Farmers are aware of the projected climate change for their area, the implications for cocoa production and possible adaptation measures** **(RM 311 A1) (2)**	**What** • Participatory collection of baseline data on current practices, production, issues, problems (participatory to also ensure buy-in from cocoa farmers and proper understanding of most urgent issues) • Awareness raising on climate change projected and implications for cocoa production with the involvement of government extension officers • Demonstration of agroforestry and climate-smart practices and benefits, and comparison with monoculture to raise awareness of on-farm adaptation needs/possibilities among farmers • Awareness raising among farmers on the impact of landscape-level land use and ecosystems on farm productivity in view of CC **How** • Introductory meetings and subsequent workshops • Agreements from farmers associations and local government (formal requirement) • Cocoa Day with farmer cooperatives, • Visits to demonstration plot on Climate Smart Agriculture with a comparison monoculture area
Why Any support from investors/buyers and the government extension system achieved via advocacy towards the CSP will fall on relatively barren ground if farmers are not aware of climate change risks and adaptation measures, and so understanding of CC risk, implications and possible adaptation measures is equally important with farmers as well as policymakers and responsible buyers. Of particular importance is also making farmers aware of the causal relationship between the state of the surrounding landscape on the effectiveness of their individual, on-farm adaptation activities. To this purpose they need to hear 'the message' from not just the project partners, but also from the government extension officers, they usually take advice from.	
OUTPUT 1.4 **Based on credible documentation, multi-stakeholder support has been created among public agencies, other CSOs and private sector for an integrated landscape approach to**	**What** • Consolidate documentation for projected local climate change impacts and potential of agroforestry as adaptation measure into policy or position paper together with University as deemed most effective • Advocate for increased support to and investment in adaptation measures, both on-farm and at landscape level, based on documentation and the landscape assessment and seek CSP endorsement • Visit to model farms with CSP members and university representatives • Develop position paper on best practice guidance for all parties in district and seek its endorsement by CSP • Build support for implementation of a Verified Sourcing Area to access markets at reduced costs for smallholder producers • Develop landscape restoration map with priority investments for public & private sector ensuring landscape-level CC resilience

climate change adaptation **(RM 41081 M+A1) (2)**	**How** • Multi-stakeholder workshops (district level, CSP, among fellow CSOs/NGOs) • Information meetings (district level, among fellow CSOs/NGOs) • Joint training sessions in the field
Why Activities aim at building understanding and concrete support for promoting climate change-adaptive agroforestry over traditional cocoa cultivation systems, which are much more vulnerable to climate change, and by gaining understanding of the significant challenge also gaining increased support to at-risk cocoa farmers (climate change) and investments (primarily private sector) at farm and landscape level to facilitate climate adaptation at a critical threshold scale. The CSP - with its mix of other NGOs, private sector companies and relevant public agencies – is a potential 'one-stop shop' for addressing all key players in the cocoa sector, including potential investors in payments for ecosystems services providing climate change adaptation services, and incentivising farmers for producing cocoa in agroforestry systems (companies such as Indonesian chocolate factory Krakakoa and Danish company SLOW). With public agency support such investments in cocoa producers can be directed to where in the landscape such investment is most critical for livelihoods and climate change-buffering ecosystem services. With a combination of 're-trained' government extension officers offering training on cocoa agroforestry and investments from buyers to fund the conversion cost for farmers, the necessary ingredients for climate change adapted cocoa cultivation are present. Lobbying may be directed at all at once, or via a 'divide and conquer' strategy building alliances among a subset of actors before addressing the main actors.	

OUTCOME 2: COCOA FARMERS' LIVELIHOODS ARE IMPROVING AS A RESULT OF ON-FARM CLIMATE CHANGE ADAPTATION MEASURES IN THE FORM OF AGROFORESTRY	
OUTPUTS	**MAIN ACTIVITIES**
OUTPUT 2.1 **Farmers are organised in Farmer Field Schools (FFS) to allow self-sustained learning and adaptive management of agroforestry systems plus additional farmer recruitment**	**What** • Prepare FFS training methodology • Organisation in farmer groups to allow effective delivery of training by project partners and government extension officers • Train farmers in FFS methodology and learning practice/feedback loops and monitoring • Develop, test, implement data support application (simple, e.g. whatsapp group) to facilitate adaptive farm management • Community-based monitoring and documentation of intervention effects (demo-plots vs traditional plots) • Capture results, write and disseminate a summary publication of results from farmers point of view **How** • Community meetings to recruit interested farmers and identify model farmers (future trainers) and farms • Initial FFS workshops on organisation and purpose • IT 'app': Establish user panels to describe functionality and most appropriate interface

