



Department  
for Environment  
Food & Rural Affairs



 **UK International  
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## Darwin Initiative Main: Annual Report

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

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

**Submission Deadline: 30<sup>th</sup> April 2024**

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### Darwin Initiative Project Information

Project reference	30-025
Project title	Developing Sustainable Near-shore Sea Cucumber Aquaculture on Selayar Island, Indonesia
Country/ies	Indonesia
Lead Partner	Centre for Sustainable Energy & Resources Management @ Universitas Nasional (CSERM-UNAS)
Project partner(s)	Heriot-Watt University
Darwin Initiative grant value	£556,778
Start/end dates of project	1 May 2023 - 1 April 2026
Reporting period (e.g. Apr 2023 – Mar 2024) and number (e.g. Annual Report 1, 2, 3)	May 2023 - Mar 2024, Annual Report 1
Project Leader name	Dr. Jito [REDACTED]
Project website/blog/social media	<a href="http://cserm.unas.ac.id/">http://cserm.unas.ac.id/</a> , <a href="https://instagram.com/cserm_unas">https://instagram.com/cserm_unas</a>
Report author(s) and date	Dr. Jito [REDACTED], Qurratu [REDACTED], Christopher [REDACTED], Siti [REDACTED] [REDACTED] 30/04/2024

### 1. Project summary

The seagrass ecosystem on the tropical coast of Indonesia is a habitat with a high level of diversity and plays an important role in carbon sequestration. However, the condition of seagrass in Indonesia is under protected at the national level. Threats that put pressure on this ecosystem include anthropogenic impacts, destructive fishing, and reclamation, which can negatively affect biodiversity, including important marine species, coastline integrity, and the biodiversity of adjacent mangrove forest and coral reef habitats. One of the living creatures that is highly associated with seagrass is sea cucumber, a high-demand commodity in the market, which is also under pressure due to high exploitation, non-selective harvesting and the use of dangerous tools in fishing activities.

In the Selayar Islands, sea cucumbers are commonly caught but in a non-sustainable way. On the other hand, one of the leading sectors in Selayar, the tourism sector, is still in the recovery phase after Covid 19 pandemic. In this sector, there is also the risk of boat engine prop scarring and poor waste management. In coastal communities, there is a division of labour between men and women in marine resource utilisation activities. This condition causes women to become dependent on men.

This project will develop seagrass friendly, near-shore sea cucumber aquaculture to strengthen economic resilience and critical habitat conservation for coastal communities around Selayar Island in the Takabonerate-Selayar Biosphere Reserve, in collaboration with an established private sector partner and formal support from local government development agency.

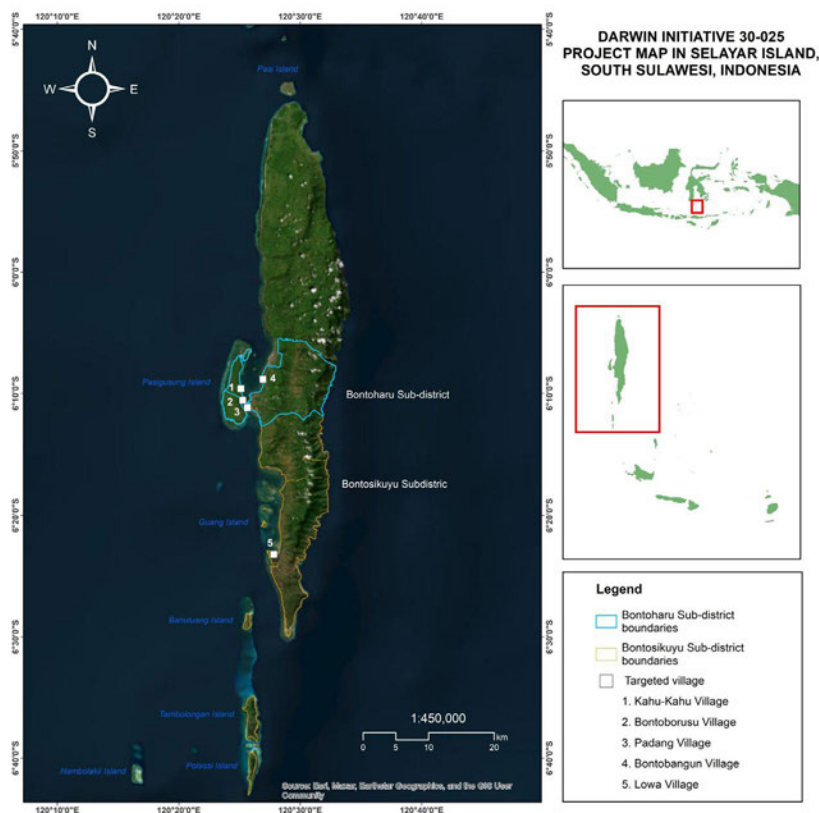


Figure 1 Project's site map

This project addresses multiple CBD targets: development of sustainable resource utilisation within a national biosphere reserve to raise awareness of biodiversity, and integrate key habitats into development. This project also provides supplementary income for local communities with an ecosystem-based approach, so that sea cucumber cultivation will reduce the impact of local global warming/climate change, reduce the impact of anthropogenic pressure, effectively regulate the near shore coastal environment while providing sustainable livelihood opportunities is critical to the preservation of this uniquely rich marine ecosystem.

This project focuses on developing sustainability in order to maximise benefits for women, capacity building to maximise economic returns based on product quality, with female community members from two family welfare empowerment associations (PKK). The project will empower local women with sustainable income opportunities in the near-shore environment, where they have traditionally harvested marine resources, and prevent the overexploitation of endangered sea cucumber species (*Holothuria scabra*) with effective management and regulation. By introducing blue carbon sea cucumber aquaculture as a vehicle for sustainable management of near-shore seagrass beds, the project will deliver tandem livelihood development and habitat conservation benefits for local communities and the wider Selayar Islands-Takabonerate Biosphere Reserve.

## 2. Project stakeholders/ partners

This project was initiated by CSERM-UNAS, the in-country lead partner, who invites all other partners to collaborate on implementation and leads coordination with other stakeholder groups including local communities, state agencies and private sector actors. Effective working

relationships have developed between all project partners, with complementary strength and skills sets helping ensure all project outputs have been achieved according to schedule. PT SPK has fulfilled all contractual obligations regarding technical assistance with the assessment and identification of suitable sea cucumber ranching sites, facilitating effective pilot project implementation, and providing sea cucumber juveniles. Heriot-Watt University has provided detailed assistance in the design and implementation of a habitat monitoring program to verify sustainable operations, and are preparing to take an increased role in sustainable scaling and management in Y2. Local communities from 3 target villages have been engaged as active participants and consultants in all project activities, contributing local knowledge and experience to the design modifications and operational innovations of the aquaculture program. Government stakeholders including the Fisheries Agency & Regional Planning & Development Agency have been involved in regular update meetings, and continue to provide both strategic advice on how best to develop a sustainable industry, as well as technical support where necessary. They are each currently engaged in developing fast-tracked support systems for developing a local-scale aquaculture economy, ahead of schedule as planned for Y3. In particular, Bappeda representatives have assisted with the publication of project materials to be disseminated through the Southeast Asia Biosphere Network, in which they play an important role.

### **3. Project progress**

#### **3.1 Progress in carrying out project Activities**

Activities listed by associated output number in Logframe

Output 1: Sea Cucumbers and Seagrass Habitat Ecology Education, Awareness Raising

##### 1.1 - Seagrass habitat assessment and profiling

Preliminary habitat assessment conducted across 30 km of coastline with 2 government agencies (Marine and Fisheries Agency and Regional Planning Agency) at 6 village locations around Selayar Islands recommended for aquaculture, based on existing data and interviews with local residents in May 2023. The preliminary assessment was then presented in [the 8th Indonesia Biotechnology Conference \(IBC\)](#) in the same month. [A visit to sea cucumber aquaculture site in Southwest Papua](#) was conducted to learn about integrating aquaculture activity with ecotourism.

