IFAD
Investing in rural people

IMPACT ASSESSMENT PLAN

Republic of Indonesia

Coastal Community Development Project (CCDP)

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Cavatassi, R., Brueckmann, P., McCollum, K., Mabiso, A., 2018. Impact Assessment Plan: Coastal Community Development Project, Republic of Indonesia. Rome: IFAD.

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1. Introduction

In the Republic of Indonesia, the largest archipelago on earth with the second largest coastline in the world (CIA 2018), 2.5 million households are engaged in capture fishery and aquaculture (BPS 2015), producing 22.2 million tons of fish annually, which corresponds to about 11% of the world's total production (World Bank 2018). Fishery and aquaculture is of ever increasing importance to the Indonesian agricultural sector as well as to the overall economy, witnessing a stable and high growth rate since the year 2000 (FAO, 2012; BPS 2015). In 2011, when IFAD's Coastal Community Development Project (CCDP) was designed, Indonesia produced 12.2 million tons of fish, of which small-scale fishers accounted for 92% of the production.

Both capture fishery and aquaculture are important sources of food for Indonesia's 237 million people and essential to livelihood in about 10,000 coastal villages and small islands across the country, where the vast majority of the poor are located. About sixty-five percent of the Indonesia population lives in coastal areas or on small islands. Both sectors, aquaculture and capture fishery, contribute to food as well as nutrition security (Belton and Thilsted 2014, Béné et al. 2016) and foster employment in the primary as well as secondary production sectors at the local and national level (Schuhbauer and Sumaila 2016, FAO 2016, Dyck et al. 2010).

Nevertheless, capture fishery and aquaculture households in Indonesia face several challenges to improve their production and overall wellbeing. Whereas they constitute a vast renewable natural capital and source of economic growth, effective and sustainable management presents a substantial challenge. Moreover, most of the fishers living in coastal villages and small islands rely on a low income and low standard of living (FAO 2014), they lack access to advanced technology and gears for fishing (Schuhbauer and Sumaila 2016), have limited access to financial resources (FAO 2014) and are especially exposed to weather variability and extreme climatic events (Cheung et al. 2009, Troell et al. 2014). These challenges in turn have severe implications on fish stock in these regions. Weak or non-existing fishery management plans; illegal, unreported and unregulated fishing practices (IUU), combined with natural and human-induced coastal reef and marine habitat degradation; land-based pollution and human clearing of coastline trees and shrubs (e.g. mangrove); natural hazards etc. led and will further lead to severe fish stock depletion and catch potential (Edinger et al. 1998, FAO 2014, Graham 2014, Varkey et al. 2010). This all implies lower fishing yields and decrease in fish productivity (Pratchett et al. 2014).

CCDP in Indonesia had the objective of addressing several of these challenges through enhanced, sustainable and replicable economic growth among the active poor in coastal and small island communities. To this end, the project aimed to address constraints to small-scale fishery communities by increasing fish catching and fish productivity and income through improvement of fishing gears and fishing practices and increasing

participation in high-potential value chains. The project also aimed at rehabilitating coastal and natural resources.

Project activities are closely linked to the Strategic Plan 2010-2014 of the Indonesian Ministry of Marine Affairs and Fisheries (KKP) and the new Village Law from 2014 in particular, which aims to strengthen the local governance and to implement village groups and projects, including agricultural and natural resource management projects, with on average USD 122.000 per year (World Bank 2015). The project outcomes are also aligned to the strategic objectives (SO's) of IFAD: increased rural people's productive capacity (SO1), increased access to market (SO2), greater environmental sustainability and climate resilience of rural people's economic activities (SO3) and improved nutrition and gender balance.

The project had a total cost of US$43.2 million and was implemented in 181 villages within 12 Districts (+ Bali) throughout Indonesia. It was approved in October 2012 with project implementation lasting over five years, starting in January 2013 and project completion on the 31st of December 2017. The KKP serves as the Project's Executing Agency while the CCDP activities at the district level are implemented by the Dinas Kelautan Dan Perikanan (DKP).