<table>
<tr><td colspan="2">Why Training in groups instead of one individual farmers at a time is (i) more efficient per input; (ii) offers the opportunity to expand an individual farmer's knowledge/experience beyond his own farm and learn from fellow farmers; (iii) builds trust and ability to act collectively both in terms of advocacy as well as practically in terms of e.g. fighting pests and disease, and economies of scale in purchases, attracting investments, sales and marketing of products.</td></tr>
<tr><td>OUTPUT 2.2

Agroforestry model and practices adapted to local conditions

(RM 311 A1) (2)</td><td>What
• Farmers' preferences and markets for shade tree species/crops and ground cover crops mapped
• Optimal cocoa varieties identified, incl. source of improved varieties
• Identification of optimal levels of shade and shade species (value as crops as well as for nutrient cycling/fertilization)
• Generic agroforestry model adapted to local biophysical conditions, farmers' preferences and market opportunities
• Prepare training materials based on results/local adaptation (combinations of crops, interspacing etc.)
• Engaging government extension officers to enlist support and instil ownership
How
• Consultations in Farmer Field Schools/groups
• Consultations with government extension officers
• Cross learning/study visit
• Desk-based research and meetings/consultations with researchers to map state-of-the-art</td></tr>
<tr><td colspan="2">Why Designing the specific agroforestry models (mix & match between ground cover and shade trees) so they are acceptable and practically feasible in a local context, including acceptable/attractive to local cocoa farmers/households with the time horizon and risk profile these may have, across communities as well as for individual farmers, will ensure maximum uptake of agroforestry. Having a 'menu' of possible crops, as well as different time horizons for maturity and intensity of shade trees is intended to allow more farmers to adopt at least some elements of climate change adaptation measures.</td></tr>
<tr><td>OUTPUT 2.3

Farmers are increasingly establishing agroforestry systems and employing climate-smart cultivation practices

(RM 311 A1) (2)</td><td>What
• Set-up of demo-plots/model farms showcasing all elements of how agroforestry is suited to buffer climate change effects
• Training of trainers = model farmers and government extension officers and representatives of other CSOs/NGOs
• Training of additional farmers in new and climate-smart practices, multi-crop management, water retention methods, etc.
How
• Training workshops and field tests for FFSs involving also government extension officers
• Revise/optimise training material/formats (in collaboration with local CSOs) directed towards local/farmer communities
• Follow-up and exchange of experiences between individual FFSs
• Cross visit as part of learning in farmer level</td></tr>
<tr><td colspan="2">Why Output 3 is the final step in rolling out actual adoption of agroforestry and climate-smart practices after having organized farmers, identified model farms and farmers as focal points for training under the FFS concept, and offers volume in farmer training from small steps towards climate change</td></tr>
</table>

adaptation - while waiting for model farms to deliver on promises of increased or sustained stable yields, diversified revenue streams (incl. possibly payments for ecosystem services) - or going the whole way of establishing the 'gold standard' of agroforestry systems. Involvement of both government officers and representatives from other CSOs and NGOs is included to create more agents of change, i.e. capable trainers of (model) farmers in their own constituencies.