In June 2023, FGDs conducted with representatives of 20 villages and fisheries extensive workers to gather information about the condition of seagrass beds (including outlining project aims), particularly with regards to the presence of sea cucumbers, gleaning and other coastal economic activities. The FGD resulted in 28 potential locations identified across 20 villages for preliminary profiling ([FGD mapping - recommended locations](#)). Following the FGD, subsequent analyses of substrate, seagrass species, tidal currents and potential predators were conducted during June-July 2023 at the recommended locations and the potential locations were narrowed to 5 priority locations.

In-depth ecological surveys of identified target sites for aquaculture development at five sites in four villages (Bontolebang, Bontoborusu, Lowa and Kahu Kahu (2 sites)) in August-September 2023 alongside PT SPK, including quantified seagrass density and growth rates, biosurvey of benthic fauna, and chemical/physical analyses of water and substrate ([baseline data - substrate, seagrass](#)). This data confirms site selection for aquaculture development and provides baseline environmental data to establish positive/negative environmental impact of sea cucumber aquaculture. The data was also presented in the Wallace Science Symposium at Hasanuddin University in August 2023.

Seagrass habitat assessments continued in October 2023 based on refined methodology and established operational procedure with assistance from HWU. From five sites surveyed in August and September, habitat assessments were conducted at two recommended sites, one experimental site, and two additional new experimental sites. The addition of these two sites was due to the similar characteristics of the substrate type (muddy sand, predominantly mud) with the ecosystem adjacent to the mangrove forest. Seagrass habitat data becomes a baseline for targets for improving ecosystem health referring to outcomes ([habitat seagrass assessment - Oct 2023](#)).

## 1.2 - Production of education/engagement materials

In August to September 2023, our team compiled data from target aquaculture development sites to present a summary profile of each location, and provide insight to local residents about why certain sites are selected over others. We also prepared simplified project outline leaflets and flyers to provide to local partners (village heads, community leaders and target participants), as well as technical outline for government stakeholders, and created PowerPoint materials for community engagement meetings.

The materials prepared for the National Biosphere Reserve Conference in Makassar, February 2024, outlining the importance and potential of near-shore seagrass habitats to be utilised and managed sustainably.

In March 2024, we distributed operational and technical posters, published, and posted across all 5 village partners to provide enhanced details of ongoing operations, requirements for community partners, and intended expansion in year 2, as well as an open invitation to provide feedback and other relevant data to the project implementation team.

The education/engagement materials can be accessed through this [link](#).

## 1.3 - Women's-only project focus groups

Informal discussions were held in June to August 2023 with local residents, specifically women engaged in coastal gleaning for sea cucumbers and other marine resources. Discussions focused on identifying established methods and locations for gleaning, motivations for sea cucumber harvesting, challenges and perceptions of the economic potential and general conditions of social, economic and household welfare. Our team also conducted interviews with 70 women in 6 villages engaged in sea cucumber gleaning in to establish baseline economic data and pre-empt any potential needs for additional outreach, engagement, or modification of project aims and methodologies.

Several FGDs were conducted in September and October 2023. In September, formal FGDs were conducted with 54 women participants in 2 villages identified as ideal locations for sea cucumber aquaculture as part of regular women-only meetings. The discussions focused on seagrass ecology and benefits, outlining project aims and methods, introducing preliminary framework for participation including roles and responsibilities, anticipated outcomes, time frame etc., to begin engaging potential participants in the pilot project process. At the end of September, the discussions with 47 women focused on the seagrass species found in Selayar, using the baseline data as the discussion materials.

In November 2023, female income surveys were conducted following extensive engagement with local women, predictive modelling of profitability based on operational roadmap and setting of productivity targets developed from established operational procedure. The surveys were participated by a total of 120 women from 5 villages. A site visit conducted within this month with PT SPK included an enhanced technical training session for participating women and active Q&A session.

## 1.4 - Monthly community meetings

Monthly community meetings were held every month with local communities and/or village heads in the pilot project locations. During the first quarter (May to June 2023), preliminary outreach meetings with village heads were conducted to outline general project aims and request permission for initial project surveys and associated activities. The FGDs in June also secured formal permission for project implementation across two sub-districts.

During July to September 2023, preliminary briefings and informal discussions regarding project aims and potential next steps should their villages be selected as implementation sites were conducted along with the habitat surveys accompanied by village and sub-district heads at each location. Discussions with interviews in July to August were conducted with 70 fishermen and their households to establish baseline socioeconomic data and pre-empt any potential needs for additional stakeholder engagement during project implementation. By September 2023, our team had targeted 5 village locations and held formal meetings with village heads, local neighbourhood heads, sub-district heads to secure consent for pilot study development, including detailed explanation of proposed methodology and outcomes and technical specifications for pilot.

The monthly meetings in October to December 2023 discussed the ongoing coordination with local community partners, preliminary discussions regarding ideal locations for expanded aquaculture sites in Y2, including establishing security rota, and continuing support for project aims and objectives. Discussions with the local community in the third quarter were mainly about technical matters in the construction and installation of sea pens and operations in sea cucumber grow-out, including the obstacles faced and finding solutions together.

In January 2024, village-wide discussions to develop wave-resilient and optimally-productive aquaculture operations intended to reduce maintenance burden and enhance monitoring and harvesting of cultured stock were conducted. The results of these discussions resulted in modifications to the sea pen in February. The community reported monitoring the condition of this modification and showed that the damage was less than the initial damage. In March 2024, meetings with the community also discussed the feedback from the community participating in activities for the continuity of activities and improvement of activities in the second year.

#### 1.5 - FGDs with government agencies

In May 2023, initial meetings were conducted with the Marine and Fisheries Agency and Regional Planning Agency to coordinate preliminary project surveys and secure support for project aims and methods.

From June to September 2023, coordination and information sharing with regional and local governmental bodies were conducted to ensure ongoing engagement as project stakeholders, provide details of project activities including invitations to join as observers. In September we also conducted a FGD to secure formal support and permission for aquaculture development at identified target sites.

In November 2023, a multi stakeholder workshop with regional planning and development agency was conducted, with the representatives from 5 participating villages and PT SPK to discuss ongoing project development and the role of each stakeholder in facilitating expansion in Y2. Discussions with the regional secretary and deputy regent of Selayar regarding the progress of activities were carried out in the same month.

Discussions with Bappeda and Takabonerate National Park in December 2023 were regarding the progress and challenges of project implementation, including site modifications in Lowa Village in anticipation of west season storms as a prototype for other locations as consulted with Takabonerate National Park Authorities.

Selayar Regional Planning and Development Agency [visited pilot project sites in February 2024](#), recording technical specifications and codifying approaches for replication, coordination with Biosphere Reserve Management to coordinate integration within habitat management framework.

In the meetings with Selayar Regional Planning and Development Agency in March 2024 we discussed activity plans for the second year, including requests for recommendations for activity licensing applications. Documentations on FGDs with government agencies can be accessed [here](#).

#### 1.6 - Pilot project sites established

Aquaculture pilot sites were identified at 2 participating villages, Lowa and Kahu Kahu, in preparation for construction of ranching pens in September 2023. There were also small-scale 'experimental' aquaculture sites identified at 3 further locations to establish viability for additional capacity expansion.

Output 2: 2. Participating women trained to successfully manage and operate aquaculture pilot project sites

#### 2.1 - Construct pilot project sites

September 2023 - Ahead of schedule, preliminary construction of aquaculture ranching pens has been initiated in September 2023. Materials had been purchased and organised in preparation for deployment in the field, with primary fencing columns currently under construction. Local

women participants identified at each location and project engagement initiated, registered for stage 1 pilot development. Construction took place during October 2023 and was completed in November 2023.

## 2.2 - Technical capabilities

In anticipation of community-focused technical training provided for local women in Q3, in August and September 2023 the project team participated in a series of internal training sessions with sea cucumber experts and the project's private sector partner PT SPK to prepare required materials. Topics included sea cucumber biology for target species, technical design specifications and operation requirements for aquaculture pens, wild harvesting methods, seagrass ecology analysis and species identification.

Preliminary pilot site visits in October 2023 were held by a total of 8 women to observe and understand the sea ranching model, including demonstration and hands-on training of monitoring and maintenance activities. Initial workshops related to raising sea cucumbers and designing and installing sea pens. [Workshop materials](#) were prepared by Lisa Indriana as the sea cucumber biology specialist and the Field Team, as well as discussions with PT SPK. The technical capabilities included in the workshop include sea pen maintenance and monitoring sea cucumber growth. The five villages took part in this training, and the total participants were 8 women and 12 men.