The CCDP has been selected to be evaluated using a rigorous ex-post impact assessment design and provide insights on the impact of CCDP activities on small-scale fisheries and aquaculture households as well as the local economy and natural resource base in the project areas. The impact assessment of CCDP takes place at an opportune time for IFAD, for regional and national institutions in Indonesia as well as for the scientific community. First of all, results of this impact assessment will measure the effects of the project on its key indicators in addition to understanding mechanisms that allowed it to achieve its impacts and the barriers encountered. As such, results will generate lessons that inform the design, implementation and monitoring of new IFAD fishery and coastline rehabilitation projects but also inform replication or scaling up of the CCDP in the future (Gertler et al. 2011). Secondly, based on this impact assessment, the CCDP could serve as a good practice example for future investments in the Indonesian fishery and aquaculture sector for national and international stakeholders. Furthermore, it can inform evidence-based decision making and policy formulation, particularly considering the on-going formulation of the Medium Term National Development Plan (RPJMN) 2020-2025. Lastly, this impact assessment is one further addition to the growing body of scientific literature that investigates the impact of rural development projects. This is of special importance given scant evidence on poverty alleviation through fishery and aquaculture (Béné et al. 2015).

This document presents the outline of the impact assessment design. In the following sections, the Theory of Change (ToC) of the Project and the main IA questions shall be highlighted, focusing on specific components of the CCDP that have been selected for the IA. The third section of this document presents the overall IA design, including the construction of an appropriate control group and methodology. The sampling strategy and plan for data collection will be highlighted in section four. Lastly, the current time plan and budget information will be provided.

2. Theory of change and main impact assessment questions

2.1 Understanding the CCDP approach and its theory of change

Capture fisheries, aquaculture and related processing and trade are strategic and crucial sectors to improve the livelihood of poor small fishers and coastal communities through the provision of nutritious food as well as through increase in income and employment (Arthur et al. 2010, Weeratunge et al. 2014).

More than 90% of households that depend exclusively on fishery and fish-related activities for their livelihood live in developing countries (Béné et al. 2015). About 7.9 million Indonesian fishers are considered poor, constituting 25.1% of the total number of Indonesians living in poverty (IFAD 2012). There is an enormous diversity among the fishing communities in Indonesia, as expected with such a range of physical and cultural environments. While many coastal and fishing communities have a thriving marine economy, others face an increasing struggle to make a good return from their fishing, due to difficulty in accessing markets and in some areas due to declining catch levels. In some communities, destructive fishing and sometimes overfishing are having negative effects on the resources.

The areas of the CCDP intervention are all located in Eastern Indonesia, consistent with IFAD's strategy to focus on areas which have a high incidence of rural poverty. Within Eastern Indonesia, the project concentrates on 12 districts that represent diverse marine environments and socio/cultural contexts. Communities in these districts, while being poor, also have good resource endowments and potential to develop market access –two critical factors to carry out a transformative project that could have an impact on rural development. The aim of the CCDP was to increase incomes through improved returns from fishing and marine activities, by increasing fish harvested or captured but also linking people to the market through needed infrastructure and contractual arrangements. Last but not least the project aimed at increasing the natural resource endowments through new fishing regulations and gears but also through rehabilitation of the coastline.

Overfishing has long been an issue in Indonesia, determining negative consequences both in the short- as well as in the long-term. In the long term, overfishing combined with IUU fishing practices and the use of bombs to facilitate fishing, leads to the extinction of species and to the degradation of the coral reef and marine habitat, in the short run overexploitation of fish resources decreases the amount of catch and of diversity, which in turn decreases the income derived from their main economic activity (Agnew et al. 2009, Muawanah et al. 2012, Petrossian 2015, Varkey et al. 2010). In addition to overfishing, the deforestation of mangrove and coastlines poses another threat to the ecosystem in Southeast Asia and Indonesia in particular. Indonesia has one of the highest rates of mangrove area loss globally (Miettinen et al. 2011, Polidoro et al. 2010) mainly caused by unplanned and

