

Darwin Initiative Main: Annual Report

To be completed with reference to the “Project Reporting Information Note”:
(<https://www.darwininitiative.org.uk/resources-for-projects/information-notes-learning-notes-briefing-papers-and-reviews/>).

It is expected that this report will be a **maximum of 20 pages** in length, excluding annexes)

Submission Deadline: 30th April 2023

Submit to: BCF-Reports@niras.com including your project ref in the subject line

Darwin Initiative Project Information

Project reference	29-029
Project title	Nature Climate Solution to Protect Mangrove Biodiversity and Improve Livelihood
Country/ies	Indonesia
Lead Partner	Yayasan Konservasi Alam Nusantara (YKAN)
Project partner(s)	<ul style="list-style-type: none"> – Faculty of Biological Sciences, University of Leeds – Faculty of Fisheries and Marine Science, Mulawarman University
Darwin Initiative grant value	GBP 599,365
Start/end dates of project	1 July 2022 – 31 March 2025
Reporting period (e.g. Apr 2022 – Mar 2023) and number (e.g. Annual Report 1, 2, 3)	Jul 2022 – Mar 2023 Annual Report 1
Project Leader name	Mariski Nirwan
Project website/blog/social media	[still in development]
Report author(s) and date	Mariski Nirwan

1. Project summary

Indonesia has the largest mangrove ecosystem in the world with an area of 3.9 million hectares (23% of the world's mangroves), which can store up to 1/3 of all carbon stored in the world's coastal ecosystems. This mangrove forest is one of the most carbon-rich forests as it can absorb 3 to 5 times more carbon than terrestrial forests. Unfortunately, Indonesia's mangrove forests are disappearing faster than tropical rainforests and coral reefs with rates of approximately 5,000-10,000 ha per year. The major cause of mangrove loss in Indonesia is conversion of land for shrimp ponds. Berau Regency in East Kalimantan has 86,043 ha of mangrove ecosystem, the biggest in East Kalimantan Province. However, in 2019 alone 13% or 11,237 ha mangroves were converted to shrimp ponds. If the pond area continues to expand, it will have a severe impact, not only to the ecosystem but also for the coastal communities.

Unsustainable aquaculture practices (converting mangroves into shrimp ponds to increase productivity) support 30% of the population but threaten 54,000 ha of mangrove ecosystems in Berau Regency, East Kalimantan. Through community engagement, capacity building and establishment of land-use plans, the project aims to protect 15,000 ha of mangroves, and provide a novel community-based model to increase shrimp productivity while restoring up to 80% of

shrimp ponds back to mangroves in 5,000 ha. Healthier mangrove ecosystems and comparable, and preferably higher, harvest of shrimps, lives, and biodiversity in the coasts of Berau Regency can enjoy increased resilience, higher income, and better living conditions.

The expected outcomes are increased biodiversity and governance of vulnerable mangroves, and improved livelihoods in 3 villages namely Pegat Batumbuk, Suaran, and Tabalar Muara.

2. Project stakeholders/ partners

YKAN’s SIGAP (Aksi Inspiratif Warga untuk Perubahan or Inspiring Community Actions for Change) is a seven-phase, community-based planning and empowerment approach to create and implement development plans to improve village governance and manage their natural resources. Celebrated as the ‘gold standard’ and adopted by the East Kalimantan Provincial Government and the Berau District Government in 2010, SIGAP has been successfully implemented in 100 villages in Berau District as a government-led programme. We apply SIGAP in this project in our assessment of women’s groups, aquaculture groups, and village-owned enterprises. We also use the SIGAP approach in assisting preparation of village mid-term development plans, home industry food licensing, stakeholder analysis, and capacity gaps of village-owned enterprises.

Mapping and involvement of related stakeholders is visualized in annex 5. Stakeholders having high influence on the project’s objectives are ones who have authority to support successful aquaculture practices and mangrove management within the scope of this project. Deeper engagement and involvement of related Berau government agencies and those working in aquaculture within mangrove areas need to be nurtured to ensure the success of the project.

The project facilitates local application of participatory planning and action approaches including community-led mangrove protection, enhance collaboration and shared learning among stakeholders. We work closely with the communities on-the-ground where assistance is provided on a regular and even daily basis by our village facilitators to carry out aquaculture and restoration activities. YKAN already has a long established relationship with the governments of East Kalimantan Province and Berau District. They are actively involved in our project not only from a helicopter view for overall monitoring and endorsements, but also supplying information and technical know-how alongside YKAN. The below table gives an overview of our government partners and their role in the project. We’ve ensured we have a central contact point in each agency/department, to ensure efficient exchange of information. Many of these not only attend meetings, but also provide knowledge and technical inputs into the project (mentor and resource person).

Government Partner	Role in Project
Ministry of Marine Affairs and Fisheries	Mentor and resource person of Secure and Ecosystem Approach of Aquaculture (EAA) development
National Research and Innovation Agency	Research, collecting data, resource person for SECURE and EAA development
Marine and Fisheries Agency of East Kalimantan	Mentor and resource person of SECURE and EAA
Research, planning and development Agency of East Kalimantan	Update database from SDG’s activities in SECURE project
Environmental Agency of East Kalimantan	Resource person of SECURE and part of EAA working group
Fisheries Agency of Berau District	Mentor and SECURE field supervisor, and EAA working group
Community and Village Empowerment Agency of Berau District	Mentor and resource person of Village Government capacity building, BUMKamp (village-owned enterprises) improvement, and EAA working group
Environment and sanitary agency of Berau District	Mentor and resource person of SECURE, and EAA working group

Partnership with the University of Mulawarman and University of Leeds for the implementation of the project on biodiversity and spatial planning was delayed due to the legal and administrative process of concluding the subgrantee agreements. Cooperation with University of Mulawarman kicked off in January 2023 while with Leeds, the Subgrantee Agreement was signed in March 2023. Coordinating closely with YKAN’s field team, University of Mulawarman has completed all field works and generated sample data. University of Leeds and University of Mulawarman will

coordinate a joint visit to the site, expected by mid this year (adjusting to university and teaching calendar).

3. Project progress

3.1 Progress in carrying out project Activities

Toward **Output 1**, aiming to develop management plans for the protection of mangrove ecosystems and their biodiversity, we have conducted the participative consultation process through our SIGAP approach. We have recruited SIGAP facilitators in each of the 3 target villages, which have assisted in conducting the participative reviews of village development plans with village stakeholders to advocate for including sustainable mangrove forest management actions in the village development strategy. Finalising the 2024 village development plan is pending until village head elections are concluded in October 2023 (indicator 1.1).

YKAN has also supported the community rights to manage mangrove areas with one of the highlighted results being the formal designation of abandoned ponds in the village of Teluk Semanting as community-based ecotourism managed by the Mangrove Management Team (decree: Berau Regency Head No. 484 Year 2022). We have also organized training for mangrove surveillance for the Berau Mangrove Task Force and other authorized institutions resulting in an agreed SOP for surveillance process and increased know-how thanks to a field practice session at the end of the training (indicator 1.3).

Complementing mangrove ecosystem governance, we have established the biodiversity baseline metrics for the project area (indicator 1.2). In collaboration with University of Mulawarman, we have collected 76 eDNA samples from 36 points and 1,100 plankton/litre in pond areas and 1,200 plankton/litre in mangrove areas from the 3 villages. Due to delayed shipment of reagent for lab processing, the University's final analysis will be slightly delayed and expected to be ready by the end of May 2023. The analysis is expected to describe hidden biodiversity from both ponds water column, sediment from shrimp ponds, and mangrove areas that will be used as the baseline biodiversity metrics. Summaries of biodiversity components and distribution including abundance and species diversity are presented in the University reports.

We have also measured water quality information around the pond areas to measure nitrate, nitrite, 3rthopho and 3rthophosphate across 12 ponds in three different villages. It showed that the nitrate value in Berau is 0.145 mg/L, higher than the upper limit of 0.1 mg/L, which suggests potential of a eutrophication effect, which enhances the growth of phytoplankton and algae.

And lastly, using Visual Encounter Survey (VES) combined with Point Count method we have also conducted species observation to measure abundance and diversity. This was currently limited to Pegat Batumbuk Village and we will expand areas of observation for the next reporting cycle. This initial survey recorded 6 species from 6 different families including Proboscis monkeys, Chinese egrets, and Lesser adjutant stork (details can be seen in table 3 of Fauna Biodiversity Report, in annex). Of the species found, one of them is classified as threatened EN species according to IUCN red list and listed in Appendix I CITES (*Nasalis larvatus*).

For **Output 2**, working toward mangrove restoration and biodiversity improvement plan and the demonstration of SECURE model, we have initiated the Ecological Approach to Aquaculture (EAA), redesigned and constructed our pilot shrimp ponds areas, conducted mangrove vegetation analysis, and collected data on soil organic carbon from both mangrove and pond areas.

The EAA work kicked off with carrying out a capacity analysis of the shrimp aquaculture in the three villages to understand where potential EAA designation areas lie. Two field studies were implemented through Focus Group Discussion, and YKAN conducted interviews with shrimp farmers to gather data on the shrimp pond conditions. This baseline data as presented in the reports (Report on the Feasibility Study of the Tiger Shrimp Cultivation Area for EAA Management and Activity Report on EAA Socialization; see annex 4) has been discussed with the Berau Fisheries Agency office, the provincial marine and fisheries agency, and several district agencies to establish a common ground understanding for the development of EAA in Berau Regency. These activities are the preliminary work with the end goal of producing EAA plans in the area (means of verification 2.1.1).