OUTCOME 3: CLIMATE CHANGE ADAPTATION MEASURES INTRODUCED HAVE GENERATED ADDITIONAL INCOME SOURCES DECOUPLED FROM DIRECT ACCESS TO LAND FOR WOMEN AND YOUTH	
OUTPUTS	**MAIN ACTIVITIES**
OUTPUT 3.1 **Innovation training has identified feasible business opportunities to supply, support and/or market products and services related to landscape-level climate change adaptation measures and agroforestry production**	**What** • Identify youth and women, who are interested in training • Training in innovation techniques for youth and women • Identify a selection of problems to be solved/opportunities to pursue (iterative) • Identify the best solutions for each problem/opportunity • Training in simple market surveys (incl. a market supplying/servicing farmers) • Training of trainers (ToT) • Development and feasibility test of the best solutions • Anchoring of innovation training with local institutions (TVETs) **How** • Broad (open to all), as well as separate (youth, women), community meetings to identify interested persons • Workshops (training and development of ideas) • Field surveys (identification of potential new ideas/needs) • Ideas competitions (identification of best solutions for each problem/opportunity) • Simple market surveys (incl. among farmers) • MoU with 1-2 local TVET colleges – identification of ToTs
Why Women and youth occupy disadvantaged positions in Indonesian society, particularly in rural areas. Introduction of new production systems offer possibilities of new sources of revenue even for groups – such as women and youth – who often have neither land of their own, nor much say over how the household farm areas are used. Putting these groups at the centre of coming up with age and gender acceptable business ideas makes it much more likely that a good balance is struck between pushing, but not crossing, gender and age-related perceptions of the acceptable without becoming counterproductive. This will give them dignity, confidence, and a source of relative independence, while serving a very real purpose in making agroforestry systems a more likely success. TVETs are proposed to be involved to increase chances of continuity of efforts and support beyond project duration.	
OUTPUT 3.2	**What**

Agri-businesses building on climate change adaptation initiatives are established and capable of business management and development	• Technical training of youth and women in cocoa/agroforestry related activities identified as having business potential • Training in business management, economy, sales, distribution and competitions in business plan development • Facilitate formalisation of businesses • Training of trainers from local TVET-colleges • Anchoring of business training with local institutions (TVETs) **How** • Select one or more "local champions" in each district • Workshops and on-the-job technical training • Workshop series/courses (business registration, organisation, planning/management, development) • MoU with local TVETs
Why One thing is a good idea, but making it a profitable activity is not a simple thing. Support to gradually professionalize the budding new agri-businesses increases chances of internal, organizational stability and external success. Typical challenges are lack of start-up funding, valuing input in time, failing to include all costs in calculating profitability, depreciation and organizational issues in terms of democracy vs decision-making ability, necessary investments in e.g. marketing, as well as advantages of relative specialization. Training, both theoretical and practical, will seek to address these issues to increase likelihood of businesses thriving. TVETs are proposed to be involved to increase chances of continuity of efforts and support beyond project duration.	
OUTPUT 3.3 **Agri-businesses have established profitable linkages to 'green' markets**	**What** • Training on marketing – the why and how (in relation to surveys also) • Marketing plan elaborated for each business incl. (i) 'Green' markets and buyers identified and approached; (ii) Mapping of attractive markets' characteristics; and (iii) Production of simple marketing materials • Training on market demands and client services (incl. immaterial and after delivery services) • Contract negotiations – training and support for actual negotiations (first times), plus support to first deliveries **How** • Workshops/courses and on-the-job mentoring/follow-up during the process • Participation in local markets and trade fairs • Exposure to CSP members through project presentation • Specialised market surveys
Why Profitable businesses require good understanding of and continued monitoring and investment in marketing and market adaptation. In the case of rural communities these are often trading under unequal power balances, giving insufficient profits to invest in the future well-being of the business. Also, investing in product development and sales is often neglected – especially after typical development interventions end, and needs to be a strong focus to ensure sustainability of enterprises. So, we envision continued support beyond the project – either by the involved TVETs or a renewed project support.	

4.2 Project strategy – Theory of Change

Referring to section 3.3 on barriers, farmers are not practicing climate change adapted agriculture at the moment because they are unaware of the concrete causes and effects of global and local climate change and how to break or mitigate the causal waves of impact descending upon them as a result of their own practices, those of their environment and those with global origins.

The reason they are not fully aware is in part that the severity of this (and the effective remedies) is also not fully recognised by authorities in charge of providing extension services and training to farmers, as well as enabling conditions for actual conversion to climate-smart agriculture. So the first outcome is awareness raising to win recognition of the issues and remedies by both farmers and decisionmakers, based on solid documentation from both academia and field tests, followed by pressure to secure allocation of funds and resources to overcome the barriers, which - even if and when farmers are aware of climate changes issues - farmers still need funds, new knowledge and skills to tackle. With the membership consisting of public agencies, companies and civil society representatives, the CSP is a key opportunity to advocate for increased support to farmers from both the public system (knowledge and skills via the extension system), as well as investments and incentives from commercial companies to fund and reward conversion to more sustainable and climate resilient production. Other CSOs/NGOs can be both allies and means of spreading best practice.