unregulated aquaculture, particularly shrimp farming (Richards and Friess 2016). The conservation and rehabilitation of mangroves, the most carbon rich forests in the tropics, can help reduce carbon emissions (Ahmed and Glaser 2016, Siikamaeki et al. 2012), mitigate the consequences of weather extremes (Barbier 2006), reduces coastal erosion (Walton et al. 2006, Mumby 2006) and provides important habitat for wildlife as well as fish nurseries (Primavera et al. 2011) which in turn enhances the abundances of fish and eventually increases the catch of mangrove-dependent fish, shrimps and crabs (Das 2017, Serafy et al. 2015).

Historically, projects in Indonesia have tried to combat overfishing by investing solely on conservation. Using an alternative approach, the CCDP combines a conservation element with other social and market elements, which, when implemented together, intend to create a virtuous circle that stimulates incentives for fishing communities to protect their environment while simultaneously improving their own wellbeing.

To address environmental challenges and overcome IUU fishing practices and deforestation, the CCDP established community-based coastal resource management (CBCRM) groups for each community. The CBCRM groups received training and developed a coastal management plan at the village-level, which set guidelines on no take zones/no fishing areas, mangrove replanting and other environmental activities such as the surveillance of sea protection areas and rubbish clean up. Through the CBCRM, members of the villages were encouraged to claim ownership of the coastal waters bordering their village and to enforce resource-protecting restrictions as a community. A rotational plan for fishing areas was also established and enforced to ensure reproduction of fish and conservation of fish species.

From a mere productive and income generating point of view, the CCDP established formal groups of fishers and provided inputs to increase productivity. Groups received engines for fishing boats, allowing them to fish farther off the coast for higher value and more diverse catches (Schuhbauer and Sumaila 2016, Pomeroy and Andrew 2011). Additionally, fishing groups received training on aquaculture and materials to establish and maintain aquaculture installations in the communities' coastal waters.

To complement these activities, infrastructure groups were tasked with identifying community-wide needs for infrastructure. In many communities, the infrastructure groups established market points for sales, which could be used by multiple neighbouring communities. Markets included cooling facilities for vendors so that products could be preserved and sold even into the afternoon or in the coming days to reduce post-harvest fish losses and increase the quality of fish sold (Akande and Diei-Ouadi 2010). This last element highly contributed to determine a more stable income and reduce income volatility due to the mere seasonality of fishery. Indeed, households engaged in fishing often struggle with financial management due to the highly irregular nature of their income. Income levels vary heavily due to uncertainty related to the amount of fish harvested or caught but also to seasonality and above all due to the market related uncertainty linked to nearly non existing storage and cooling facilities (FAO 2014). During the six to eight months of the year suitable for fishing, fishing households find themselves unable to adequately stretch

their resources to cover the remaining months of the year. During fishing months, a large amount of catches is wasted due to its fast perishability, especially in small-scale fisheries (Béné et al. 2015). Post-harvest fish losses occur at all stages in the fish supply chain. Poor handling, processing, storage and distribution of fish products imply significant quantity and quality losses and therefore diminishes its value, often unexpectedly (Ahmed 2008, Akande and Diei-Ouadi 2010, Kumolu-Johnson and Ndimele 2011).

Such volatile patterns of income generation can present problems for the household, not only in their ability to financially plan, but also in their ability to avoid a cycle of debt or to repay credit. In order to smooth their income or invest in equipment for fishing, households have the option to borrow from a middle-man at high interest rates (Rosengard and Prasetyantoko 2011), a challenge that the CCDP project has addressed by promoting saving mechanisms.