For the implementation of SECURE model (indicator 2.3), we have obtained agreements with the owners of 13 shrimp ponds totalling to 103 hectares across the 3 villages (Figure 1). We have finished the redesign of 8 shrimp ponds and started construction on 5 ponds (4 in Tabalar Muara and 1 in Pegat Batumbuk). The staggered approach to the construction and hydrological improvement of the ponds is due to different in-field challenges (e.g. managing the construction works in such a way that it would not damage existing mangroves surrounding the ponds) and limited availability of heavy equipment in the area (including delayed progress due to malfunctioning heavy equipment). However, other construction materials such as water gates are ready to set once the embankment work is completed for the pond areas. Aquaculture practices in SECURE ponds include the provision of Saponin (organic “poison”), organic fertilizer, and probiotic. We are currently in cycle one of shrimp harvest (3 months duration) and milkfish harvest (6 months duration). The training of the farmers to strengthen their capacities through a field school is still in the procurement process and expected to start in May 2023.

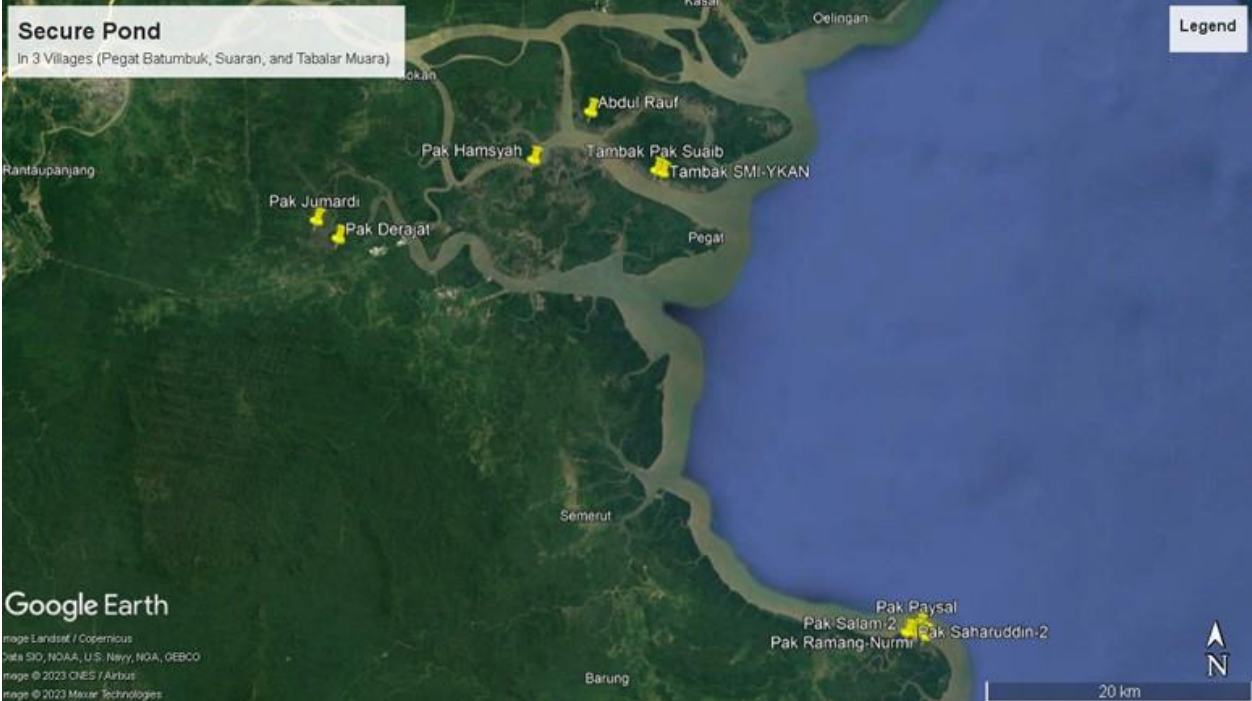


Figure 1 – Map of Darwin-supported ponds in the Berau Regency

For the restoration area of the SECURE pond (indicator 2.2), we have planted around 900 mangrove seeds (*Rhizophora* sp, *Sonneratia* sp, *Bruiguiera* sp, and *Xylocarpus* sp) to restore mangroves and improve their density. Initial observations after 3 months of planting showed positive results, with an 80% survival rate. The threats for both natural plant growth and planting include caterpillar attacks and invasive plants. We addressed this challenge by spraying the mangrove with an organic solution of saltwater and detergent. This restoration approach will be replicated factoring in each specific ponds conditions in other SECURE demonstration sites.

Vegetation analysis was conducted by surveying 11 of the ponds across the 3 villages and stands as our baseline that will be compared to next six-monthly vegetation studies. Parameters measured include importance value index (IVI), diversity and evenness index and canopy coverage index. We found eight true mangrove plants (*Avicennia Marina*, *Avicennia Officinalis*, *Nypa Fruticans* etc.) and nine mangrove associates (*Ficus Macrocarpa*, *Canthium Horridum*, *Tarennia Fragens*, *Premma* sp, etc). *Avicennia Marina* and *Sonneratia alba* have the highest IVI (INP 200%), compared to other species, while the highest diversity and evenness index was found in two sites in Tabalar Muara. The drone imagery depicting the density are currently being analysed and are expected to be finalised by May 2023.

The SECURE model will also be evaluated on its contributions to carbon emission/sequestration from pond and restoration areas (indicator 2.4). We have collected data on soil organic carbon from both mangrove and pond areas from 54 sampling sites across Berau. We found that C-organic content in mangrove ecosystem is higher than that of shrimp pond ecosystem albeit the difference is not significant (Figure 2). Carbon stock value increases with soil depth in all areas

for both pond and mangrove ecosystems. In the next measurement period we will check the fluctuation and comparative data of carbon stock and C-organic value. Mangrove areas that have been cleared continue to emit carbon; these measurements will be used to track changes in emission/sequestration on pond and restoration area throughout the project period.

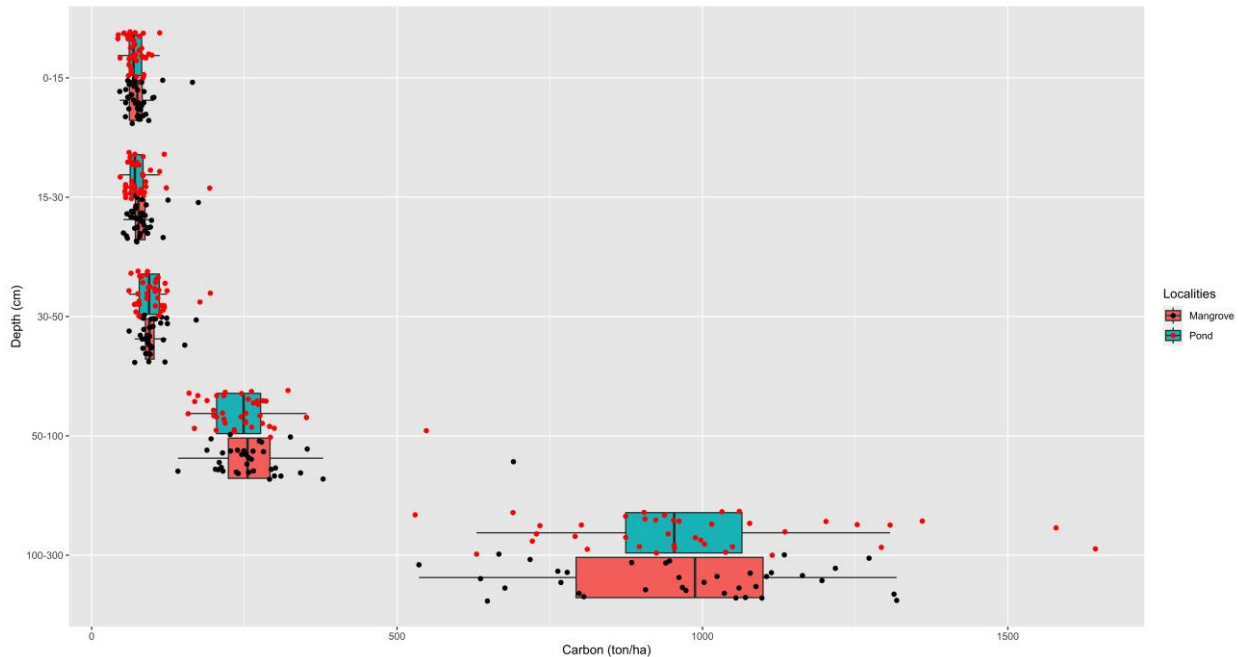


Figure 2 – Soil carbon measurements across depths in mangrove and pond areas

Conservation actions need to support robust community livelihoods. Under **Output 3**, we work to maintain and improve the incomes of people in our 3 demonstration villages and those working in mangrove-based livelihoods. We took a social-economic baseline survey from shrimp farmers' households in the 3 villages to be compared with a similar survey by the end of the project. We also set up a Business Model Canvas (BMC) to analyse the production chain and identify the capacity building needs in the production facilities of several women business groups (Kerjasama Jaya, KUPS Kaldu, and Kelompok Tarling) (indicator 3.1). We supported Kerjasama Jaya group with upgrading their products with better packaging and successfully facilitated their certification processes for a home industry license for their processed fishery products (indicator 3.2).

We are aiming to link the products from women's group businesses to village-owned enterprises (BUMKam) to promote and market their products. For that, we conducted a capacity gap analysis for the BUMKam in each village. Pegat Batumbuk Village's BUMKam is more advanced than that in Suaran, and Tabalar Muara's BUMKam is at the very early stages of development. Capacity plans will further be developed to strategize the strengthening of BUMKam with possibility of focusing on Pegat Batumbuk and Suaran in respect to project timeline.

With the issuance of Berau Regency Head Decree No. 483 Year 2022 for Teluk Semanting community ecotourism (see above, output 1), we assisted their ecotourism management team to develop Standard Operating Procedures and visitor protocols. We also facilitated a study tour for them to Muara Angke Reserve in Jakarta to share experience in mangrove restoration and mangrove ecotourism management (indicator 3.1).