Enhanced training workshops provided by PT SPK in December 2023 for women participants, ongoing review of monitoring and maintenance activities for the pilot project women group. Sites maintained well, algae growth controlled and no evidence of either damage or disruption.

In December 2023, sea cucumber juvenile stock delivered from Lombok, acclimatised and distributed to pilot sites. Survival rates in transit suboptimal (est. 20%) leading to additional stock delivery planned in January 2024. Ongoing monitoring of initial ranching stock. 24/7 security monitoring in place for all pilot sites.

Sea cucumber accompanied a monitoring program transferred to increased local autonomy, weekly support and coordination with the project field team in January 2024. Training provided for construction, repair and addition of supplementary ranch netting.

In March 2024, training expanded for pilot project participants to include harvesting and processing of sea cucumbers, preparation for market and storage. A total of 22 participants participated in the training, as well as the following skills evaluation & assessment.

## 2.3 - Modify and refine pilot project operations

Site visit to PT SPK sea cucumber aquaculture facility in Lombok in August 2023 to review successful implementation of aquaculture methodology, site conditions etc by field team members. Designs for aquaculture ranching pens modified and adapted based on locally available skills and materials for the Selayar context in preparation for construction.

In November 2023, PT SPK did a site visit to assess technical parameters of pilot site construction and provide enhanced technical advice regarding maintenance and monitoring, as well as preliminary identification of [target expansion sites](#).

Modification was done in December 2023 to net size and construction of additional layers to prevent escape of cultured sea cucumbers and predation by identified problem species (crabs).

In January 2024, the second delivery of juvenile stock from PT SPK with enhanced monitoring and coordination with the project field team, resulted in limited improvement to survival rate (approx 30%). Two locations (Kahu Kahu & Bontobosuru) restocked because of concerns over escape/poor survival rate (less than 30% of total stock identified through monitoring program). More resilient sea pen designs collated and discussed with local community partners.

Comprehensive review of stocking, rearing, harvesting, processing and storage operations to date, in order to establish predictive Y2 modelling and implement corresponding activities framework was conducted in February 2024. Post-storm repairs carried out on existing pilot sites and initial modifications fitted/constructed. Expanded sourcing for sustainable supply of juvenile sea cucumbers as a potential alternative to deliveries from Lombok, including restoring facilities on Selayar itself.

Modified ranching pilot designs installed in Lowa village in March 2024, to be assessed when weather permits to ensure structural integrity, and FGDs with all participating villages to secure formal permission for aquaculture site expansion. Preliminary discussions with the National Research and Innovation Agency, to establish a hatchery program on Selayar island itself, survey and assessment of available facilities.

During project implementation in the first year we encountered the following issues/problems:

Technical equipment purchase - delays in procuring a made-to-order water quality tool unavailable domestically forced the preliminary habitat survey (for aquaculture suitability) and detailed ecosystem profile (to measure impacts) had to take place separately, however this was remedied by adjusting the schedule of other activities to avoid wasted time/resources.

Administrative challenges - identifying specific jurisdictions for a complex, intersectoral project presents some challenges in Indonesia. In order to ensure maximum participation permission/support was secured from a wide range of government bodies at the provincial, district and local level.

Scale of seagrass habitat - ideal aquaculture development conditions (including seagrass health, ease of access, protection from tidal surges etc.) at individual target sites concentrated in specific areas. This will be addressed by the preliminary construction of 3 'experimental' sites to establish viability at additional locations before expanding activities and full participant numbers.

Local conservation zone - one target site for aquaculture development has been established as a community-based conservation zone, so in order to avoid overlap and potential conflict of interest, additional pilot sites have been identified.

Economic surveys - challenges associated with the reliability of sensitive income data provided by participants has precipitated a multi-parameter approach incorporating survey responses, government census data and in-kind calculations of economic contribution to establish baseline participant income.

Nearby settlements - access to marine resources between different villages is an occasional cause of conflict, with non-participating villages under no obligation to support or engage with the aquaculture development process. Discussions with local law enforcement, island-wide information sharing campaigns and direct outreach will be used to anticipate any potential conflict.

Logistics costs - changes in the domestic logistic network have increased the cost of transporting sea cucumber juveniles from PT SPK hatchery, undermining profitability. During the feasibility study demonstrating ideal ecological conditions, additional options will be explored for business development, including: alternative courier/logistics services, alternative sources of sea cucumber juvenile, high-value processing on Selayar to increase sale price.

Staff change - due to unforeseen health complications, one member of the secondary partner team (Michael Bell) from Heriot Watt University, UK, will no longer be able to participate in the project. His workload and compensation will be distributed between the two remaining team members as agreed via formal change request.

## **3.2 Progress towards project Outputs**

### **Outputs:**

#### **1. Education and awareness raising of the importance, ecology and economic potential of seagrass beds provided to local communities as a precursor for pilot projects**

Ongoing consultation with community and government partners, including focused information sharing forums and training workshops have been conducted to ensure harmonisation in understanding of project aims and activities. Total of 5 village partners and the regional government had given permission to conduct habitat survey and develop aquaculture pilot sites ([village partners agreement](#)). Printed materials, banners and posters remain in place in key locations, with field team members available to respond to questions and provide additional

information where necessary. In the third quarter, our team also [collaborated](#) with a local NGO in Selayar, Selayar Bebas Sampah Plastik (SBSP - Selayar Plastic Waste Free), that focuses on the issue of plastic waste to raise awareness of the importance of preserving coastal ecosystems, as well as publicising the sea cucumber cultivation activities through visits to four secondary schools (including one located at the pilot project site) and a talk show. Support and permission for pilot projects with these aims was secured on schedule, with pilot projects ongoing according to plan within these parameters.

## **2. Participating women trained to successfully manage and operate aquaculture pilot project sites**

At the end of Y1, a first batch of 8 women participants had been trained in the successful management and operation of aquaculture pilot project sites, demonstrated by ongoing capability to maintain and monitor individual sites by women's groups in each location, as confirmed by skills review conducted in March 2024. These first batch participants will be leveraged in Y2 to support an expanded training program for 120 individuals, where their skills and experience will serve as a secondary resource for new participants alongside formal training sessions conducted by project implementation team and associated experts. Stage one participants demonstrated average knowledge and skills regarding sea cucumber cultivation, with an average score of 91.47%.

## **3. Pilot sites expanded into full-scale sea cucumber ranches managed by participating women at Stage 2.**

Based on the successful establishment and operation of pilot aquaculture sites in project Y1, expanded full-scale sea cucumber ranching operations are ready to be implemented in project Y2, with scaled infrastructure constructed alongside an expanded training program to ensure increased capacity to stock, rear and harvest sea cucumbers from sustainably-operated sea pens. Skills assessment results demonstrate participant capacity to understand and conduct sea cucumber aquaculture, and enhanced prospects for expanded program.

### **3.3 Progress towards the project Outcome**

#### **Outcome: Adopting sustainable sea cucumber ranching delivers a profitable supplementary livelihood as economic empowerment for local women from 120 households across 3 coastal villages and effective seagrass habitat conservation**

Profitability potential for aquaculture livelihoods has been demonstrated via established pilot projects, with minor modifications to planned commercial operating procedures and harvesting regimes to be implemented in Y2. This will achieve the main project outcome of delivering sustainable livelihood enhancement for 120 women across 3 target village subdistricts (Indicator 0.1, 0.2, 0.3). The long-term impacts of these activities on seagrass ecosystem conservation remains to be seen, but no adverse impacts have been recorded thus far by ongoing monitoring and habitat assessments. Preliminary findings suggest a positive relationship between pilot project operations on the coasts of Selayar island with healthy seagrass habitat and strong sea cucumber growth rates (Indicator 0.4). Based on the results of a survey on the income of coastal women who carry out seagrass ecosystem utilisation activities (gleaning) and family income, we are optimistic that the 120 female participants will benefit from increasing income according to the target from this sea cucumber cultivation activity. Progress indicates cause for optimistic projections towards project outcomes in Y2-Y3. Regarding the establishment of no-take zone/no prop scarring zone, community partners and state agencies have agreed to establish priority for sea cucumber aquaculture in pilot project locations. The habitat management plans will be confirmed at the end of the funding period following successful scaling (Indicator 0.5).