Finally, the project also ensured that increased produce would be translated into higher income and gross margins by linking households to the market. This was done by establishing value chains and market access groups. Each community established enterprise groups, which received training on the production of higher value fish products so to be able to conserve the produce and to capture economies of scale in production and reduce transaction costs or ensure higher gross margins in sales. To increase sales potential, groups received health certification as well as halal certification. It is important to note that traditionally in Indonesia, male household members engage in fishing while women engage in post-harvest and marketing. In this regard the project paid special attention to engaging women in post-harvest processing and marketing so to increase women participation and income.

The logic of the project is such that each component is directly interlinked in a virtuous circle and productive manner with other components to improve the wellbeing of the beneficiaries but also to remove potential barriers and create an enabling environment for the project to work. For example, the CBCRM groups, once well trained, contribute to the economic viability of fishing groups and enterprise groups by conserving and monitoring the ocean resources necessary for each group's sustainability. Fishers groups take advantage of greater technology and healthy sea life to bring in higher value catches. Enterprise groups can purchase from fishing groups or from other nearby catches to make products that last longer and sell more widely, thus smoothing their household's income throughout the year. Infrastructure groups establish selling points used by fishers and enterprises, with facilities that allow vendors to sell for longer hours to a wider area of consumers.

These connections among various project inputs allow households not only to increase their income and make it more regular, but they provide added benefits when implemented at the group level in two ways. First, groups can pool resources and sell collectively in order to minimize transaction costs (i.e. reduce the costs of transport and time associated with marketing and have a higher bargaining power). Key informants interviewed during the scoping mission, reported that while some members of the enterprise group are in the next community selling their product, others can be marketing it via social media or phone

calls, while others continue to work in the production facility. Secondly, per project requirement, each group must include a savings mechanism in their activities (i.e. a portion of the profits from the fishers group goes into a collective pot) which needs to be reinvested to ensure maintenance, increased technology and training. Alternatively, it can be used as a loaning device for group members' individual needs. By establishing saving groups, the project not only aimed to increase the gross margin of economic efforts, but also sought to eliminate the need for high-interest loans by smoothing income and providing alternative loaning strategies.

Given the logic and the implementation approach of the project, a number of impacts are expected as summarized below:

- a reduction of poverty and increased economic mobility thanks to increased household income from higher amounts and higher-value of sales,
- a more diversified income portfolio given the number and typologies of enterprise groups and of people employed in these enterprises as opposed to an economy mainly based on fishing and fish catch;
- a higher income stability thanks to market connection and cooling and storage facilities;
- greater nutrition and food security as a result of more diversified economy sources and a more regular income.
- Increased resilience to both natural risks, thanks to rehabilitated coastline and fishing practices and to economic/financial risks thanks to more stable, higher and diversified income but also thanks to the saving groups and to better and stronger social capital.
- A stronger social capital due to the project requirements of collective actions and groupings and to the project requirement to address certain components to well established groups and to women. Given that enterprise groups are expected to directly benefit women members, the project should contribute to women's involvement in and ownership over economic activities.

The project team identified a number of unintended outcomes that were observed during the course of implementation and that may have been triggered through a local economy leverage. In addition to the clearly aimed eco-tourism activities, several tourist-related impacts are possible to occur which have not been accounted for. That includes a general increase in eco-tourism, especially due to the rehabilitation of coastline and mangroves, and the sales of processed fishery products to tourists. Further, it is possible that fishery households could increase the number of off-fishing income generating activities e.g. reting out their boats to tourists and other fishery households.

Further, non-beneficiary villages near project communities may have benefited from spill-over effects from the project. Such effects include the use of facilities and infrastructure established by the project, as well as the observation and subsequent adoption of technology, such as aquaculture, promoted by the project.

Figure 1: Theory of change

Given the theory of change of the CCDP as presented above, the Impact Assessment will focus on the following key impact questions that will help evaluate the program's effectiveness:

- Does the project translate into higher, more stable and more diversified income sources (as a whole and disaggregated by gender)?
- Does the project improve the household food and nutrition security?
- Does the project translate into increased women's participation in economic decision making and remunerated employment?
- Does the project increase resilience to natural hazard and increase mitigation potential?