3.2 Progress towards project Outputs

Output 1: Management plans for the protection of 15,000ha of mangrove ecosystems and their biodiversity are developed, approved, and implemented through strengthened village governance capacity

During these first 9 months of the project, we have completed the baseline study of the mangrove species biodiversity (indicator 1.2), including mangrove and fauna monitoring and analysis, water quality, and analysis of soil carbon in pond and mangrove areas. This baseline will inform a management plan for the protection of 15,000ha of mangrove ecosystems and their biodiversity (indicator 1.1). The GIS-spatial component has not been conducted due to late finalization of

subgrantee partnership agreement with Leeds University. Leeds University scope of work includes the development of the demarcation, zoning, and preliminary management plans as well as recommendations for biodiversity spatial prioritisation and protection. We expect to start the GIS-spatial component by May 2023.

We supported Teluk Semanting's Mangrove Management Team for the designation of 748.89ha mangrove areas as community-based ecotourism as decreed via Berau Regency Head No. 483 Year 2022; hence, these areas are legally protected from unfavourable and unsustainable activity development. Ahead of the project target (indicator 1.3), mangrove surveillance units are already established, and we are currently providing training for them to develop protocols (see Mangrove Surveillance Training report) and practice for mangrove monitoring.

Output 2: 10-year mangrove restoration and biodiversity improvement plan developed and approved for 5,000 ha of shrimp ponds and, a 100 ha SECURE model demonstration site (within the 5,000ha area) is established by the end of the project

Through our engagement with the Berau Regency, we have identified a willingness to use a management system with the EAA approach for shrimp aquaculture. Assessment of this EAA designated area is 12,054.93 hectares. The Government of Berau Regency through the Fisheries Agency has also set priority areas for tiger prawn aquaculture that can serve as entry point to introduce EAA application.

We have secured 13 shrimp ponds totalling to 103 hectares for SECURE demonstration sites (indicator 2.2 & 2.3). 8 out of the 13 shrimp ponds have been redesigned and 5 ponds have begun construction. We expect to finalise the redesign and construction by July 2023. Aquaculture and mangrove restoration trials conducted in a pond in Pegat Batumbuk and will be basis for replication in other ponds. Carbon stock data has also been collected and will be done annually that would feed into the development of carbon business case (indicator 2.3).

Output 3: At the completion of the project (2025) the income of people working in shrimp aquaculture, mangrove ecotourism, and mangrove-based household industries in the 3 target villages is increased by 15% (compared to baseline)

Business Model Canvas and social-economic baseline surveys were conducted for women groups, farmer groups, and other households in the 3 villages (indicator 3.1). We will work with Kerjasama Jaya women group in Pegat Batumbuk, Mangrove Ecotourism Management in Teluk Semanting, and farmer groups to train them in new, more environmentally friendly practices. We are open, however, to extend our capacity strengthening and support to other groups and household who needs the support, particularly when the field school starts in May 2023.

With Kerjasama Jaya, we supported their products with improvement in production and packaging as well as facilitating them to obtain home industry certification. Halal certification will follow suit as PIRT is the first step of legalization.

3.3 Progress towards the project Outcome

Thus far, the project is on track with its progress toward the intended outcome. For the management plan (indicator 0.1), the basis to advocate for a management plan for conservation has been collected, namely the benefits of mangrove ecosystems for biodiversity, fauna, and mangrove-based livelihoods. Once the spatial and GIS activities are conducted (expected to start Q1 of FY23/24), a draft of the spatial plan will provide a clear overview of the management areas. Currently, a mangrove ecosystem management team has been formed in each of the 3 villages. Pegat Batumbuk is managed by Village Forest Management Institution (LPHD) legalized through Ministry of Environment and Forestry's decree No. SK.7992/Menlhk-PSKL/PKPS/PSL.0/11/2018. Tabalar Muara Village is located in the Coastal and Small Islands Conservation Area of Derawan Islands and Surrounding Waters (KKP3KDPS) and is managed by Tabalar Muara Lestari Group (acknowledged by the village head). The mangrove area in Suaran Village is under 'Other Area of Use' land status to which an informal management group is formed.

The EAA management plan is progressing well (indicator 0.2). After the field survey to gauge potential EAA areas and to gather inputs from farmers, consultative meetings were held with Berau Regency Fisheries Agency, Berau Regency Manpower Office, Berau Regency Investment Service, and East Kalimantan Province Maritime Affairs and Fisheries Office. The EAA concept

was well received by these key stakeholders. In order to start implementing EAA in the identified shrimp ponds, our next step will be to prepare an action plan. East Kalimantan Province Fishery Agency also supports the Berau Regency as one of the pilot projects to implement EAA in SECURE ponds. We have already started to implement the SECURE demonstration model that combines aquaculture and mangrove restoration.

As shared above, the baseline study on the richness of mangrove flora and fauna has been established (indicator 0.3). At the end of the project, once we have data on the improvement of fauna and flora due to the project, we will submit the report to Indonesia's Biodiversity Strategy and Action Plan (IBSAP) team.

As shared above, the socio-economic baseline study has been conducted, and we have started working with people dependent on mangrove-related livelihoods across the 3 target villages (indicator 0.4). At the end of the project, we expect to see improvement in the incomes of communities relying on mangrove for their livelihoods i.e. shrimp farmers and women groups.

3.4 Monitoring of assumptions

Assumption 1: No negative effects from forest fires or natural disasters including pandemic in site locations / There is no drastic change of the ecosystems due to man-made or natural disasters such as forest fire, storm, or tsunami that affect wide scale habitat the aquatic biota and key species.

Comments: Thus far no natural or pandemic events occurred except for occasional bad weather and high tides that hampers in-field work. We are constantly monitoring the weather and adapt a flexible working approach particularly for working on the project sites works where the tide and weather can change by the hour.

Assumption 2: Continued support of Government policies for mangrove conservation following Provincial government elections scheduled during this project's timeframe. An active communication with the government in charge is needed to ensure the new government will have a consistent policy with the previous administration

Comments: Change of regional leadership and the leadership vacuum period before the elections in October 2023 are still a risk for the project. However, each region has a conservation mandate and targets from the central government (NDC and regional FOLU Net Sink) which will allow the project objectives to be pursued despite any leadership changes. This may potentially delay some works if non-incumbent leaders are elected, as newly elected heads must submit village development plans within 3 months after being elected. This also allows us some time to work with the new government.

Assumption 3: Continued community commitment and engagement

Comments: YKAN/TNC has a long standing and strong presence in East Kalimantan and have gained the trust from both the regional government as well as the communities. In this project we also engage facilitators from the local communities that support building strong relationships and engagement with the community. It has also already become clear that these facilitators become local champions and thus continue promoting and advocating our cause.

Assumption 4: The government successfully provided a clear regulation and mechanisms on carbon financing for both domestic and international markets. To anticipate the slow legislation process, this project will also seek potential of voluntary carbon market.

Comment: Until now, the Government of Indonesia has not yet set endorsed regulations for carbon trading. Governance, systems, and mechanism are still being finalised. The project will prepare the carbon pre-feasibility study while continue updating ourselves with the progress of the carbon market/trading regulations.

Assumption 5: At least 70% of community members reliant on shrimp aquaculture and mangrove-based industries for income are able to attend training courses.

Comment: The project is identifying and listing people who will join the field school expected to start in May 2023. This field school will welcome all shrimp farmers, not only the ones joining the SECURE programme.

Assumption 6: The economic situation, especially shrimp global demand, not disrupted by disasters such as pandemic or regional conflicts. To anticipate and minimise the impact on community's income, the project should invest also on market and product diversification

Comment: The project is also promoting and supporting alternative mangrove-based livelihoods through value added products such as milkfish crackers, milkfish floss, and ecotourism to diversify income sources. At the moment, we are looking for partners who have experience in similar shrimp aquaculture business to link us to new potential markets for SECURE shrimp.

3.5 Impact: achievement of positive impact on biodiversity and poverty reduction

Project Intended Impact: Biodiversity threats halted, poverty reduced and long-term climate changed impacts mitigated in mangrove ecosystems in Berau Regency, East Kalimantan, Indonesia

The novel mangrove restoration and shrimp carbon aquaculture programme (SECURE) developed by YKAN employed in this project can be shared to create a best practice model to scale up efforts to other regions in Indonesia, and globally, contributing to poverty reduction, mitigated climate change impacts, and reduced biodiversity threats in Berau, East Kalimantan where the project operates.

Around 83% of mangrove loss in Indonesia is due to aquaculture expansion. The project primarily seeks to improve shrimp aquaculture practices that are not environmentally friendly by increasing productivity that corresponds to increased income. We also support income diversification by supporting women groups with value added products from fish harvest. Feedback from the women groups showed that they gained extra income that helps support their families, albeit not yet at scale.

This is combined with reconvertng portions of the ponds back into mangrove and protect surrounding intact mangroves. Thanks to the restoration and protection of mangroves, the coastal areas will be more resilient against the negative impacts of climate change and natural disasters. The restored mangroves will continue to absorb CO₂ and store them in the soils thus helps combating climate change, and the roots will trap organic soil and plastic pollution from the surrounding waters. Results from this first-year show positive conclusions to support these premises.

4. Project support to the Conventions, Treaties or Agreements

This first 9 months of the project, we have seen encouraging results to mangrove conservation through restoration and protection actions as well as promising adoption for ecosystem-based approaches from the trial in our pond in Pegat Batumbuk Village as explained in Section 3. These climate mitigation and adaptation actions through improved mangrove management can support global and national obligations such as sustainable use of natural resources & halting & reversing decline of nature by 2030 as laid out in the Post-2020 Global Biodiversity Framework; Indonesia's NDC; Paris Agreement; and the SDG 13, 14 and 15 targets. Specifically, the project directly tackles SDG14 targets through mangrove restoration and improved aquaculture practices (Target 14.2), assisting communities to sustainably manage and conserve coastal areas (Target 14.5), and increases economic benefits through capacity building of environmentally friendly aquaculture, mangrove ecotourism and non-timber household industries (Target 14.7).