The two more technical outcomes (2) increasing on-farm adaptation to climate change; and (3) spin-off diversification of income sources then get a substantial initial push from the project to provide both actual strategic services to very needy farmers, while putting a permanent human resource in place to continue training others and establishing reference and model farms to convince decisionmakers and other farmers to take up climate-smart agriculture and agroforestry, leading by example.

By end-of-project the aim is to have all the individual, necessary components in place, at least in principle, to demonstrate a holistic landscape-level approach, where a multistakeholder forum like CSP is aware of problems, barriers and solutions and working together on providing knowledge, extension services, conversion funds and running incentives for climate-smart cocoa production in a supportive biophysical environment. This overall process is presented in *figure 4*, linking barriers to outputs to outcomes to impact.

BARRIERS	ACTIVITIES/OUTPUTS	OUTCOMES	IMPACT
Threatened ecosystem capacity at local and landscape level	1.1 Landscape-level assessment 1.2 Uni collaboration 1.3 Farmer associations awareness 1.4 Advocacy towards CSP and District (AEOs)	**Outcome 1: Evidence-based advocacy towards the CSP** Pave the way for increased investments in agroforestry Establish a landscape-level overview to guide the combined advocacy, awareness-raising and farm-level adaption actions	An evidence-based land-scape level approach to climate change adaptation enables poor cocoa farmer communities in the buffer zone of Bukit Barisan Selatan National Park, Lampung Province, to effectively adapt to the negative effects of climate change, global as well as local.
Lack of technical capacity	2.1 Agroforestry model and practices 2.2 Skills/training about effects of CC 2.3 Document and improve best practices	**Outcome 2: Increased farm-level income and livelihoods** Farmers' livelihoods are improving as a result of on-farm climate change adaptation measures via agroforestry.	

Lack of possibilities of diversification & value addition	**Output 3: Diversification of income sources** 3.1 Innovation training to support production 3.2 Entrepreneurship and biz development 3.3 Profitable linkages to green markets	**Outcome 3: Additional income sources for women and youth** CC adaptation measures introduced have generated additional income sources decoupled from direct access to land.	

Figure 4: Theory of Change (according to CCAM format/guidelines)

Intervention strategy

On a backdrop of widespread poverty among Indonesian cocoa farmers and unsustainable practices, the logic underlying all three proposed outcomes hinges on human self-interest and thus our ability to: (i) demonstrate that agroforestry practices bring increased benefits to individual farmers compared to existing conventional practices; and (ii) reach cocoa farmers and extension officers efficiently with that message.

We thus assume that demonstrating CSP practices such as reducing production cost, health/pollution issues, making a logic and on the model farms tangible case for improved soil moisture and fertility, plant health, diversified income sources, increasing yield and likely price premiums, will sufficiently motivate farmers to change practices, provided adequate technical support is available and other barriers to adoption absent. Using project-based resources to provide such support in the short run will ensure proof of concept; build a resource of community-based trainers and government extension officers, and so address replication and long-term sustainability due to training received by model farmers and extension officers, and establish farmer organisations and so increase farmers' bargaining power towards both government (duty bearers) and commercial partners. Combined, proof of concept, tailored training materials and a training delivery system (model farmers and AOEs) will mean increasing numbers of cocoa farmers taking up agroforestry-based production as long as buyers are willing to pay for sustainable and deforestation-free cocoa, which at least American, British and European buyers are now obliged to by a number of legislative instruments, such as the EU Deforestation Regulation (EUDR) and Due Diligence Directive.

Thus, the rationale is that

WHEN: *Evidence-based advocacy towards the cocoa sustainability partnership (CSP) has paved the way for increased investments in agroforestry and local ecosystems to enable climate change adaptation in cocoa production (Outcome 1),*

AND: *Cocoa farmers' livelihoods are improving as a result of on-farm climate change adaptation measures in the form of agroforestry (Outcome 2),*

AND: *Climate change adaptation measures introduced have generated additional income sources decoupled from direct access to land for women and youth (Outcome 3),*

THEN: *Poor cocoa farmers communities in the buffer zone of Bukit Barisan Selatan National Park, Lampung Province, will be able to effectively adapt to the negative effects of climate change, global as well as local.*

4.3 Number of people and organisation involved in climate change related training and advocacy

Activities	# of female	# of male	# other	Persons in total
Technical training for poor and vulnerable groups relevant for climate change adaptation.	900	2,400	N/A	3,300