### **3.4 Monitoring of assumptions**

Important Risks and Assumptions from the proposal and logical framework:

Outcome Assumptions:

1. Participating women and households openly and accurately report relevant income data



Initial income reporting through survey data corroborated by discussions, interviews and monitoring of seagrass gleaning in each partner village location.

2. Participating women opt to formalise their aquaculture enterprise in accordance with government initiatives

No reason to doubt this assumption, participating women have indicated a desire to collaborate with state partners

3. No external shocks, disasters (of human or natural origin) which negatively affect seagrass ecosystem health

No incident or indication of rapid deterioration or threat, storm season did not compromise ecosystem integrity, local actors engaged in regular beach cleanup activities

4. Economic benefits of project implementation encourage participation and support for associated initiatives by wider community

strong support reported from community partners for livelihood development, including in supporting industries and services, additional villages express an interest in blue carbon sea cucumber ranching

Output Assumptions:

- 1.1 Existing interest by local community partners remains until project start date in 2023

Confirmed.

- 1.2 Seagrass habitat health remains in good enough condition to facilitate aquaculture pilot project

Confirmed according to ecosystem survey & growth analysis.

- 1.3 No conflict of interest between identified pilot sites and changes to local government development or planning agenda

Regular coordination with state partners to ensure pilot project sites continue operating, additional expansion zones identified. Regional planning and development express willingness to formally designate sea cucumber ranching in coastal land use framework.

- 2.1 Participating women are able to attend repeated training sessions and happy to collaborate on monitoring/maintenance activities

Enthusiastic participation in training sessions and monitoring confirmed by regular attendance, including by individuals not yet formally inducted into the training program.

- 2.2 Comparative data between different locations, stocking densities and other factors produce clear, actionable findings

Data recorded in the project archive has been effectively used to determine variable scaling programs, design parameters, and livelihood modelling.

- 2.3 No external shocks, disasters (of human or natural origin), theft or destruction which disrupts pilot operations

Unanticipated poor survival rate of sea cucumber juveniles transported to Selayar by PT SPK limits potential profitability and scaling of operations.

We feel that these risks and assumptions related to our outcome still remain true, with the exception of 2.3. A review of logistics parameters and juvenile costing is currently underway to determine response and/or modification of project implementation in early Y2.

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

We originally proposed the impact of effective conservation and sustainable utilisation of Indonesian seagrass beds through demonstrating the potential of near-shore sea cucumber

ranching practices as a vehicle for female economic empowerment and broader coastal resilience.

At the higher-level impact on biodiversity conservation, significant stakeholders including state agencies and participating coastal communities have become aware of the potential for sustainable utilisation of seagrass beds, and closely coordinate with project management and field team to monitor ecosystem health and ensure potential expansion of profitable blue carbon sea cucumber ranching operations in the future across several suitable locations around Selayar Island. Potential locations identified through [collaborative mapping](#) with the field team and external consultants.

Regarding our contribution to a higher-level impact on human development and wellbeing (poverty reduction), current sustainable livelihood operations remain supported by project field team and external budget inputs, and provide only minimal livelihood opportunities for local communities engaged in pilot project security, logistics, construction etc. Long-term higher-level poverty reduction impacts are anticipated in Y2-Y3 following profitable scaling of aquaculture operations.

#### **4. Project support to the Conventions, Treaties or Agreements**

In addition to aligning with a wide range of international agreements, as translated into Indonesian law by decree of parliament, this project also supports several domestic policy making initiatives in the field of wildlife conservation, sustainable resource utilisation & habitat management. This includes the National Strategic Action Plan published by the General Directorate for Conservation of Natural Resources and Ecosystems to develop low carbon solutions to coastal development for Indonesia's small islands in particular, and priorities outlined in the National Climate Adaptation Plan for the Marine & Coastal Sector, prioritising Combined Ecosystem-based adaptation (EbA) and community-based adaptation approaches including maintenance of a coastal greenbelt for which sea grass beds are a vital component.

The project has also been featured as part of the [Wallacea Symposium](#), where it was identified as fulfilling the critical aims of habitat conservation, sustainable economic empowerment of local communities, fighting against climate change and providing an alternative to the overexploitation of threatened species. Summary of our participation in the Wallacea Symposium is published on [our website](#).

#### **5. Project support for multidimensional poverty reduction**

The twin issues of economic deprivation and chronic vulnerability to degraded coastal ecosystems are extremely salient issues for this project's participant communities. The project beneficiaries include residents of coastal villages around Selayar Island, the largest island in the Selayar Islands-Takabonerate Biosphere reserve, which represent some of the most economically deprived communities in the province due to their relative isolation and lack of access to resources. This project specifically targets women, whose participation in the local economy remains suboptimal as they are largely engaged in purely subsistence 'gleaning' as well as some petty trading in basic necessities. This project will provide meaningful, sustainable livelihood opportunities for local women, eroding reliance on male breadwinners' income and empowering their wider communities. Sustainable in-situ sea cucumber aquaculture is predicted to increase participating women's current income by at least 100%, and provide a model for other communities seeking sustainable management of critical seagrass ecosystems. In particular, the income from these activities is intended to address periods of time in which local women are left without regular income while their husbands are away on fishing expeditions. At the current stage, sustainable in-situ sea cucumber aquaculture has been proven viable in several trial locations, and is ready to be scaled and expanded into profitable enterprise by the end of project Y3. Over the long term, this project will deliver improvements to the awareness and ecological understanding of local communities, as evidenced by ongoing enthusiasm for and participation in education and training programs, as well as enhancing empowered custodianship of communities over their immediate coastal environment. As well as directly providing sustainable

income from blue carbon sea cucumber aquaculture, sustainable management of this critical near-shore coastal ecosystem will provide a wide range of other ecosystem services, including increased yields from adjacent gleaning activities, enhanced biodiversity in the surrounding waters, and resilience against wave erosion which threatens low-lying villages.

## 6. Gender Equality and Social Inclusion (GESI)

Promoting female empowerment is a central focus of this project, with education, training, livelihood development and ownership all directed primarily towards female participants (outcome indicator 0.1, 0.2, 0.3; output indicator 2.1, 2.2). The poverty-reduction impact of this project is specifically intended to address current inequalities between male and female economic participation, by developing women-owned sustainable livelihoods to empower women as custodians over the near-shore environment which they have traditionally relied on for subsistence gleaning. Providing additional income to women enhances their economic decision-making and supports improved household welfare for dependants. Documentation on activities involving women can be accessed at the following [link](#).

Please quantify the proportion of women on the Project Board <sup>1</sup> .	50% of project board women, including project manager, finance officer, and sea cucumber expert
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 <sup>2</sup> .	HWU: team led by woman (Joanne █████) (50%)

GESI Scale	Description	Put X where you think your project is on the scale
<b>Not yet sensitive</b>	The GESI context may have been considered but the project isn't quite meeting the requirements of a 'sensitive' approach	
<b>Sensitive</b>	The GESI context has been considered and project activities take this into account in their design and implementation. The project addresses basic needs and vulnerabilities of women and marginalised groups and the project will not contribute to or create further inequalities.	
<b>Empowering</b>	The project has all the characteristics of a 'sensitive' approach whilst also increasing equal access to assets, resources and capabilities for women and marginalised groups	
<b>Transformative</b>	The project has all the characteristics of an 'empowering' approach whilst also addressing unequal power relationships and seeking institutional and societal change	X

<sup>1</sup> 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.

<sup>2</sup> 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.