Improvement in mangrove habitat links to the protection of migratory water birds under the Convention of the Conservation of Migratory Species of Wild Animals. The biodiversity and fauna reports produced by the project in conjunction to the application of SECURE practices and mangrove management as reported in Section 3 can support Ramsar targets 3,9,12 and 13 as well as Indonesia's commitment to the Convention on Biological Diversity (CBD) presented in the Indonesian Biodiversity Strategy and Action Plan (IBSAP).

Economic and social incentives for local communities to support conservation agenda is embedded in the project through community engagement and awareness, including women and women groups of whom are very active in shrimp aquaculture post-harvest activities, to empower

them to protect and restore mangroves and to develop alternative sustainable livelihoods. Our works with village women groups for milkfish products and community-led ecotourism explained in Section 3 above supports SDG 1 and 5. SDG Targets 1.4, 1.5 and 5a are also supported by promoting equitable businesses and integrating women's involvement in mangrove management decisions.

5. Project support to poverty reduction

The project's conservation goal to restore and protect mangrove ecosystems is directly linked to the safeguarding of lives that depend on the mangrove ecosystem, including biodiversity, coastal communities, and coastal areas. In Berau, over 5% of the population live in extreme poverty relying heavily on shrimp aquaculture for their subsistence with few other alternative livelihoods available to them. Low productivity of shrimp ponds has driven communities to convert more mangroves into shrimp ponds in a attempt to increase harvest without realizing that this practice counterproductively reduces the ability of the ecosystem to support shrimp production. Raising awareness and inducing behaviour change is therefore beneficial for long-term poverty alleviation outcomes and increased community resilience.

The SECURE model is working to improve aquaculture practices combined with mangrove restoration within the same pond that will increase production and translates into increased income generation. In this first 9 months, pond redesign and construction have started. In one of the ponds in Pegat Batumbuk Village, a preliminary shrimp aquaculture trial has been conducted for 1 cycle (3 months) with good and comparative yield result to before SECURE. Milkfish aquaculture is conducted jointly with shrimp for the first SECURE cycle (6 month). Milkfish production is one of the main sources of income for the women groups in the villages. We provided them with capacity to upgrade their products into milkfish floss (longer shelf time considering electricity is an issue in the area), better packaging, and facilitating licensing process for this home industry.

During a monitoring visit, the women's group testified that without the milkfish products (crackers and floss), they do not have additional income nor other significant economic activities. Although not yet in scale, they have seen increase in their income and were very proud to say that they have extra income to provide for the family and even to treat their husbands. To us, the empowerment they felt is an alleviation beyond mere poverty measures.



Figure 3 - Monitoring visit to a local women's group

6. Gender equality and social inclusion

Women are particularly active in the post-harvest activities including shrimp fry and feed collection, and storage and processing. Despite women's significant contribution to shrimp farming, Indonesian gender norms view women's primary role as domestic caregivers, so are typically only hired as casual workers creating barriers to their engagement to decision making in this industry.

Our gender responsive livelihood programme within the project explicitly targets women and/or women's groups. We started the programme by applying FPIC, conducting a gender analysis

and socio-economic baseline study. We will work exclusively with women groups (local women who associate together for developing additional income) for the development of alternative livelihoods in the project. To date, the programme has been well received by the women groups and we hope to see more good news throughout the project.

Please quantify the proportion of women on the Project Board ¹ .	75% 6 out of 8 YKAN's Board members for this project are women
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women ² .	100% Our partners, University of Mulawarman and University of Leeds teams, are both headed by women.

7. Monitoring and evaluation

YKAN has an overall dashboard that keeps track of each indicator and the overall project progress. This dashboard is linked to staff KPI and performance. Additionally, we have set up communication and reporting lines to allow timely and more accurate updates from the pond level to project outcomes. These came in the form of: (1) Monthly monitoring for internal purpose; (2) Adaptive management, regular meetings and additional when needed to respond dynamics in the field, including evaluating and capturing project successes and learnings; (3) Data collection and on-site monitoring; (4) Project dashboard updating; and (5) YKAN's Senior Manager Team (SMT) and Indonesia Leadership Team (ILT) reviews and reports. With our partner, University of Mulawarman, we organized briefing sessions both on programmatic and admin-finance aspects. The same will be done with University of Leeds. Both partners are monitoring progress within their scope of work and submit progress reports to YKAN accordingly to the timetable that has been set and jointly agreed. We also have a WhatsApp Group dedicated for fluid communication (WhatsApp is a big communication tool in Indonesia, used even as formal platform by government). Thus far these methods work fine for us.

We are monitoring our progress against these indicators described in Section 3 of this report:

Biodiversity	
Mangrove hectare	To monitor areas restored back to mangrove (linked to benefits of mangroves)
Mangrove density	To monitor healthiness, survival rate, and success of restoration (linked to benefits of mangroves)
eDNA test results	To trace species, avifauna, and other animals that depend on mangrove ecosystem
Soil carbon	To measure and monitor climate change mitigation and carbon sequestration in our projects as evidence for conservation actions. In future, we hope to value this and prepare a feasibility study for potential carbon credits.
GHG emission	
Livelihood	
Shrimp harvest (productivity)	To develop appropriate aquaculture production model and practices and evidence for improved livelihood as measured by harvest per hectare
Social economic data	To monitor and check impacts of the project to community welfare. This database has just started to be collected and will be collected yearly to see if the project contributes to community welfare

¹ A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

² Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

8. Lessons learnt

Thus far, our data show that SECURE restoration areas are conducive/supportive for natural mangrove regeneration. To supplement the natural recovery, we collected wild saplings, acclimatized them in the pond's mangrove nursery, and transplanted them into the restoration pond areas. SECURE ponds showed around 80% survival rate.

We found that in some cases, restoration areas also generate higher productivity than traditional ponds (e.g., in Tabalar Muara, the restoration area of the pond contributes significantly higher than the dedicated pond area). This supports our hypothesis that healthier mangrove ecosystem provides environmental services beneficial as nutrients and protection for shrimp and other fish products in the ponds.

The project implementation means reaching out and engaging with each individual shrimp farmer/pond owner (they don't have one central representative organisation). Our SIGAP process has been a great guiding process for this as it provides constant and regular coordination, updates, and relationship with pond owners, including negotiation for them to join in agreement to implement SECURE. However we have noticed that a reliable pond database is absent, so we are developing our own (and will be the first) shrimp ponds digital database. This process includes ground truthing, surveys of each pond, geo-tagging, and collaboration with middlemen for actual harvest data that will be linked to its corresponding pond.

9. Actions taken in response to previous reviews (if applicable)

Not applicable.

10. Risk Management

We are monitoring risks with most updated risk mitigations compiled as below table:

Risk	Likelihood	Impact	Mitigation
Pond owners reluctant to join the program	Medium	High	<ul style="list-style-type: none"> YKAN Berau team has close ties with communities including having village facilitators for close communications with pond owners Tailored agreements with each pond owners based on mutual interests Continue looking and assessing potential ponds and strengthen relationships with villagers Invite pond owners to participate in the field school
Natural hazards such as high tides, unfavorable weather, or government restrictions	Medium	High	<ul style="list-style-type: none"> Implement agile and adaptive management approaches Monitor weather and schedule activities accordingly to minimize effects
Production failures due to various reasons	Medium	High	<ul style="list-style-type: none"> YKAN's research on productivity function remains strong Engage experts such as from BBPBAP Jepara in brackish aquaculture Develop guidelines on the management and implementation of SECURE Conduct research on seeds, fertilizers, water quality and other environmental factors contributing to harvests (incl. treatments)
Changes in Berau/East Kalimantan development priorities	Low	High	<ul style="list-style-type: none"> Involve local governments closely Assist local government in developing policies/regulations on mangrove-aquaculture
Uncertainty of government regulations on carbon	High	Low	<ul style="list-style-type: none"> Keep project updated with regulations, methodologies, and verification methods adopted by GoI As the project is only building its carbon case/proof and not aiming for carbon trading, this has less impact politically or reputationally with MoEF

Of the risks mentioned in above table, the reluctance of some pond owners to join in the programme happened during this reporting period as we experienced some owners changed their minds. The field team and local facilitators continue to engage the communities and farmers and were able to secure agreements with owners to meet the project's target of 100 hectares. Updated risk framework attached.

11. Other comments on progress not covered elsewhere

YKAN understands that heavy research is needed to validate the SECURE approach and ensure that this prototyping approach can be successful. This project and further match funding sources

support research on shrimp productivity functions (the interplay between pond size and age, pond inputs, and spatial variables), mangrove density and pond productivity, the development of pond digital database, measuring GHG emissions including purchase of Lidar equipment, and expanding SECURE ponds to observe potential adjustment or customization needs depending on ground conditions. This necessary to check our assumptions, improve the SECURE model where necessary, and build evidence on project achievements and lessons learned.

12. Sustainability and legacy

Within this reporting period, we have established community-led protection and restoration of mangroves where the communities actively participate and take actions with assistance from YKAN. Direct economic benefits combined with increased community awareness have resulted in a willingness from the communities to join the mangrove protection and restoration activities with the aim of capacitating them to uptake these practices themselves.

On the other hand, we also worked on integrating participatory planning approaches into the work of relevant government agencies, as aiming to get EAA development and SIGAP approaches build into their mangrove conservation plans and turn it into action. Potential challenges lie in the financing of conservation and sustainable aquaculture practices. To this we are working on (1) improving production, market access, and financing access for mangrove-based livelihood; (2) assisting Government of Berau with their planning documents that would be included in state budget; and (3) building our carbon portfolio for potential carbon credit and benefits that can be enjoyed by Government of Berau and the community.

13. Darwin Initiative identity

Our project transparently communicates Darwin’s support to our government counterparts (Berau Regency Office, Berau Fisheries Agency, East Kalimantan Marine and Fisheries Agency, and East Kalimantan Environmental Agency) and stakeholders we work with. We include partners’ logos (such as the Darwin Initiative) in our backdrops during events, mention partners’ support in our remarks to allow our stakeholders to identify Darwin and other donors we work with.