It is expected that the CCDP had impacts on multiple dimensions of participants wellbeing and livelihoods. To understand the mechanisms and channels that could lead to the impact indicators, the Impact Assessment will investigate the following additional research questions.

- Does the project increase the productivity, reduced post-harvest losses and higher prices of sales?
- Does the project lead to increased savings and better access to credit, especially among women?
- Does the program translate into higher and stronger social capital through more participation in associations ?
- Does the program translate into an improvement of coastal marine resources through an increase of area planted with mangrove?
- Does the project translates into better market access through more established contracts, higher amount of sales, and reduced transaction costs?
- Does the project translates into increased resilience towards both natural as well as economic risks?

2.2 CCDP target group and selection of beneficiaries

The areas of project intervention are all located in eastern Indonesia, consistent with IFAD's COSOP and strategy to focus on areas which have a high incidence of rural poverty. The project concentrates on a limited number of districts, with diverse marine environments and socio/cultural contexts, containing communities which while poor also have good resource potential and market access.

As a first step, the project team conducted an identification exercise of all eligible areas identified using project eligibility criteria (poverty, coastal area, prevalence of income from fishery and production capacity) ending up with an initial selection of 25 districts. A screening matrix was then used for district selection that included variables related to the number of poor coastal communities and their potential for increasing incomes from fishing and marine operations (Project Completion Report, 2018). This was coupled with the selection of districts to cover a variety of geographic and socio-cultural contexts to better generate lessons learned for replicating the development models being tested. The Project also applied a targeting strategy for village and household selection.

Once overall poverty level was taken into account the project team decided to mainly focus on the eastern part of Indonesia, therefore excluding a number of originally eligible districts. At this stage project awareness campaigns were promoted in the remaining eligible districts collecting requests of interest and follow up by the selected districts who had to provide documentation to show concrete interest and political will to participate. From the answers and feedback received the project ended up with a further refinement of project districts and to a final selection of 12 districts.

The target group of poor households in coastal communities was identified by using the national definition of poverty and the village database of vulnerable households to identify a long-list of poor households.

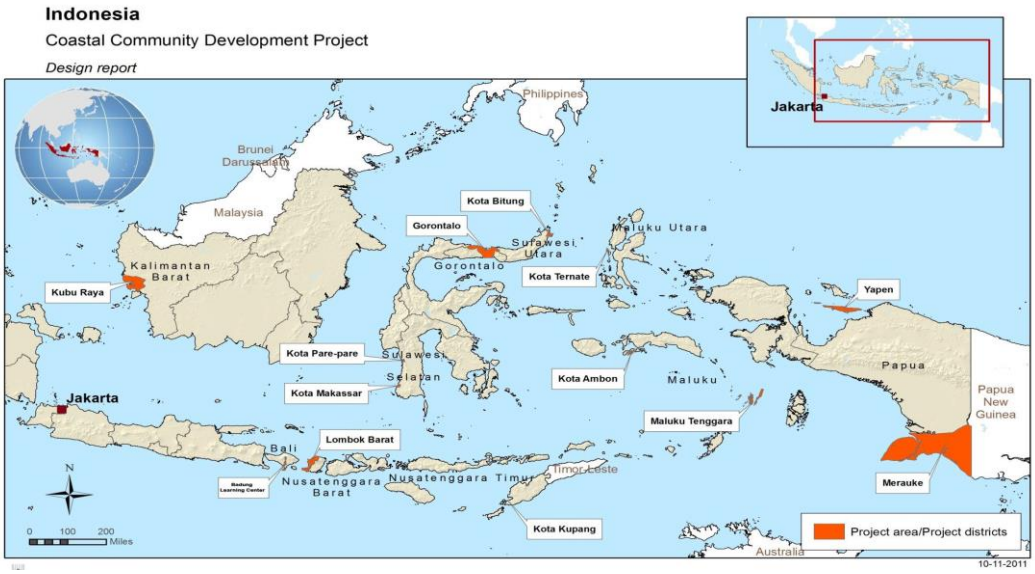
The size of the fishing boats owned by households was a major determining factor for the capture fishery groups. Numerous supervision visits to the various PIUs concur that this targeting approach has been effective in identifying poor and vulnerable households.