## **7. Monitoring and evaluation**

As outlined in the project logframe, all activities contributing to the delivery of specific outputs are designed to ultimately contribute to the project outcome, namely reduction in poverty and enhanced conservation of critical seagrass habitat. The project activities and outcomes are designed in a systematic way, whereby education and skills enhancement is conducted in tandem with scientific research and aquaculture pilot projects to ensure that in Y1 and Y2 all project partners and participants possess the knowledge and capacity to establish genuinely sustainable enterprises with sufficient profit margin to make a significant impact on the economic status and empowerment of participating communities, and women in particular. Confirmed delivery of specific outputs is measured against anticipated long-term impacts to ensure all project activities are coordinated towards a coherent outcome, as outlined below:

Successful delivery of training and education programs was initially measured by participation levels and individual participants' capacity to demonstrate understanding of key concepts and ideas, but has since been replaced by demonstrated capability to manage and maintain in-situ sea cucumber aquaculture pilot sites. 5 pilot sites are currently in operation, with an initial batch of participants to be expanded in year two to a total of 120 individuals. Current participants will be enlisted to provide secondary guidance and training to their peers, as well as support and feedback to project management regarding the operation of expanded aquaculture sites at larger scales. Successful rearing and harvesting of sea cucumbers at commercially viable levels, including minimal repair and maintenance costs outside of unanticipated external shocks, will be used as the primary measurement of success for this metric, to be replaced by quantitative income analysis during the profitability scaling program Y2-Y3.

The skills enhancement and livelihood development program is conducted in tandem with ongoing habitat assessments to ensure long-term ecological integrity as the foundation for genuinely sustainable livelihoods over the medium-long term. These comprehensive assessments are based on a range of relative metrics, including benthic biodiversity and abundance, seagrass growth rates, sediment and water quality. The results of these assessments, with seasonal fluctuations and natural variability in natural environments accounted for, will be used to inform predictive models of long-term change in the seagrass bed environment as a result of project activities, to ensure no negative impacts which threaten ecosystem integrity, and confirm the positive impacts associated with increased sea cucumber abundances fulfilling the species' role as critical ecosystem engineers. These surveys will also be used in combination with market surveys and reporting by local partners engaged in the collection and sale of wild sea cucumbers, to monitor wild sea cucumber populations and ensure the long-term conservation of these endangered creatures in and around pilot project sites and across Selayar island more widely.

M&E for this project is coordinated primarily by CSERM-UNAS, which provides regular updates to all implementation partners via weekly online meetings and dedicated review forums conducted over 1-3 days each quarter. HWU assumes specific responsibility for supporting seagrass habitat assessment and monitoring sustainability parameters for livelihood development. M&E for stocking and harvesting of individual aquaculture sites has been enhanced over Y1 from quarterly to monthly monitoring on key variables including total stock, stock per square metre, survivability and harvest rates, sale price at market and livelihood capacity, to ensure all activities are harmonised towards the delivery of target outcome at project end.

## **8. Lessons learnt**

Overall project implementation was conducted successfully and according to plan, with community engagement, stakeholder coordination with various government agencies, training and skills enhancement and aquaculture pilot operations all being implemented smoothly with minimal disruption to established schedules, activities or outputs. A weakness in the proposed implementation mechanism was identified in the restocking mechanism reliant on regular provision of sea cucumber juvenile by PT SPK from their hatchery facilities on the island of Lombok. Initial deliveries of live sea cucumber stock produced survivability rates well below

anticipated levels, increasing the cost per unit and undermining the potential profitability of expanded operations in Y2. Supplementary deliveries were closely monitored and conducted with enhanced provisions specifically to increase survivability rate, but remain below target levels, with alternative juvenile provision mechanisms currently being discussed by project implementation partners and additional stakeholders in the state and private sector. Those intending to implement similar projects in the future would be advised to trial external provision of sea cucumber juvenile with small-scale deliveries initially to identify unforeseen issues with survivability and logistical capacity, or source juvenile through an independent hatchery program implemented locally to project implementation sites. Y2 project implementation will pivot focus in Q1 towards securing a more reliable source for sea cucumber juvenile to facilitate effective profitability projections, including establishing a local hatchery pilot program, developing sustainable harvesting regimes for wild-caught sea cucumbers to be reared and reproduced via a captive breeding program, and links with additional private sector partners. Independent provision of juvenile for aquaculture operations will produce additional sustainable livelihoods, reduce the cost of production per unit, and further enhance capability and capacity towards sustainable livelihoods for coastal villages on Selayar Island.

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

N/A. This report is our first annual report for the first year of the project.

## **10. Risk Management**

Compared to preliminary analyses conducted by CSERM-UNAS and PT SPK, unreliable survival rates for sea cucumber juvenile in transit from PT SPK facilities to project location in Selayar present a delivery risk to the profitability of expanded in-situ aquaculture operations by increasing the potential cost of production per unit (fewer individuals surviving the relatively expensive transit), and undermining the predictable modelling of production by leaving sea ranching pens at suboptimal capacity. This risk impacts the successful delivery of sustainable livelihoods for the target number of participating women (120 women producing 100% increase in seagrass-derived income).

Adaptations to the project design are currently being coordinated between delivery partners, with potential options in early Y2 including: increasing the supply of stocked sea cucumbers from wild-caught local sources with an integrated breeding program, reducing the wild population impact from existing wild collection by ensuring reared individuals have a chance to breed before being harvested for sale; establishing a local pilot hatchery on Selayar island in coordination with the local fisheries agency, who are currently in possession of a disused hatchery facility and have expressed formal willingness to assist in pilot development; expanding supply of juvenile from sources nearer to the provincial capital of Makassar. Once feasibility analyses have been completed for each potential option or combination of options, a modified implementation timetable will be submitted to Darwin-NIRAS via a formal change request prior to implementation.

## **11. Sustainability and legacy**

The sustained legacy of project impacts and activities remains a key focus of implementation and a reasonable expectation given the successful implementation of project activities at the current stage. Local community partners have sustained enthusiasm and active participation in all project activities, with participants for expanded Y2-Y3 operations already identified, briefed, and ready to be inducted into the aquaculture program. Successful trial projects have reinforced the positive perceptions of local community partners and secured permission for ongoing expansion of implemented activities.

Support from relevant state agencies has also reinforced the project's potential to deliver sustained impacts in the post-funding period, with close coordination between project management and government partners including the National Research and Innovation Agency, local Fisheries Service, and Regional Development & Planning Agency ensuring information gathered as part of ongoing implementation has been effectively shared and enhanced the

capability of these agencies to manage seagrass habitat and develop sustainable blue carbon sea cucumber aquaculture in the future. Furthermore, successful Y1 implementation has encouraged active participation by these government partners in expanding the scale and developing the capacity of aquaculture enterprises in Y2, and they have stated their intention to facilitate a hatchery pilot project in Selayar island using disused facilities currently under the management of the National Research & Innovation Agency.

## 12. Darwin Initiative identity

Support from the Darwin Initiative has been a central component of promoting the project and its activities, and the Darwin Initiative logo appears on all associated promotional and dissemination materials including: uniforms for field officers (t-shirts, hats); promotional banners and signage of field office and all field locations; informational posters and public announcements in the village hall of each participating village; digital materials used in public discussions, stakeholder meetings and when presenting project summaries in academic forums including the Wallacea Symposium, and the National Biosphere Reserve Seminar in February 2024.

All project promotional and publication materials include reference to the Darwin Initiative being funded by the UK government, including a clear Biodiversity Challenge Fund logo with an integrated union jack. The Darwin Initiative is familiar to many leading conservation groups and certain state actors in key locations where projects have been previously implemented, but is not well known among the general Indonesian public.

This project is operated as a distinct project with its own clear identity, but integrates well with CSERM-UNAS' long-established livelihood development and marine conservation work alongside communities on Selayar Island and throughout the Takabonerate biosphere. It also aligns with a range of regional planning and policy development initiatives by state agencies prioritising sustainable livelihoods within the context of enhanced marine conservation and habitat management.

## 13. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?	Yes
Have any concerns been reported in the past 12 months	No
Does your project have a Safeguarding focal point?	Yes [Inez ██████████, CSERM DSO] ████████████████████
Has the focal point attended any formal training in the last 12 months?	No
What proportion (and number) of project staff have received formal training on Safeguarding?	Past: 30% [3] Planned: 60% [6]
<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> <p>Project safeguarding procedures have been expanded to include workplace safety for construction &amp; monitoring, including requirements for monitoring team to report any safety incidents which can be anticipated in other locations and addressed accordingly</p>	

Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify.

CSERM-UNAS DOA & field team will participate in an online course centred on the safeguarding of children and vulnerable adults in Y1Q1 focused on safeguarding women in training programs prior to the expanded training workshops begin.