The project is in the process of recruiting a Learning and Communications Officer who will be responsible to ensure the identity of Darwin will be embedded in our activities, to produce press releases, and other communication activities/materials. Currently, a dedicated project web page is being developed by YKAN’s Communication Unit and expected to be up and running in a few months.

14. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?	Yes/No
Have any concerns been investigated in the past 12 months	Yes/No
Does your project have a Safeguarding focal point?	Yes/No Rizya Ardiwijaya [REDACTED]
Has the focal point attended any formal training in the last 12 months?	Yes/No REACT Right Instructure for First Aid, CPR, AED, and O2 Management (2022)
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 30% [15/year] Planned:30% [15/year]
<p>Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses.</p> <ul style="list-style-type: none"> Contraction of Covid 19: during a field mission, one member contracted Covid-19. The island we stayed in had no internet connections and telephone network. Access to a hospital had to wait the next day when boats could sail. In such field missions, YKAN’s SOP mandated a nurse to be travelling along with mission members and this proved useful during that time and any other times when members had cuts from coral or other small incidents. Isolation was easily managed and not an issue on the island. When returning to Berau, the staff member travelled separately (accompanied by the nurse), to 	

<p>avoid transmission to others. All present staff members were provided with Covid-19 tests.</p> <ul style="list-style-type: none"> On another field mission, one person got injured from falling off a slippery boat. We enforce our float plan (consisting of an itinerary, response plan, communications plan, and important contact numbers). The communications tree performed well and the patient could immediately be evacuated to a hospital in Berau.
<p>Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify.</p> <p>Yes.</p> <ul style="list-style-type: none"> Training on “REACT Right Instructure for First Aid, CPR, AED, and O2 Management” will be delivered to all project staff

15. Project expenditure

Please note that the below figures are draft.

Table 1: Project expenditure during the reporting period (1 April 2022 – 31 March 2023)

Project spend (indicative) since last Annual Report	2022/23 Grant (£)	2022/23 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Monitoring & Evaluation (M&E)				
Others (see below)				
TOTAL	185,239	104,093		

Due to unforeseen delays in contractual arrangements between partners, the project suffered a delay in start up. However, YKAN is confident we will be able to make up for this delay in the second year and an adjusted expenditure is being developed.

Table 2: Project mobilising of matched funding during the reporting period (1 April 2022 – 31 March 2023)

	Matched funding secured to date	Total matched funding expected by end of project
Matched funding leveraged by the partners to deliver the project.		
Total additional finance mobilised by new activities building on evidence, best practices and project (£)		

16. OPTIONAL: Outstanding achievements or progress of your project so far (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Initiative Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here).

Indonesia has the world’s largest mangrove area, boasting the highest richness of mangrove species that provide resilience from natural disasters, tropical storms and sea level rises. Indonesia’s mangroves are sanctuaries for marine fish, crabs, shrimp and molluscs that directly support the livelihoods of coastal communities while also sustaining a diversity of terrestrial wildlife. While mangroves are the most effective ecosystem at storing carbon, they are also one of the most threatened tropical ecosystems with an alarming 20% destroyed, less than 7% protected, and more than 40% of mangrove terrestrial species at risk of extinction. In Indonesia, it is estimated that the majority (83%) of mangrove loss is due to aquaculture expansion.


With support from Darwin Initiative, YKAN developed the mangrove restoration and shrimp carbon aquaculture programme (SECURE) to restore mangroves within the existing shrimp ponds and to protect intact mangroves from potential land clearing. SECURE approach allocates up to 80% of existing pond as mangrove restoration area and the remaining part as redesigned shrimp aquaculture with better hydrology, greener choices of materials, and improved farming practices.

Just within its initial first 9 months, SECURE restoration areas showed promising results for natural mangrove regeneration with 80% survival rate. We found that in some cases, restoration areas already contribute higher productivity than traditional ponds. This supports our hypothesis that healthier mangrove ecosystems provide environmental services beneficial as nutrients and protection for shrimp and other fish products in the ponds.

While SECURE addresses aquaculture productivity and mangrove conservation aspects, we understand that conservation actions need to support robust community livelihoods. As a derivative of shrimp aquaculture production, milkfish harvests from the ponds can add to community livelihoods and empower women’s groups who mainly rely on milkfish-based products to generate income. We provided the women’s group with capacity to upgrade their products into milkfish floss (longer shelf time considering electricity is an issue in the area), better packaging, and facilitating licensing process for this home industry.

During a monitoring visit, the women group testified that without the milkfish products (crackers and floss), they would not have additional income nor other significant economic activities. Although not yet in scale, they have seen increases in their income and were very proud to say that they have extra income to provide for the family and even to treat their husbands. To us, the empowerment they felt is an alleviation beyond mere poverty measures.

File Type (Image / Video / Graphic)	File Name or File Location	Caption, country and credit	Online accounts to be tagged (leave blank if none)	Consent of subjects received (delete as necessary)
Image		Pond Nursery in Pegat Batumbuk Village, Berau, Indonesia, Basir		Yes
Image		Pond Construction, Berau, Indonesia, Basir		Yes
Image		Pond Embankment		Yes

		Work, Berau, Indonesia, Basir		
Image		One of the SECURE Pond Designs in Tabalar Muara Village, Berau, Indonesia, Basir		Yes

Annex 1: Report of progress and achievements against logframe for Financial Year 2022-2023

Project summary	SMART Indicators	Progress and Achievements April 2021 - March 2022	Actions required/planned for next period
<p>Impact</p> <p>Biodiversity threats halted, poverty reduced and long-term climate change impacts mitigated in mangrove ecosystems in Berau Regency, East Kalimantan, Indonesia</p>		<p>SECURE model divides existing ponds into aquaculture and mangrove restoration areas. On the aquaculture area, we work to improve shrimp aquaculture practices that are not environmentally friendly by increasing productivity that corresponds to increased income.</p> <p>The restoration area is done by reconverting portions of the ponds back into mangrove and protect surrounding intact mangroves. Thanks to the restoration and protection of mangroves, the coastal areas will be more resilient against the negative impacts of climate change and natural disasters. The restored mangroves will continue to absorb CO2 and store them in the soils, and the roots will trap organic soil and plastic pollution from the surrounding waters. Results from this first-year show positive conclusions to support these premises.</p>	
<p>Outcome</p> <p>Biodiversity threats prevented from protection of 15,000ha intact mangrove forests and improved biodiversity and community income from management plans for 5,000ha of shrimp ponds in Berau Regency, East Kalimantan</p>	<p>0.1 By 2025, community based mangrove management plan for conservation (15,000ha) developed and implemented by village communities and Regency government, and endorsed by national Ministry of Environment & Forestry</p> <p>0.2 By 2025, The Regency Government Approved the Village Governments Plan to implement an Ecosystems Approach to Aquaculture (EAA) improvement plan covering 5,000 ha</p>	<p>Thus far, the project is on track with its progress toward the intended outcomes. For the management plan, basis data to advocate management plan for conservation has been collected. Currently, mangrove ecosystem management has been formed in each of the 3 villages.</p> <p>EAA management plan is progressing well. Field study, interviews, consultations, and socialization with government representatives and</p>	<p>Spatial and GIS works toward developing spatial plan that will layout boundary areas, maps, and designation for management plans.</p> <p>Development of EAA action plan in EAA, consultative meetings, drafting of EAA.</p>

	<p>of shrimp ponds (including a 100ha SECURE model demonstration site) to increase overall shrimp yield whilst reducing total pond size area.</p> <p>0.3 mangrove flora and fauna (e.g. mammals, water birds, aquatic biota) are stabilized in the 15,000ha protected areas and increased by at least 10% in the mosaic of restored mangroves in the 5,000ha shrimp pond/mangrove area compared to baseline study of 2022.</p> <p>0.4 By 2025, the average household income of people dependent on mangrove-related livelihoods across the 3 target villages will have been increased by 15% compared to baseline study of 2022.</p>	<p>farmers completed as initial steps in EAA development stages. Indicative EAA area has also been identified for further advocacy.</p> <p>Within the project's scope, analysis has been done using eDNA sampling and monitoring fauna as baseline aimed to inform to Indonesia's Biodiversity Strategy and Action Plan (IBSAP).</p> <p>Favourable result from SECURE approach is expected to increase community incomes. We have collected baseline socio-economic data that will be compared to survey result by end of project.</p>	<p>Lab testing for further analysis, creation of potential biodiversity report case to Bappenas.</p> <p>Market identification and assessment for SECURE shrimp.</p>
<p>Output 1. Management plans for the protection of 15,000ha of mangrove ecosystems and their biodiversity are developed, approved, and implemented through strengthened village governance capacity</p>	<p>1.1 By the end of the project's first year consultations with local communities in the 3 target villages attended by 60 village leaders and community representatives are completed, and management plans for the protected mangroves are submitted by the heads of the villages to the Regency Government for Approval and to the MOEF for an endorsement.</p> <p>1.2 By the end of the project, the richness of mangrove tree species, mangrove-associated aquatic species, and key threatened species (e.g. Proboscis monkeys-EN, Chinese egrets-VU, Lesser adjutant stork-VU) for this target mangrove area in Berau are stabilized compared to validated baseline study.</p> <p>1.3 By the end of the project, the village governments have capacity to develop policies, standards, and have a management team in place</p>	<p>During this first period, we have completed baseline study of biodiversity, mangrove and fauna monitoring and analysis, water quality, and analysed soil carbon on pond and mangrove areas. This baseline will inform management plan for the protection of 15,000ha of mangrove ecosystems and their biodiversity.</p> <p>In this first year, we assisted the designation of 748.89ha mangrove areas as community-based ecotourism; hence, legally protects the area from unfavourable and unsustainable activities in that area. Ahead of the project target, mangrove surveillance units are already established, and we provided training for them to develop protocol and practice for mangrove monitoring.</p>	