Around 15 villages in each district were, thus, selected with a total of 181 villages envisaged for inclusion, implying an estimated amount of 660 households within an average project village, approximately 60/75% of village inhabitants have been involved directly in project fishing, aquaculture and other marine-based activities. This has added up to a total of about 19200 households as direct beneficiaries. The household targeting strategy was designed to include five sub-groups within project-supported villages: (i) households with assets to access medium-high value marketable marine resources; (ii) households which provided labour; (iii) households with assets that allowed limited access to resources; (iv) households with very basic productive assets; the resources available to them allowed only limited opportunities to raise their incomes; and (v) households with no marine access-enabling assets and limited/unskilled labour. Given low levels of female empowerment, the CCDP also had specific gender targets seeking: (i) 30% of project participants at all levels being women; and (ii) at least two enterprise groups in each village

be comprised predominately of women with women involved in key management decisions within the group.

Given the necessary condition of selecting small islands and districts with coastal villages mainly living out of fishery activities and with good potential and will, the **pro-poor focus** has been one of the main determining factors in selection of the project communities – all selected project villages have at least 20% of households below the poverty line. Within those communities, the focus is on the active poor – those households that can make effective use of the investments made under the project with the market-based approach – and on inclusion of the poor in project activities. **Replication and scaling-up** of project activities and processes is also a key element which has influenced the selection of districts, that are located in a range of different marine and social environments, and has resulted in the physical and social diversity and geographical spread of project districts which can easily allow for replication in other districts and small islands in the future. Adoption of such an approach influences the structure and functioning of project management and imposes costs on project implementation. But, it also enables the dispersed project districts to become regional nuclei testing a range of solutions in diverse, but predominantly poor communities. This would facilitate replication and scaling up in other areas and districts in Indonesia.

Figure 1: Geographic areas participating in the CCDP project.



A replication exercise has been conducted in 2016 reproducing the same approach and eligibility strategy adopted at the beginning of the project. The replication exercise, which ended up with identification of 10 new districts for implementation of a second phase of CCDP and to 60 new villages within participant districts, will form the basis of the sampling strategy developed for conducting the Impact Assessment of the project and presented in the next section.

3. Impact assessment design

3.1 Overall approach

Given the ex-post nature of this impact assessment, the project will be evaluated using a quasi-experimental approach replicating, to the extent possible, the selection of beneficiaries that was undertaken at project implementation and combining propensity score matching (PSM) with a single difference method (that is, measuring the difference in outcomes between treatment and control after the intervention). The impact assessment design for CCDP will follow a mixed-method approach, collecting quantitative data at the household and village levels from project beneficiaries and control groups and qualitative data from beneficiaries, non-beneficiaries in control villages and key informants. The quantitative impact estimation will form the focus of the impact assessment, with the methodology consisting of a statistical matching design used to construct a robust counterfactual group of non-CCDP households. Qualitative methods are extremely useful in that they better inform identification and selection of beneficiaries as well as decision making from eligible villages or beneficiaries that lead to potential self-selection and therefore helps identify and overcome potential self-selection bias. In this regard qualitative methods are extremely useful to inform and guide sampling strategies.

Yet, at the same time qualitative methods are also extremely useful to help understand project benefits, difficulties, implementation functioning and barriers to participation and as such they are a complement to data findings but also help guide the design of the questionnaire.

With regard to the former objective, a wealth of information is already available thanks to a replication exercise that has been conducted with the purpose of scaling the project up and starting a second phase of the project. As such a number of key informants have already been interviewed and the list of districts to participate to the second phase has been provided to inform the identification of districts that will be part of the sampling strategy. Nevertheless, validation and further identification of village level will be informed and supported by further interviews of additional key informants.