Please describe any community sensitisation that has taken place over the past 12 months; include topics covered and number of participants.

-

Have there been any concerns around Health, Safety and Security of your project over the past year? If yes, please outline how this was resolved.

Initial concerns regarding the necessity of nighttime monitoring activities were addressed with the provision of additional lighting, signage, sight markers, equipment including boots and headlamps, and a special training session focused on safe monitoring at night in coastal environments. Weather-based concerns including storms and strong waves were integrated into the monitoring schedule to avoid unnecessary risks on the part of participants

#### 14. Project expenditure

Table 1: Project expenditure during the reporting period (1 April 2023 – 31 March 2024)

Project spend (indicative) since last Annual Report	2023/24 Grant (£)	2023/24 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)				
Others (see below)				
<b>TOTAL</b>	<b>183,131</b>	<b>183,267.1</b>	<b>100.07%</b>	

**Table 2: Project mobilised or matched funding during the reporting period (1 April 2023 – 31 March 2024)**

	Secured to date	Expected by end of project	Sources
Matched funding leveraged by the partners to deliver the project (£)			Universitas Nasional, Heriot-Watt University
Total additional finance mobilised for new activities occurring outside of the project, building on evidence, best practices and the project (£)	-		

**15. Other comments on progress not covered elsewhere**

In line with anticipated learning and modification aspects of developing an innovative and context-specific approach to in-situ sustainable sea cucumber aquaculture, existing models of sea cucumber aquaculture as practised by PT SPK have been modified in collaboration with local community partners to enhance wave resilience and facilitate streamlined harvesting and maintenance. These modified sea pens are anticipated to increase annual productive capacity by mitigating disruption from strong tides and storm events.

Habitat assessments conducted to ensure ecological sustainability and positive conservation impact of project implementation on target seagrass habitat have been modified according to expert input from HWU and Lisa Indriana, to account for the unique coastal conditions around Selayar Island. This includes prioritising the impact of heavy rains on coastal water salinity as a predictive indicator of cultured stock growth, reducing the frequency of turbidity monitoring, given its lack of impact on sea cucumber growth rates, and developing a comprehensive habitat assessment framework which can be accessed [here](#).

Recent review of sea cucumber juvenile provision by PT SPK identified suboptimal survival and stocking rates despite enhanced precautions having been taken to ensure maximal survival of transported individuals. This compromises potential expansion of profitably scaled enterprises in Y2-Y3, and will be addressed by adapting project implementation methodology as outlined above, either through: increasing the supply of stocked sea cucumbers from wild-caught local sources with an integrated breeding program, reducing the wild population impact from existing wild collection by ensuring reared individuals have a chance to breed before being harvested for sale; establishing a local pilot hatchery on Selayar island in coordination with the local fisheries agency, who are currently in possession of a disused hatchery facility and have expressed formal willingness to assist in pilot development; or expanding supply of juvenile from sources nearer to the provincial capital of Makassar. This refined method of restocking aquaculture pens will enhance the resilience and scaling capacity of established enterprises at project end, and support ongoing expansion by additional community partners through the development of local supporting infrastructure and expanding economic linkages supporting sustainable operations.

**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 Biodiversity Challenge Funds to edit and use the following for various promotional purposes (please leave this line in to indicate your agreement to use any material you provide here).



<b>File Type (Image / Video / Graphic)</b>	<b>File Name or File Location</b>	<b>Caption including description, country and credit</b>	<b>Social media accounts and websites to be tagged (leave blank if none)</b>	<b>Consent of subjects received (delete as necessary)</b>
				Yes / No
				Yes / No
				Yes / No
				Yes / No
				Yes / No

## Annex 1: Report of progress and achievements against logframe for Financial Year 2023-2024

Project summary	Progress and Achievements April 2023 - March 2024	Actions required/planned for next period
<p><b>Impact</b></p> <p>Effective conservation and sustainable utilisation of Indonesian seagrass beds through demonstrating the potential of near-shore sea cucumber ranching practices as a vehicle for female economic empowerment and broader coastal resilience</p>	<p>Sustainable utilisation pilot projects based on in-situ sea cucumber aquaculture currently operational, community partners demonstrate increased awareness of ecological value from seagrass beds and enthusiasm for sustainable management</p>	<p>Blue carbon sea cucumber aquaculture to be expanded into profitable enterprise Y2</p>
<p><b>Outcome</b></p> <p><b>Adopting sustainable sea cucumber ranching delivers a profitable supplementary livelihood as economic empowerment for local women from 120 households across 3 coastal villages and effective seagrass habitat conservation</b></p>		
<p>Outcome indicator 0.1</p> <p>Increase in 120 participating women's monthly income from seagrass associated activities of at least 100% in year 3 compared with year 1 baseline, overall monthly income of at least 50% in year 3 compared with year 1 baseline, overall income of participating households by at least 10% in year 3 compared with year 1 baseline</p>	<p>Pilot aquaculture sites in operation, not yet at profit generation stage. Y1 baseline income data already compiled and reviewed.</p>	<p>Profitability scaling and income generation from sea cucumber aquaculture to be expanded in Y2, modified and refined Y3</p>
<p>Outcome indicator 0.2</p> <p>120 women report improved economic resilience to external shocks, increased household decision-making power and more financial independence as a result of project implementation in year 3 compared to year 1 baseline</p>	<p>Pilot aquaculture sites in operation, not yet at profit generation stage. Y1 baseline income data already compiled and reviewed, combined with interviews to establish baseline economic resilience profile</p>	<p>Profitability scaling and income generation from sea cucumber aquaculture to be expanded in Y2, modified and refined Y3</p>
<p>Outcome indicator 0.3</p> <p>At least 50% of participating women elect to continue with or expand existing 'ranching' operations as an alternative livelihood beyond the project life span</p>	<p>To be determined at the end of the project funding period. Reported enthusiasm among participating women remains high at this stage.</p>	<p>Profitable aquaculture operations to be transferred to local 'village enterprise' ownership at end of project life cycle</p>
<p>Outcome indicator 0.4</p> <p>Improved seagrass ecosystem health in and around 50m radius of sustainable 'ranching' sites ([a] seagrass growth rate increase of at least 10% compared with control sites in year 2, 20% in year 3, [b] seagrass coverage increase of at least 10% compared with</p>	<p>To be monitored throughout project implementation with final results collated at end of funding period. Preliminary findings indicate a positive relationship between pilot project operations and healthy seagrass habitat.</p>	<p>Monitoring program to continue through Y2</p>

year 1 baseline, [c] benthic macroinvertebrate abundance increase by at least 5% compared with year 1 baseline, species diversity 10% higher in year 3)		
Outcome indicator 0.5 No-take zone/no prop scarring zone established around aquaculture 'ranching' sites to protect commercial operations and associated seagrass habitat	Achieved. Community partners and state agencies have agreed to establish priority for sea cucumber aquaculture in pilot project locations. To be confirmed at the end of funding period following successful scaling.	Specific details of expanded pilot project site locations to be confirmed prior to construction Y2Q1
<b>Output 1. Education and awareness raising of the importance, ecology and economic potential of seagrass beds provided to local communities as a precursor for pilot projects</b>		
Output indicator 1.1 Formal permission to conduct habitat survey with clear intention to develop aquaculture pilot sites by local communities and government representatives following public meeting and FGD with government at the start of project	Delivered. MoU signed with 5 village partners and relevant government agencies	Completed
Output indicator 1.2 Formal permission for at least 3 aquaculture pilot sites development by local government and community members given within 1 month of habitat assessment survey, following public meeting and FGD with government	Delivered. Pilot project sites permitted and currently active following habitat assessment survey and a range of targeted public discussions with state and community partners	Completed
<b>Output 2. Participating women trained to successfully manage and operate aquaculture pilot project sites</b>		
Output indicator 2.1. 60 groups of women agree to join 12 month training program (month 12-24 of project implementation) conducted by CSERM team & PT Sejahtera Putra Kusuma.	Current pilot project participants number 8 individuals who have agreed to participate in the 12-month training program and provide additional training support to an expanded program through the process of knowledge sharing.	Ongoing
Output indicator 2.2. Participating women display key technical capabilities and knowledge within month 1 of training program in preliminary review session	Participating women have successfully completed the first assessment, demonstrating sufficient knowledge and technical skills to operate aquaculture sites semi-independently in phase 2 training	Ongoing
Output indicator 2.3 Methodology, technical designs, management practices refined and modified specifically for conditions at each site formalised (5)	Phase 1 pilot site SOP and technical designs have been established and agreed upon with implementation partners. Modified and expanded operational procedures currently in development for formalisation in Y2.	Ongoing