	to successfully implement the management plan for 15,000 ha of village protected mangrove forest.		
Activity 1.1 Consultations with local communities in the 3 target villages attended by 60 village leaders and community representatives are completed, and management plans for the protected mangroves are submitted by the Village Heads to the Regency Government for an approval through a Regent Decree and to the MOEF for an endorsement		YKAN's Field Coordinators implemented SIGAP (Communities Inspiring Actions for Change) approach through a live-in community facilitation in assisting preparation of village mid-term development plans, home industry food licensing, stakeholder analysis, and capacity gaps of village-owned enterprises. The project facilitates community-led mangrove protection and enhance collaboration among stakeholders through technical assistance and meetings.	Conduct GIS spatial analysis for demarcation, zoning, and produce preliminary management plans comprised of biodiversity status and conservation actions
Activity 1.2 The richness of mangrove tree species, mangrove-associated aquatic species, and key threatened species (e.g. proboscis monkeys-EN, chinese egrets-VU, adjutant stork-VU) for this target mangrove area in Berau are stabilized compared to validated baseline study.		Biodiversity survey and analyses conducted by the collaborating university partner (Mulawarman University) using environmental DNA sampling methods. We have also conducted water quality measurement.	Conduct periodical physical-chemical characteristics of the water measurements and another eDNA sampling by collaborating university.
Activity 1.3 Village governments have capacity to develop policies, standards, and a management team to implement the management plan for 15,000 ha of village protected mangrove forest		Mangrove surveillance training organized for Berau Mangrove Task Force and other authorized institutions resulting in agreed SOP for surveillance process and increased know-how from field practice session at the end of the training. There are delays in capacity development processes (gap analysis, curricula, and training implementation) due to slow procurement processes.	Undertake capacity needs assessment in terms of both human resources and equipment, develop curriculum and training plans.
Output 2. 10-year mangrove restoration and biodiversity improvement plan developed and approved for 5,000 ha of shrimp ponds and, a 100 ha SECURE model demonstration site (within the 5,000ha area) is established by the end of the project.	2.1 By the end of the project's second year, village authorities have developed and approved spatial and management plans for the 5,000 ha shrimp ponds using FAO's Ecosystems Approach to Aquaculture (EAA) that takes into consideration the 15,000 ha	Shrimp aquaculture in the existing Berau Regency can be encouraged to use a management system with the EAA approach. Assessment of this EAA designated area is 12,054.93 hectares. The Government of Berau Regency through the Fisheries Agency has also set priority areas for tiger prawn aquaculture that can serve as entry point to introduce EAA application in Berau. We have secured 13 ponds totalling to 103 hectares for SECURE demonstration sites. 8 out of the 13 shrimp ponds have been redesigned and 5 ponds have begun construction. Aquaculture and mangrove restoration trials conducted in Pegat Batumbuk and will be basis for replication in other ponds. Carbon stock has also	

	<p>protected mangroves and village area</p> <p>2.2 By the end of the project, ~80% of the 100ha SECURE model demonstration site is restored back to mangroves using hydrological or hybrid engineering restoration approaches</p> <p>2.3 By the end of the project, ~20% of the 100ha SECURE model demonstration site is being managed as shrimp ponds with improved aquaculture practices, which will increase overall shrimp yield by 30%</p> <p>2.4 By the end of the project, a business case for carbon finance for mangrove restoration and protection is developed and used as business proposal for carbon finance project.</p> <p>2.5 By the end of the project, village authorities have the knowledge to co-manage carbon financing for the project area.</p>	<p>been collected and will be done in annually to feed into the development of carbon business case.</p>	
<p>Activity 2.1. Village authorities develop and approve spatial and management plans for the 5,000 ha shrimp ponds using FAO's Ecosystems Approach to Aquaculture (EAA) that takes into consideration the 15,000 ha protected mangroves and village areas</p>	<p>Feasibility study for shrimp aquaculture EAA conducted supplemented with field studies, interviews, and government consultations and socialization.</p>	<p>Assessment of the initial status for EAA management designation, consultative meetings, development of action plan including forming of working group.</p>	
<p>Activity 2.2. ~80% of the 100ha SECURE model demonstration site is restored back to mangroves using hydrological or hybrid engineering restoration approaches.</p>	<p>Agreements with 13 pond owners totaling to 103 hectares across the 3 villages obtained. Following that, construction and hydrological improvement in 5 redesigned shrimp ponds (4 in Tabalar Muara and 1 in Pegat Batumbuk) conducted. Restoration was tried in SECURE pond in Pegat Batumbuk with promising result of mangrove survival rate.</p>	<p>Continue construction of redesigned ponds and implementation of mangrove restoration with the community, conduct semesterly vegetation analysis.</p>	
<p>Activity 2.3 ~20% of the 100ha SECURE model demonstration site is being managed as shrimp ponds with improved aquaculture practices, which will increase overall shrimp yield by 30%.</p>	<p>Cycle one of shrimp harvest (3 months duration) and milkfish harvest (6 months duration) on going. Early indication</p>	<p>Provision of materials and technical expertise for community,</p>	

		shows that harvest from SECURE pond is comparable to traditional ponds despite smaller in size.	implementation of aquaculture field school.
Activity 2.4 A business case for carbon finance for mangrove restoration and protection is developed and used as business proposal for carbon finance project.		Carbon soil content, vegetation analysis, and land cover analysis conducted to provide accurate information about potential carbon emission reduction. YKAN team is learning and monitoring changes in Government of Indonesia's regulations related to carbon.	Provision of consultant for carbon information, regulation, and market opportunity analysis. Analysis on mangrove ecosystem benefits relating to microplastic, etc.
Activity 2.5 Village authorities have the knowledge and capacity to manage carbon financing for the project area		N/A	Facilitates carbon project training for village government.
Output 3. At the completion of the project (2025) the income of people working in shrimp aquaculture, mangrove ecotourism, and mangrove-based household industries in the 3 target villages is increased by 15% (compared to baseline).	<p>3.1 By the end of the project's first year, 100 selected households (400 persons, with at least 50% women) are trained in new practices in environmentally-friendly shrimp aquaculture, mangrove ecotourism, and non-timber mangrove-based household industry development.</p> <p>3.2 By the end of the project, products produced by workers with mangrove-based livelihoods in at least two aquaculture ponds will meet the requirements for national and globally recognized certifications, (.e., Aquaculture Stewardship Council (ASC), Halal, and Indonesia Good Manufacturing Practices (GMP) improving the product value and quantity, with a broader access to markets.</p>	<p>Business Model Canvas (BMC) and surveys conducted for women groups, farmer groups, and other households in the 3 villages. We will work with Kerjasama Jaya women group in Pegat Batumbuk, Mangrove Ecotourism Management in Teluk Semanting, and farmer groups to upgrade their businesses. We are open, however, to extend our capacity strengthening and support to other groups and household who needs the support, particularly when the field school starts.</p> <p>In order to measure changes, baseline surveys on socio-economic conditions and income have been conducted and will be compared to future survey by end of the project. With Kerjasama Jaya, we supported their products with improvement in production and packaging as well as facilitating them to obtain home industry license. Halal certification will follow suit as home industry license is the first step of business legalization.</p>	
Activity 3.1 100 selected households (400 persons, with at least 50% women) are trained in new practices in environmentally-friendly shrimp aquaculture, mangrove ecotourism, and non-timber mangrove-based household industry development.		Socio-economic data on communities in the 3 villages and on women groups and BUMKam capacity gap assessment completed. Strengthening of community-led ecotourism business with development of SOP/protocol and technical assistance for management i.e. comparative study visit.	Provision of BUMKam capacity and training sessions.

<p>Activity 3.2 Products produced by workers with mangrove-based livelihoods in at least two aquaculture ponds will meet the requirements for national and globally recognized certifications, (i.e., Aquaculture Stewardship Council (ASC), Halal, and Indonesia Good Manufacturing Practices (GMP) improving the product value and quantity, with a broader access to markets</p>	<p>Business Model Canvas (BMC) applied to local business groups, assistance to Kerjasama Jaya women group resulted in issuance of their home industry license.</p>	<p>Provision of materials to support women group production, market study for the women groups' products, and/or facilitate exhibition.</p>
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Annex 2: Project’s full current logframe as presented in the application form (unless changes have been agreed)

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions
Impact: Biodiversity threats halted, poverty reduced and long-term climate changed impacts mitigated in mangrove ecosystems in Berau Regency, East Kalimantan, Indonesia			
Outcome: Biodiversity threats prevented from protection of 15,000ha intact mangrove forests and improved biodiversity and community income from management plans for 5,000ha of shrimp ponds in Berau Regency, East Kalimantan	0.1 By 2025, community based mangrove management plan for conservation (15,000ha) developed and implemented by village communities and Regency government, and endorsed by national Ministry of Environment & Forestry	0.1.1 Spatial plan agreement signed by Berau Regency Government. 0.1.2 Endorsement letter from Ministry of Environment & Forestry received. 0.1.3 Village government decision letter delivered on the establishment of Community Surveillance unit and certificate of training completion of by the Government Fisheries Agency.	<ol style="list-style-type: none"> 1. No negative effects from forest fires or natural disasters including pandemic in site locations. 2. Continued support of Government policies for mangrove conservation following Provincial government elections scheduled during this project's timeframe. An active communication with the government in charge is needed to ensure the new government will have a consistent policy with the previous administration. 3. Continued community commitment and engagement.
	0.2 By 2025, The Regency Government Approved the Village Governments Plan to implement an Ecosystems Approach to Aquaculture (EAA) improvement plan covering 5,000 ha of shrimp ponds (including a 100ha SECURE model demonstration site) to increase overall shrimp yield whilst reducing total pond size area.	0.2.1 Management Plan for Ecosystem Approach to Aquaculture (EAA) signed by Berau Regency Government. 0.2.2 Report on the SECURE Model Pond comprised of information on each shrimp pond characteristics, land ownership status, aquaculture improvement plans, and conservation agreement with the community group to manage the SECURE Model Pond	
	0.3 By 2025, the richness of mangrove flora and fauna (e.g. mammals, water birds, aquatic biota) are stabilized in the 15,000ha protected areas and increased by at least 10% in the mosaic of restored mangroves in the 5,000ha shrimp pond/mangrove area compared to baseline study of 2022.	0.3 Annual biodiversity status reports comprise of species count, population, distribution, threats, and recommendation, shared to Indonesia’s Biodiversity Strategy and Action Plan (IBSAP) team to be included in the IBSAP development process.	