Activities where climate vulnerable groups share knowledge, experiences, and best practices in relation to climate change adaptation	900	2,400	N/A	3,300
Number of CSOs that will enhance their advocacy capacity on climate adaptation				CSOs in total: 3-4
Advocacy training of poor and vulnerable groups (selected from farmer organisations and biz groups)	150	150	N/A	300

4.4 Areas of responsibility and professional contributions of the partners and other actors

Rikolto is particularly strong on cocoa farming practices in an Indonesian context, farmer fields schools and local advocacy connections and will be responsible for the day-to-day implementation of the project. Given their membership of CSP, Rikolto will be the primary actor involved in advocacy for a landscape approach and agroforestry as best practice climate adaptation measure for cocoa cultivation, respectively, in this forum, but supported by Preferred by Nature – and the university collaboration - in building the case and evidence for these solutions to climate change. PbN will also be able to, with considerable expertise, weigh in on the legal requirements for buyers to demonstrate sustainable and deforestation-free origins of their imported cocoa, the means of which overlap considerably with agroforestry as a production system, and so may serve as leverage to convince buyers to invest in climate resilient landscapes and climate change adapted cocoa production on-farm. PnB will also engage other partners, such as Rainforest Alliance, with a seat on CSP to pull in the same direction and brings to the project a number of commercial contacts with a declared interest in sourcing cocoa from agroforestry systems, and willingness to invest at landscape level.

Technically, PbN will primarily provide expertise during the landscape-level analysis (particularly the landscape and ecosystem integrity layer, identifying types and location of investor activities – e.g. ecosystem restoration, payments for ecosystem services incl. paying for carbon in the form of agroforestry trees) and for technical support in the farm data collection system, plus innovation & entrepreneurship training, ensuring a sound methodology, training materials and transfer of capabilities to ToTs in Rikolto and villages.

In combination the two partners cover all aspects of cocoa farming adaptation to climate change, from multi-level advocacy to farming technology on the ground, from landscape level to individual farms, overall ensuring a holistic approach to climate change adaptation across the productive landscape in Lampung.

Local CSOs will be trained during the first year of the intervention (ToTs) after which they are expected to participate actively in the implementation of activities during then remaining two years to the extent their resources permit. We will take this as an opportunity to get to know more, local CSOs in Indonesia for potential future collaboration on practical or networking initiatives.

4.5 Monitoring, Evaluation and Learning (MEL) framework

A relatively standard MEL process of quarterly project monitoring meetings between PbN and Rikolto project managers will be followed to keep on top of progress relative to implementation plan, the results framework, assumptions (ToC) and risks. For both Rikolto and PbN climate adaptation is not a new field, so we do believe we have reasonable hypotheses of the causal linkages in our strategy and ToC. However, just as in any other project, there is good reason NOT to assume we know all the factors potentially influencing the hypothesised causal links bringing us from activities to overall objectives, and with a short (compared to theme) project period, it is critical to keep an eye on the uptake, lack off and reason of climate adaptation measures.

To address this, and in service of both MEL, documentation of the merits of agroforestry vis-à-vis climate change adaptation for advocacy purposes, learning in FFSs and empowerment, a dedicated project MEL officer will be trained by the PbN adviser on collecting data using predefined data-forms available on smartphones to record key project impact data and key indicators on adoption and effect of agroforestry and climate-smart practices. The project will test the 'lowest appropriate level' which we can meaningfully engage in data collection on this,

but the ambition is at least model farmers and/or youth groups more technically inclined can be involved, also to open possibilities for eventually adding economic value to this data towards buyers.

The participatory mapping of main perceived climate change related barriers and production practices, which forms part of outcome 1, will provide an opportunity to also capture aspects of adaptation or production issues, we have not foreseen in the project design and incorporate MEL elements of particular interest to targets groups, increased the chance of ownership and buy-in. Indicators 2.C, 2.D and 3.B, plus sub-categories are expected to be most relevant to the target groups; other indicators will be captured by project staff.

Similarly, the project team will use a shared project Log (online document) to continuously record ideas, problems, risks, and opportunities cropping up during the project. The Log file will be reviewed – and responses assigned – by the project managers and MEL staff as part of the regular project meetings. See also 'soft' MEL questions in 4.7, which will also form part of regular assessments of project progress and effectiveness.