Output indicator 2.4 Pilot stock sea cucumbers harvested & sold successfully to private sector partner		Anticipated Q2Y2
<b>Output 3. Pilot sites expanded into full-scale sea cucumber ranches managed by participating women at Stage 2.</b>		
Output indicator 3.1 At least 75% of workshop/pilot site participants elect to participate in site expansion	Initial round of pilot project participants have all chosen to continue with program. Full capacity for expanded sites to follow modified design trials, Q2Y2	Ongoing
Output indicator 3.2 Responsibility for management and monitoring of expanded sites in accordance with sustainability SOP assumed by participating women	Phase 1 training participants have assumed responsibility for semi-independent site operation, with reduced monitoring by project field team and increased online coordination supporting monthly face-to-face coordination	Ongoing
<b>Output 4. Ranching sites developed into profitable aquaculture industry in collaboration with PT Sejahtera Putra Kusuma</b>		
Output indicator 4.1 Expanded 'ranching' sites generate ROI of at least 120% in year 3 (including initial construction costs), with sustainable harvesting regimen in place		End of project activity
Output indicator 4.2 Capacity to prepare and process sea cucumbers increased across 120 households, able to sell finished products for at least 200% year 1 baseline price per kg by year 3		End of project activity
Output indicator 4.3 Sea cucumber aquaculture established as economic development priority for Selayar District		End of project activity
<b>Output 5. Sustainable aquaculture industry transferred to local ownership and management</b>		
Output indicator 5.1 At least 50% of participants (female) in the expanded 'ranching' phase elect to take over management of the sites and associated processing activities following the end of project activities in year 3		End of project activity

Output indicator 5.2 At least 10% profits from sea cucumber aquaculture reinvested in juvenile stock and/or site expansion at 3 sites		End of project activity
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## Annex 2: Project’s full current logframe as presented in the application form (unless changes have been agreed)

Project summary	SMART Indicators	Means of verification	Important Assumptions
<b>Impact:</b> <b>Effective conservation and sustainable utilisation of Indonesian seagrass beds through demonstrating the potential of near-shore sea cucumber ranching practices as a vehicle for female economic empowerment and broader coastal resilience</b>			
<b>Outcome:</b> <b>Adopting sustainable sea cucumber ranching delivers a profitable supplementary livelihood as economic empowerment for local women from 120 households across 3 coastal villages and effective seagrass habitat conservation</b>	<p>0.1 - Increase in 120 participating women’s monthly income from seagrass associated activities of at least 100% in year 3 compared with year 1 baseline, overall monthly income of at least 50% in year 3 compared with year 1 baseline, overall income of participating households by at least 10% in year 3 compared with year 1 baseline</p> <p>0.2 -100 women report improved economic resilience to external shocks, increased household decision-making power and more financial independence as a result of project implementation in year 3 compared to year 1 baseline</p> <p>0.3 - At least 50% of participating women elect to continue with or expand existing ‘ranching’ operations as an alternative livelihood beyond the project life span</p> <p>0.4 - improved seagrass ecosystem health in and around 50m radius of sustainable ‘ranching’ sites ([a] seagrass growth rate increase of at least 10% compared with control sites in year 2, 20% in year 3, [b] seagrass coverage increase of at least 10% compared with year 1 baseline, [c] benthic macroinvertebrate abundance increase by at least 5% compared with</p>	<p>0.1a - Participating women’s monthly coastal ‘foraging’ income survey, annual</p> <p>0.1b - Participant interviews, annual</p> <p>0.1b - Participating women’s monthly income survey, annual</p> <p>0.1c - Participating household monthly income survey, annual</p> <p>0.2 - Female economic empowerment survey 2023, 2026</p> <p>0.3a - Participant feedback surveys &amp; interviews regarding successes, shortcomings, intent to continue, 2026</p> <p>0.3b - Sea cucumber ranching community-owned enterprise (kooperasi/BUMDes) membership records, 2026</p> <p>0.4a - vertical growth analysis 2023, 2026 (hole-punch method, Arnall et al. (2021))</p> <p>0.4b - annual quadrat sampling extrapolation method</p> <p>0.4c - annual biosurvey of benthic fauna</p>	<p>Participating women and households openly and accurately report relevant income data</p> <p>Participating women opt to formalise their aquaculture enterprise in accordance with government initiatives</p> <p>No external shocks, disasters (of human or natural origin) which negatively affect seagrass ecosystem health</p> <p>Economic benefits of project implementation encourage participation and support for associated initiatives by wider community</p>

	<p>year 1 baseline, species diversity 10% higher than control sites)</p> <p>0.5 - No-take zone/no prop scarring zone established around aquaculture 'ranching' sites to protect commercial operations and associated seagrass habitat (month 6)</p>	<p>0.5 - Public awareness raising materials (signage) set up by local communities around participating villages photographed</p>	
<p><b>Output 1:</b></p> <p><b>Education and awareness raising of the importance, ecology and economic potential of seagrass beds provided to local communities as a precursor for pilot projects</b></p>	<p>1.1 - Formal permission to conduct habitat survey with clear intention to develop aquaculture pilot sites by local communities and government representatives following public meeting and FGD with government at the start of project</p> <p>1.2 - Formal permission for at least 3 aquaculture pilot sites development by local government and community members given within 1 month of habitat assessment survey, following public meeting and FGD with government</p>	<p>1.1 - Formal permission for seagrass habitat assessment at 9 villages with clear intention to identify ideal aquaculture pilot sites, approved by local Planning and Development Agency and co-signed by village heads in each location following public meeting with citizens</p> <p>1.2 - Formal letter of support for pilot project development with clear intention to expand successful sites at 3 village locations, approved by local Planning and Development Agency and co-signed by village heads in each location following public meeting with citizens</p>	<p>Existing interest by local community partners remains until project start date in 2023</p> <p>Seagrass habitat health remains in good enough condition to facilitate aquaculture pilot project</p> <p>No conflict of interest between identified pilot sites and changes to local government development or planning agenda</p>
<p><b>Output 2:</b></p> <p><b>Participating women trained to successfully manage and operate aquaculture pilot project sites</b></p>	<p>2.1 - 60 groups of women agree to join 12 month training program (month 12-24 of project implementation) conducted by CSERM team &amp; PT Sejahtera Putra Kusuma.</p> <p>2.2 - Participating women display key technical capabilities and knowledge within month 1 of training program in preliminary review session</p> <p>2.3 - Methodology, technical designs, management practices refined and modified specifically for conditions at each site formalised (5)</p>	<p>2.1a - Letter of commitment signed by women from participating households</p> <p>2.1b - Rota for shared monitoring and maintenance duties agreed by each group</p> <p>2.1c - Surveys demonstrating a change in understanding"</p> <p>2.2 - Preliminary skill review test score for women from group at least 75%</p> <p>2.3 - Waterproof SOP manual created for each site for reference and instructions, distributed all local participants</p>	<p>Participating women are able to attend repeated training sessions and happy to collaborate on monitoring/maintenance activities</p> <p>Comparative data between different locations, stocking densities and other factors produce clear, actionable findings</p> <p>No external shocks, disasters (of human or natural origin), theft or destruction which disrupts pilot operations</p>