	0.4 By 2025, the average household income of people dependent on mangrove-related livelihoods across the 3 target villages will have been increased by 15% compared to baseline study of 2022.	0.4 Number of poor households from Indonesia's Statistical Agency (BPS) data combined with household interviews (collected before and after project intervention).	
Outputs: 1. Management plans for the protection of 15,000ha of mangrove ecosystems and their biodiversity are developed, approved, and implemented through strengthened village governance capacity	1.1 By the end of the project's first year consultations with local communities in the 3 target villages attended by 60 village leaders and community representatives are completed, and management plans for the protected mangroves are submitted by the heads of the villages to the Regency Government for Approval and to the MOEF for an endorsement. <i>Interim target: not relevant.</i>	1.1.1 Workshop Report comprise of minutes of consultation workshops conducted within the 3 target villages, list of attendees, are documented and include boundary map of the 15,000 ha protected area which available for public view in the village offices. 1.1.2 Villages management plans for the protection of 15,000 ha of mangroves, proposed by village government, approved by Regency Government with The MOEF's endorsement.	1. Consistent government policy to protect the mangroves following Provincial government elections scheduled during this project's timeframe. An active communication with the government in charge is needed to ensure the consistent policy to support better protection of mangrove through aquaculture improvement. 2. There is no drastic change of the ecosystems due to man-made or natural disasters such as forest fire, storm, or tsunami that affect wide scale habitat the aquatic biota and key species.
	1.2 By the end of the project, the richness of mangrove tree species, mangrove-associated aquatic species, and key threatened species (e.g. Proboscis monkeys-EN, Chinese egrets-VU, Lesser adjutant stork-VU) for this target mangrove area in Berau are stabilized compared to validated baseline study. <i>Interim target: By the end of Project's first year, baseline study is available.</i>	1.2 Mangrove species biodiversity project report including the use of environmental DNA to check aquatic and associated terrestrial biodiversity, and validation of baseline measures from existing studies for threatened and indicator mangrove species is produced and submitted for peer-reviewed journal for publication by the end of the project.	
	1.3 By the end of the project, the village governments have capacity to develop policies, standards, and have a management team in place to successfully implement the	1.3 The village government issued mangrove protection standard operating procedures, and established Community Surveillance Unit for mangroves for protection comprised of 30 mangrove rangers.	

	<p>management plan for 15,000 ha of village protected mangrove forest.</p> <p><i>Interim target, by the end of Project's second year, the Community Surveillanve Unit is established.</i></p>		
<p>2. 10-year mangrove restoration and biodiversity improvement plan developed and approved for 5,000 ha of shrimp ponds and, a 100 ha SECURE model demonstration site (within the 5,000ha area) is established by the end of the project.</p>	<p>2.1 By the end of the project's second year, village authorities have developed and approved spatial and management plans for the 5,000 ha shrimp ponds using FAO's Ecosystems Approach to Aquaculture (EAA) that takes into consideration the 15,000 ha protected mangroves and village area</p> <p><i>Interim target: not relevant.</i></p>	<p>2.1.1 The Village Government's Spatial and Management plans using Ecosystem Approach to Aquaculture approved and signed by Berau Regency Government</p> <p>2.1.2 Scientific project report of potential CO2e emissions reduction/increase after the modification of shrimp ponds by the Project. The results submitted for peer-reviewed journal publication.</p>	<ol style="list-style-type: none"> 1. Consistent government policy to protect mangroves following Provincial government elections scheduled during this project's timeframe. 2. No natural disasters (e.g. forest fires, floods, storms, coastal erosion) that damage the aquaculture ponds. 3. The government successfully provided a clear regulation and mechanisms on carbon financing for both domestic and international markets. To anticipate the slow legislation process, this project will also seek potential of voluntary carbon market.
	<p>2.2 By the end of the project, ~80% of the 100ha SECURE model demonstration site is restored back to mangroves using hydrological or hybrid engineering restoration approaches</p> <p>Interim target: by the end of the Project's first year, the pond redesign and restoration plan for the 100 ha ponds are available.</p>	<p>2.2. Satellite imagery analysis of 100ha SECURE model demonstration site combined with ground mangrove biodiversity and population survey, to measure the success of mangrove restoration.</p>	
	<p>2.3 By the end of the project, ~20% of the 100ha SECURE model demonstration site is being managed as shrimp ponds with improved aquaculture practices, which will increase overall shrimp yield by 30%</p> <p><i>Interim target: by the end of Project's second year, all 100 SECURE ponds have been operating with harvest equal to business as usual productivity.</i></p>	<p>2.3.1 SECURE model ponds Performance Report comprised of annual shrimp yield and production costs, submitted for peer-reviewed journal publication.</p> <p>2.3.2 Training Report comprised of attendance reports, before and after knowledge test of the training sessions at the Aquaculture Field School (Sekolah Lapang Perikanan) at the 100ha SECURE demonstration site.</p>	
	<p>2.4 By the end of the project, a business case for carbon finance</p>	<p>2.4 Analysis report of the viability of carbon financing through the projection of carbon</p>	

	<p>for mangrove restoration and protection is developed and used as business proposal for carbon finance project.</p> <p><i>Interim target: by the end of Project's second year the business case team has finalised the first draft of the business case.</i></p>	<p>emission reduction potential, carbon price, shrimp production increased, and project costs to establish the SECURE ponds</p>	
	<p>2.5 By the end of the project, village authorities have the knowledge to co-manage carbon financing for the project area.</p> <p><i>Interim target: By the end of Project's second year, village authority has finalised carbon financing training.</i></p>	<p>2.5 Training report with before and after knowledge test for local authorities attendees for capacity building sessions for the available carbon financing mechanisms</p>	
<p>3. At the completion of the project (2025) the income of people working in shrimp aquaculture, mangrove ecotourism, and mangrove-based household industries in the 3 target villages is increased by 15% (compared to baseline).</p>	<p>3.1 By the end of the project's first year, 100 selected households (400 persons, with at least 50% women) are trained in new practices in environmentally-friendly shrimp aquaculture, mangrove ecotourism, and non-timber mangrove-based household industry development.</p> <p><i>Interim target: By the end of Project's first year, the team has identified households/ candidates for training activities.</i></p>	<p>3.1.1 List of training attendees and their knowledge surveys performed at commencement and end of training sessions (gender disaggregated) on shrimp aquaculture, mangrove ecotourism, and mangrove-based household industry development.</p> <p>3.1.2 Household income monitoring survey report completed and combined with Indonesia's Statistical Agency (BPS) data.</p>	<ol style="list-style-type: none"> At least 70% of community members reliant on shrimp aquaculture and mangrove-based industries for income are able to attend training courses. The environmental quality is not drastically changed due to the occurrence of man-made or natural disasters such as an oil spills, floods, and tsunami that make aquaculture not feasible in Berau. The economic situation, especially shrimp global demand, not disrupted by disasters such as pandemic or regional conflicts. To anticipate and minimise the impact on community's income, the project should invest also on market and product diversification
	<p>3.2 By the end of the project, products produced by workers with mangrove-based livelihoods in at least two aquaculture ponds will meet the requirements for national and globally recognized certifications, (.e., Aquaculture Stewardship Council (ASC), Halal, and Indonesia Good Manufacturing Practices (GMP)</p>	<p>3.2 Two model aquaculture ponds receive eco-certification (anticipated to be ASC) and at least 10 products halal and GMP certified.</p>	

improving the product value and quantity, with a broader access to markets.

Interim target: by the end of Project's second year, Aquaculture Improvement Plan to meet the certification requirement for the two ponds has been available and implemented.

Activities

Output 1. Management plans for the protection of 15,000ha of mangrove ecosystem and their biodiversity are developed, approved, and implemented through strengthened village governance capacity.

Indicator 1.1 By the end of the project's second year consultations with local communities in the 3 target villages attended by 60 village leaders and community representatives are completed, and management plans for the protected mangroves are submitted by the Village Heads to the Regency Government for an approval through a Regent Decree and to the MOEF for an endorsement.

1.1.1 YKAN's Field Coordinators implement SIGAP (Communities Inspiring Actions for Change) approach through a live-in community facilitation to develop management plans for the protection of 15,000-ha intact mangroves. The coordinators will convene monthly community meetings in each village, facilitate discussion and provide technical advice based on YKAN's past experience (e.g. in the Bird's Head Seascape) regarding the demarcation, zoning, and management plan of a protected area. The meetings will be attended by min. 20 community representatives in each village, total 60 people for 3 villages.

1.1.2 YKAN with technical support from collaborating partners (University of Leeds and Mulawarman University) will assist the SIGAP process with GIS spatial analysis for demarcation, zoning, and produce preliminary management plans comprised of biodiversity status and conservation actions, sustainable harvest of the non-timber products of the protected mangroves, and communication and monitoring.

1.1.3 YKAN will facilitate final workshops in each village where the Village Government formally adopt the mangrove protection management plans and submit the documents to the Regency Government and the MOEF.

1.1.4 YKAN will facilitate consultation workshops at regency and provincial levels to assist the Village Governments to secure the Regency Government approval Decree for the management plan of the Protected Mangroves and the official endorsement from the MOEF.

Indicator 1.2 By the end of the project, the richness of mangrove tree species, mangrove-associated aquatic species, and key threatened species (e.g. proboscis monkeys-EN, chinese egrets-VU, adjutant stork-VU) for this target mangrove area in Berau are stabilized compared to validated baseline study.