Outcome	Indicator	Means of verification
1. Evidence-based advocacy towards the cocoa sustainability partnership (CSP) has paved the way for increased investments in agroforestry and local ecosystems to enable climate change adaptation in cocoa production across the landscape	1.A Endorsement of agroforestry approach	Publicly available communication from CSP
	1.B Endorsement of ecosystem-based planning and investments	Publicly available communication from CSP
	1.C Road map for one Verifiable Sourcing Area	Publicly available communication from CSP
	1.D At least one cocoa buyer has invested	Publicly available communication Project reporting
2. Cocoa farmers' livelihoods are improving as a result of on-farm climate change adaptation measures in the form of agroforestry	2.A Approximately 700 HHs adopted agroforestry practices	2.A Number of HHs registered by MEL officer and reported
	2.B 800 ha hectares under agroforestry	2.B Photos and GPS location data recorded via smartphone report
	2.C 9,000 additional shade trees planted	2.C Photos and GPS location data recorded via smartphone report
	2.D 10% higher crop yield and 30% lower fertilisers/pesticides use by end of year 2	2.D Year 2 yield and pesticide information collected using smartphone reporting.
3. Climate change adaptation measures introduced have generated additional income sources decoupled from direct access to land for women & youth	3.A 10 new agribusinesses established	3.A MEL officer data collection officer or student project
	3.B 1,500 USD cash income per new agribusiness by end-of-project	3.B MEL officer data collection officer or student project

In a category of its own is the collaboration with Indonesian/Danish universities to more rigorously document changes in production parameters and yield on sample/model farms to gather proper academic documentation of the effects of converting to agroforestry from sun-grown, monoculture cocoa production.

4.6 How the intervention will respond to local demands and encourage local leadership and ownership

As a new area for partners, the proposed project is developed in close collaboration our professional network with knowledge of the specific context of cocoa farming in Lampung. Consultation with local CSOs and experience from similar projects has guided the scope and overall approach, and together with scientific research points to a definite demand for climate change adaption locally in Lampung and for cocoa.

Both training in agroforestry, innovative agri-businesses and market-linkages will follow a participatory 'human centred design' process in which the local farmers, women and youth are at the centre of developing ideas and practices facilitated by first project staff, but since trainers, which are also local residents initially trained by the project to be able to act as trainers of others beyond the project duration.

Organising farmers (and youth and women) in business entities, FOs and FFSs, training them and putting a learning methodology in place for them, is designed to empower locally anchored groups with self-interests in business development and adaptation to climate change, and employing an option of gradual adoption of climate-smart and/or agroforestry practices lowers the barrier for participation and ownership is increased for decisions made by farmers for on-farm management. Similarly, the 'mix & match' approach to which crops and trees is intended to be non-prescriptive in terms of species, markets and preferences, maximising farmer influence on his or her farm even if a generic model or practice is behind the production system.

Apart from stimulating new ideas to support climate resilient cocoa farming, innovation and agri-business development also encourages leadership skills. The participatory process, incl. increased knowledge and the (hopefully) clear connection between intervention activities and emerging results, will serve to build confidence, pride in achievements and thus ownership among farmers, women and youth involved. This will be a gradual process, though, with local and individual variation and may not fully materialise in three years.

4.7 Exit-strategy and contribution to lasting improvements for poor and vulnerable target groups

The proposed intervention will overall follow a 'phasing over' exit strategy, whereby technology and training activities will be transferred to local communities, farmer organisations (FO) and local institutions (e.g. TVET-colleges), although this may not be complete after one 3-year project given the nature of interventions (time before results materialize). During intervention planning (and implementation), emphasis has been placed on model farmers, training of trainers, relatively self-reliant FFSs and building the organisational capacity of FOs and communities so that the services provided can continue through these local organisations, with which we will also seek to build in economic motives to continue operations. So, during the implementation, regular follow-up on the following will be part of the MEL-activities:

- How strong is the community's sense of ownership/commitment to continue activities?
- To what extent does the community value program activities?
- Do community members, groups and ToTs have the knowledge and skills needed to maintain (and perhaps expand/replicate) the results of intervention activities?
- To which degree are the organisations/communities resilient to shocks and changes in the political/economic and physical environment?