	2.4 - Pilot stock sea cucumbers harvested & sold successfully to private sector partner	2.4 - At least 500x400g sea cucumbers (Holothuria scabra) harvested per chamber after 12 months' operation	
<b>Output 3: Pilot sites expanded into full-scale sea cucumber ranches managed by participating women at Stage 2.</b>	3.1 - At least 75% of workshop/pilot site participants elect to participate in site expansion  3.2 - Responsibility for management and monitoring of expanded sites in accordance with sustainability SOP assumed by participating women	3.1a - Management/monitoring agreement signed by all participants, responsibility rota established  3.2 - Attendance, rota and site monitoring report by project field officers to confirm duties carried out	Participating women are able to allocate sufficient time, and are happy to collaborate on monitoring/maintenance activities
<b>Output 4: Ranching sites developed into profitable aquaculture industry in collaboration with PT Sejahtera Putra Kusuma</b>	4.1 Expanded 'ranching' sites generate ROI of at least 120% in year 3 (including initial construction costs), with sustainable harvesting regimen in place  4.2 Capacity to prepare and process sea cucumbers increased across 120 households, able to sell finished products for at least 200% year 1 baseline price per kg by year 3  4.3 Sea cucumber aquaculture established as economic development priority for Selayar District	4.1 - Survey of net ranching income per village 2023-2026  4.2a - Sea cucumber sale price survey, 2023, 2026  4.2b - Training course attendance certificates  4.2c - Participant survey indicating shift in perception of value and skill capacity  4.3a - Letters of support from district head, planning and development agency, local industry partners, commitment to collaborate towards developing the industry  4.3b - Supporting policy framework adopted by district government	No external shocks, disasters (of human or natural origin), theft or destruction which disrupts expanded site operations or secondary processing activities  Market price fluctuations limited to within 50% of year 1 baseline
<b>Output 5: Sustainable aquaculture industry transferred to local ownership and management</b>	5.1 - At least 50% of participants (female) in the expanded 'ranching' phase elect to take over management of the sites and associated processing activities following the end of project activities in year 3  5.2 - At least 10% profits from sea cucumber aquaculture reinvested in juvenile stock and/or site expansion at 3 sites	5.1 - Act of registration for 3 village-owned enterprise to take over site management and sea cucumber processing with at least 50% of project participants (female) registering as members at the end of year 3.  5.2 - Enterprise financial reporting end of year 3	Improved livelihoods encourage women to seek higher ROI from sea cucumber ranching



**Activities** (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

Output 1:

1.1 - Seagrass bed biosurvey to establish baseline ecological data (species composition, diversity, seagrass coverage & growth rates) for education and awareness raising program

1.2 - Printed / digital materials created for dissemination among all local parties

1.3 - 12 (4x3) women's only focus groups to identify gender-specific concerns, establish support for project development and participation, and receive feedback for modifying approach in line with local women's concerns

1.4 - 12 (4x3) monthly community meetings introducing project approach and objectives, receiving feedback for modifying approach in line with local community concerns

1.5 - 3 monthly FGDs with local government agencies introducing project approach and objectives, receiving feedback for modifying approach

1.6 - Collaborative mapping of potential study sites in order to identify ideal locations for considering the interests of all parties

Output 2:

2.1 - Construct 9 (3x3) 16m<sup>2</sup> pilot project sites at specified locations, stock with juvenile sea cucumbers ( density: 3/m<sup>2</sup>)

2.2 - Hold 48 weekly workshops over the course of 12 months to engage local women in the process and provide basic training regarding monitoring, maintenance and harvesting practices

2.3 - Modify pilot operations based on data from each site to maximise productivity, produce SOP manual for local women

2.4 - Harvest, process and sell sea cucumbers from pilot sites, record weight, age, health and price

2.5 - 3 focus groups with participating women to give feedback about project implementation, provide any additional information, and prepare for site expansion

Output 3:

3.1 - Elect local women's group coordinator for each village to manage maintenance and monitoring responsibilities for expanded sites

3.2 - Construct new expanded ranching sites (size based on pilot site data), stock with juvenile sea cucumbers (density based on pilot site data)

3.3 - Establish work rota for monitoring, maintenance by participating women

3.4 - Monitor and maintain expanded sites for 9-12 months until first round stock reach weight of 450g, restock juveniles at determined intervals

3.5 - Weekly site visits by field officers to assess progress for reporting, give feedback and technical support, and identify potential issues

Output 4:

4.1 - Monthly preparatory workshops for participating women on preparation and processing of sea cucumbers for buy-back model

4.2 - Quarterly FGDs with local government and industry partners to identify and prepare necessary physical, institutional or regulatory infrastructure for developing sea cucumber industry

4.3 - Harvesting of ready stock, processing and selling sea cucumbers from expanded sites, recording weight, age, health and price conducted by participating women for profit with assistance from field officers

4.4. - Net ranching income surveys & sea cucumber price surveys conducted by field officers

4.5 - Bi-weekly monitoring and reporting of site operations, stock development by field officers

Output 5:

5.1 - Monthly monitoring of site operations by field officers, reporting of data collected by participating women

5.2 - AD/ART (articles of association) meetings held to establish 3 Women's cooperative village enterprise (BUMDes) SOP and operational structure

5.3 - Ceremony formally transferring management and operation of ranching sites, coordination of processing activities and sales to BUMDes

## Annex 3: Standard Indicators

Table 1 Project Standard Indicators

DI Indicator number	Name of indicator	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
DI-D02	Number of people whose disaster/climate resilience has been improved (income).	People	Women	0	0	120	0	120
DI-B10	Number of individuals / households reporting an adoption of livelihood improvement practices as a result of project activities	People	Women	0	8	120	0	120
DI-B10	Number of individuals / households reporting an adoption of livelihood improvement practices as a result of project activities.	Households	None	8	30	60	8	60
DI-D01	Stabilised/ improved species population (relative abundance/ distribution) within the project area.	Increased Abundance/ Distribution	Seagrass	-	-	-	-	
DI-B01	Number of new/improved habitat management plans available and endorsed	Number	Management Plans	3	3	5	3	5
DI-A07	Number of government institutions/departments with enhanced awareness and understanding of biodiversity and associated poverty issues	Number	Government Agencies In Selayar	3	3	4	4	3
DI-A07	Number of government institutions/departments with enhanced awareness and understanding of biodiversity and associated poverty issues	Number	Government Agencies in Selayar	3	3	4	4	3
DI-A01	Number of people from key national and local stakeholders completing structured and relevant training	People	Women	8	60	120	8	120
DI-A04	Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.	People	Women	8	60	120	8	120
DI-B04	Number of new/improved sustainable livelihoods/	Number	None	0	3	5	5	3

DI Indicator number	Name of indicator	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
	poverty reduction management plans available and endorsed*							
DI-B08	Taxa (Flora/Fauna/Fungi); Standard used; Product Type.	Number	Stock	0	n/a	n/a	0	n/a
DI-B07	Number of people participating in community-based management groups and/or Payment for Ecosystem Service schemes.	People	Women	8	45	90	8	120
DI-B04	Number of new/improved sustainable livelihoods/ poverty reduction management plans available and endorsed*.	Number	Management Plans	3	3	5	3	6
DI-A11	Number of individuals / households reporting an adoption of livelihood improvement practices as a result of project activities.	Percentage	Profit ROI	0	60	120	0	n/a
DI-A04	Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.	People	None	22	60	120	22	120
DI-B12	Number of policies developed or formally contributed to by projects and being implemented by appropriate authorities.	Number	Policies	0	0	1	0	1
DI-B10	Number of individuals / households reporting an adoption of livelihood improvement practices as a result of project activities.	People	Women	0	0	60+	0	60+
DI-A11	Number of sustainable livelihood enterprises that are profitable	Number	Enterprises	0	0	3	0	3

**Table 2 Publications**

<b>Title</b>	<b>Type</b> (e.g. journals, best practice manual, blog post, online videos, podcasts, CDs)	<b>Detail</b> (authors, year)	<b>Gender of Lead Author</b>	<b>Nationality of Lead Author</b>	<b>Publishers</b> (name, city)	<b>Available from</b> (e.g. weblink or publisher if not available online)

## Annex 4: Onwards – supplementary material (optional but encouraged as evidence of project achievement)

### 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 <b>correct template</b> (checking fund, type of report (i.e. Annual or Final), and year) and <b>deleted the blue guidance text</b> before submission?	yes
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> putting the project number in the Subject line.	yes
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:BCF-Reports@niras.com">BCF-Reports@niras.com</a> about the best way to deliver the report, putting the project number in the Subject line.	no
<b>Have you included means of verification?</b> You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	yes
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see Section 16)?	no
Have you involved your partners in preparation of the report and named the main contributors	yes
Have you completed the Project Expenditure table fully?	yes
Do not include claim forms or other communications with this report.	