1.2.1 Conduct biodiversity status reports (baseline and annually) that will include biodiversity survey and analyses by the collaborating university partners (University of Leeds and Mulawarman University). We will employ the use of environmental DNA sampling methods to monitor aquatic and associated terrestrial biodiversity, and field survey methods to monitor mammal and avifauna dependent on the mangroves in this region.

1.2.2 Conduct three-monthly physical-chemical characteristics of the water measurements (by collaborating university partners) in protected 15,000 ha mangrove area, and mangrove restoration, and daily measurement for the aquaculture shrimp ponds area of the 100ha SECURE site to understand their changes from the protection and restoration of the mangroves.

1.2.3 Using the biodiversity and water quality status information, develop biodiversity spatial prioritisation and protection recommendation which will inform the development of mangrove protection management plans across the three villages.

1.2.4 Provide biodiversity status data and information to Indonesia's Ministry of National Development Planning for the development of Indonesia's Biodiversity Strategy and Action Plan.

Indicator 1.3 By the end of the project, the village governments have capacity to develop policies, standards, and a management team to implement the management plan for 15,000 ha of village protected mangrove forest.

1.3.1 Undertake capacity needs assessment in terms of both human resources and equipment, and based on the findings, develop a strategy including a training plan, curriculum, and inventory of tools to improve the capacity of the government officials and community leaders.

1.3.2 Implement training plans; this will involve 3-5 workshop sessions where YKAN will assisted the village government and community leaders to develop mangrove protection policies and standard operating procedures for mangrove management.

1.3.3 YKAN supports village governments to establish community surveillance group and conduct community outreach protection and enforcement training sessions for 15 community surveillance group members.

1.3.4 Purchasing surveillance equipment, based on capacity needs assessment, anticipated to include: radio communication, drone, GPS, binoculars.

1.3.5 Conduct pre- and post-capacity building surveys to evaluate impact of both training and improved access to equipment

1.3.6 Disseminate lessons learned and best practices for community-based mangrove protection and restoration to the wider audiences through seminars at the regency, provincial, and national level, and other types of media such as poster, leaflets, and books.

Output 2. 10-year mangrove restoration and biodiversity improvement plan developed and approved for 5,000 ha of shrimp ponds and, a SECURE model 100 ha demonstration site (within the 5,000ha area) is established.

Indicator 2.1 By the end of the project's second year, village authorities have developed and approved spatial and management plans for the 5,000 ha shrimp ponds using FAO's Ecosystems Approach to Aquaculture (EAA) that takes into consideration the 15,000 ha protected mangroves and village areas.

2.1.1 YKAN will conduct carrying capacity analysis for shrimp aquaculture in the three villages using biodiversity and water quality information from 1.2 and develop preliminary plans for EAA development in the three villages.

2.1.2 Parallel with the 1.1 activities, Field Coordinators, with YKAN technical experts support, will facilitate the process to develop EAA using SIGAP approach in the three villages by convening monthly meetings for community leaders to review and finalize EAA management plans (zoning plan, communication and monitoring, and mangrove restoration plan).

2.1.3 Once finalized, YKAN will facilitate follow-up public consultations at the Regency level to obtain approval (Regent Decree) from Berau Regency Government for the implementation of EAA in the three villages.

Indicator 2.2 By the end of the project, ~80% of the 100ha SECURE model demonstration site is restored back to mangroves using hydrological or hybrid engineering restoration approaches.

2.2.1 YKAN will redesign the existing shrimp ponds for SECURE model by splitting the shrimp pond into two parts:(1) Aquaculture area (20%), mangrove restoration areas (80%). The community group will carry out the construction works: developing new pond dikes, creating water gate, shrimp pond canals, and supporting facilities including farmer hut and storage, and harvest platform.

2.2.2 Conduct mangrove restoration with the community, covering ~80% of the 100ha SECURE shrimp pond demonstration site. Restoration will be achieved by one of two possible approaches: hydrological improvement approach or hybrid engineering approach, depending on local situation

2.2.3 YKAN will undertake six-monthly vegetation analyses to monitor the restoration progress and identify actions necessary to ensure the success of restoration.

Indicator 2.3 By the end of the project, ~20% of the 100ha SECURE model demonstration site is being managed as shrimp ponds with improved aquaculture practices, which will increase overall shrimp yield by 30%.

2.3.1 YKAN will provide materials and technical expertise for community group to operate the SECURE ponds.

2.3.2 Community groups operating the total 20 ha shrimp ponds using YKAN's Better Management Practices for SECURE ponds.

2.3.3 Improve the community capacity (100 households) on implementing mangrove protection, restoration, and aquaculture improvement through the establishment of a community Aquaculture Field School (Sekolah Lapang Perikanan).

Indicator 2.4 By the end of the project, a business case for carbon finance for mangrove restoration and protection is developed and used as business proposal for carbon finance project.

2.4.1 YKAN will measure the carbon soil content, biomass (data from the six-monthly vegetation analysis), and analyse land cover change (via satellite imagery analysis and ground surveys) to provide accurate information about potential carbon emission reduction from the SECURE pond restoration at commencement and end of project.

2.4.2 A consultant will analyse the Berau mangrove carbon information, national regulation, and market opportunity to evaluate of the viability of carbon financing through the projection of carbon emission reduction potential, carbon price, shrimp production increased, and project costs to establish the SECURE ponds.

Indicator 2.5 By the end of the project, village authorities have the knowledge and capacity to manage carbon financing for the project area.

2.5.1 YKAN facilitates carbon project training for village government and BUMDES staff regarding carbon measurement, monitoring, and carbon accounting 101

2.5.2 YKAN will facilitate the Village Government and BUMDES staff to attend an apprenticeship week in a mangrove carbon project in Indonesia (eg. in North Sumatra).

Output 3. At the completion of the project (2025) the income of people working in shrimp aquaculture, mangrove ecotourism, and mangrove-based household industries in the 3 target villages is increased by 15% (compared to baseline in 2022).

Indicator 3.1 By the end of the project's first year, 100 selected households (400 persons, with at least 50% women) are trained in new practices in environmentally-friendly shrimp aquaculture, mangrove ecotourism, and non-timber mangrove-based household industry development.

3.1.1 Gather and analyse data on the natural resource conservation, poverty and livelihood (community benefits, social impacts), aquaculture practices and productivity, and village governance and social inclusiveness to improve the understanding on key socio-economic condition and changes (baseline and end of project).

3.1.2 YKAN to conduct training sessions and knowledge surveys to develop and strengthen Village Business Units by coaching BUMDES staff on the community's mangrove-based products business models.

3.1.3 YKAN will facilitate apprenticeship of community group members in a successful mangrove-based products business in other regency or province (e.g. South Sulawesi Province or East Java).

Indicator 3.2 By the end of the project, products produced by workers with mangrove-based livelihoods in at least two aquaculture ponds will meet the requirements for national and globally recognized certifications, (i.e., Aquaculture Stewardship Council (ASC), Halal, and Indonesia Good Manufacturing Practices (GMP) improving the product value and quantity, with a broader access to markets

3.2.1 YKAN will provide equipment needed by the Village Business Units for improving the quality of their products, including: refrigerator, water pump, solar panel.

3.2.2 YKAN will assist the communities in obtaining eco-certification (anticipated to be ASC) certification for two SECURE ponds and 10 halal and Indo GMP certificate for their mangrove-based products

3.2.3 YKAN will strengthen the community's small-scale enterprises by: (1) facilitating access to market through exhibitions and meetings with product off-takers, (2) linking the community enterprises with financial institutions, and (3) help connecting the community with relevant experts in livelihoods development.

Annex 3: Standard Indicators

Table 1 Project Standard Indicators

DI Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with DI Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
DI-B03	Community based mangrove management plan for conservation developed and implemented	Number of new/improved community management plans available and endorsed	Number	N/A	1			1	3
DI-A01	Ecosystems Approach to Aquaculture (EAA) improvement plan in shrimp ponds (including SECURE model demonstration site)	Number of people from key national and local stakeholders completing structured and relevant training	People Proportion (Households)	Gender	F: 8 M: 24	F: M:	F: M:	F: 8 M: 24	100 households
DI-D01		Hectares of habitat under sustainable management practices	Area (hectares)	N/A	0			0	5,000 ha
DI-D07		Carbon Sequestered/Removed	Tonnes of CO2	N/A	2,376 tonnes			2,376 tonnes	4,950 – 7,920 tonnes
DI-D03	Richness of mangrove flora and fauna (e.g. mammals, water birds, aquatic biota) are stabilized in the 15,000ha protected areas and increased by at least 10% in the mosaic of restored mangroves compared to baseline study of 2022	Number of policies with biodiversity provisions that have been enacted or amended	Number of instruments	Policy typology (Local, National Policy)	0			0	1 national and 1 local
DI-D04		Stabilised/ improved species population (relative abundance/distribution) within the project area	% Increase	Flora/Fauna/Fungi	0			0	10% increase
DI-D11	Average household income of people dependent on mangrove-related livelihoods across the 3 target villages will have been increased by 15% compared to baseline study of 2022	Number of people benefitting from improved sustainable agriculture practices and are more resilient to weather shocks and climate trends	People/ household	Gender	F: 0 M: 0	F: M:	F: M:	F: 0 M: 0	400 persons, with at least 50% women
DI-D16		Number of households reporting improved livelihoods	Households	N/A	0			0	100 Household

Table 2 Publications

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
n/a						

Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the correct template (checking fund, type of report (i.e. Annual or Final), and year) and deleted the blue guidance text before submission?	x
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the Subject line.	x
Is your report more than 10MB? If so, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the Subject line.	n/a
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	x
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	n/a
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 16)?	x
Have you involved your partners in preparation of the report and named the main contributors	x
Have you completed the Project Expenditure table fully?	x
Do not include claim forms or other communications with this report.	