We find it very likely that the present project will in itself put important knowledge and tools at the disposal of the target groups. Realistically, though, with significant components of tree planting (time to first harvest) and pauses in cocoa cropping (rejuvenation), we estimate that a second project would be disproportionate useful to consolidate and demonstrate the merits of introduced adaptation measures and accelerate spread of practices.

4.8 Risks and mitigation measures

National elections will take place in 2024. To ensure this project is viewed as impartial, we will adhere to our Code of Ethic and Integrity Protocol and vet all types of connections potentially perceived as political.

RISKS	POSSIBLE MITIGATION MEASURES
GOVERNMENT(S) OPPOSING CHOSEN PROJECT LOCATION	• Develop practical action plans consisting of a series of core commitments and comprehensive follow-up actions, share with government reps • Early engagement of local & national government representatives
DELAYS DUE TO PANDEMIC SITUATIONS	• Contingency plan to shift activities to online process • Vaccination for project team, apply health, safety, and security standard
HARVEST FAILURE CAUSED BY UNEXPECTED WEATHER, PESTS, OR DISEASES	• Facilitating climate-smart agricultural practices, experience sharing in FFSs, business development on ID and combat of pests and disease • The project manager and officers will use AccuWeather mobile phone apps and BMKG weather forecast, share with model farmers and FFSs

LOW ADOPTION RATE OF AGROFORESTRY	• Identifying first-mover/existing agroforestry model farms and farmers • Securing early commitments from buyers to reward conversion
PROJECT PROGRESS IS STOPPED/DELAYED DUE TO CHANGES IN THE LOCAL/NATIONAL POLICIES/LEADERSHIP	• Through national platform/CSP work to strengthen robust legal frameworks of governments, and commitments from companies to ensure legal or even sustainability compliance in their supply chains. • The project team will engage with contact persons in Agriculture Departments, Village leader from local, provincial and national level.
LACK OF DEMAND FOR SUSTAINABLY PRODUCED COCOA	• Design appropriate model of direct sourcing of beans from smallholders • Active engagement with the buyers and consumer organizations • Awareness raising among buyers on legal requirements, e.g. EUDR
LACK OF SUPPORT FROM LOCAL CSOS	• Establish strong relations with the farming communities • Maximise early involvement of local + national government, CSOs, Unis

5. Cost level

In addition to project monitoring staff in DK, a dedicated PbN-Indonesia based project coordinator will support project implementation at close hold, providing sparring and supervision to her Indonesia counterpart, plus institutional capacity building on select project design and management issues, creating a common understanding of LFA in the process. A second, part-time Indonesian PbN staff will support green market linkages and integration of the landscape-level adaptation measures into the road map and commercial investments, as PbN has particularly good prerequisites and connections to commercial partners. Furthermore, technical input/capacity building of local partner(s) in three areas will be provided by experts from PbN-Denmark, laying the foundation for mutual ambitions to continue to work with these areas onwards:

(i) Landscape-level assessment, Ecosystem Services, Risk & Vulnerability Analysis methodology & GIS
(ii) Data-collection tool form-development for farm data collection via smartphones
(iii) Innovation and entrepreneurship – competitions and training of trainers (volunteer)

PbN employs specialists in these subjects with considerable experience and Rikolto has expressed an interest in learning more. During the intervention, persons from local partners and target groups (youth, innovation activities/competitions) will be invited to participate in trainings.

The budget also includes provision for DK students do fieldwork on the project. The project will cover basic expenses and the DK student will be paired with an Indonesian student, that can help overcome the language barrier and also be an opportunity for a mutual learning experience and feed into information work in Denmark.

6. Intervention related information work in Denmark

Purpose In Denmark we will produce and disseminate articles and social media posts on the climate challenges for cocoa smallholders in Indonesia and developing countries. We will use the project as an opportunity to inform target-groups about more widely about the challenges in cocoa-production, and what it means to choose eco-labels when buying cocoa in shops.

***Target* groups** The primary target audience will be conscious consumers in Denmark looking to understand the impact they can have by choosing eco-label chocolate and cacao in shops. A second audience will be students and young professionals where we will host at least one event and have one of our experts talk about cocoa and responsible sourcing.

***Means of* communication** We will use website articles as the basis for multiple posts on social media: Instagram, Facebook and LinkedIn. We would like new approach and set up an automated email-sequence to provide conscious consumers with a way to learn more about the cocoa production and how to support responsible cocoa-production when buying chocolate and cocoa.