In every Impact Assessment, importance is given to the selection of a control group to ensure that the both groups are truly comparable. The first stage of the quantitative data collection will involve identifying CCDP and control villages that share similar baseline characteristics related to both programme selection and outcomes. In the case of the CCDP, the programmes team conducted a replication exercise in 2016, to choose an additional 10 districts which would be suitable for a scaling up of the project. While the possibility of a second phase of CCDP is still uncertain, these districts comply with the selection criteria used for the original project districts. Thus, they constitute a good starting point for the selection of control villages for the impact assessment.

As the project was implemented relatively consistently across villages within each district, the quantitative portion of the impact assessment takes a clustered sample of treatment villages – first selecting a subsample of districts, and then randomly selecting project

villages within these districts. The selection of districts has been based on geographic location, socio-economic characteristics and number of beneficiaries to ensure representation of the project as a whole. A clear exception represents the Papua Province in East Indonesia, which has been excluded from the primary list of provinces and districts given its distinct socio-economic, geographic and cultural background compared to the other projects regions. During and following up scoping mission a key informant and validation exercise has been conducted to select treated and control districts that would be representative of the project as a whole (geographically, socially and topographically) and has determined the identification of 5 treated and 5 control districts as depicted in Table 1.

As a next step, control villages within the selected control districts will be chosen by a four-step process:

1. Obtain a list of participant villages within each selected district;
2. Narrow the villages sampled to those which comply with eligibility criteria identified during qualitative fieldwork;
3. Create matches through a propensity score matching approach[1] (at least 2 per each selected village) of villages from the control districts sample with treatment counterparts using secondary socio-economic data from SUSENAS, Indonesia's annual, national socioeconomic survey;
4. Validate matches using stakeholder input, replacing control villages when stakeholders deem them poor matches due to significant cultural or ethnic differences.

Choosing control villages from separate districts will allow to address two key issues of the assessment. First, we avoid any potential spill-over effects in our control sample that occur due to the sharing of knowledge and infrastructure between treatment villages and neighbouring villages. Secondly, we are able to assess the full scope of the project, including the project component which involved district-level infrastructure and market investments.

Finally, the analysis will draw from monitoring data collected during the project via its weekly dashboard system. From this data, higher-performing communities can be identified in order to observe differential impacts of the project based on community initiative. Further, the weekly dashboard system will help to elucidate the mechanisms of project impact, as data was collected on important details of each community's implementation such as infrastructure investments, training topics, and women's participation.

After conducting household surveys and group-level surveys in the selected treatment and control communities, the analysis will employ a mixed methods approach. We will use both qualitative and quasi-experimental methods to create a comparable counterfactual by modelling a propensity score to weigh observations according to their likelihood of treatment. This selection model will use variables that measure or proxy a household's

[1] The characteristics that will be used to perform the propensity score include: (i) poverty level; (ii) number of household residing in the village; (iii) presence and extend of coasts; (iv) number of fishing vessels; (v) nr and types of income sources; (vi) primary schools in the village; (iv) number of health centers in the village;.

selection into the program, according to findings from the qualitative fieldwork and feedback from project stakeholders.

The project was officially completed on the 31st of December 2017. However, due to internal policy changes, implementation of the project was significantly stalled, and in some cases halted, from early 2017. As data collection will be conducted during August of 2018, we will be assessing the impact of the project approximately one and a half years after project activities ended.

Finally, once the final validated list of control villages is put together, the complete list of households residing in those communities (name, surname and address) will be provided by the facilitators for project villages and local authorities for control villages. Treated and control households to be surveyed will be randomly selected among those based on the calculated sample size.

Considering that about 60/75% of village inhabitants participated to the project, it is very likely that some of the activities implemented through the project generated positive effects for both direct beneficiaries, and other non-beneficiaries living in the same village through the economic leverage and the infrastructure component of the project. As a result, village inhabitants who did not benefit from CCDP directly might have received the benefits indirectly. These households can be considered as indirect project beneficiaries and are important to measure potential spill-over effects.

The impact assessment will therefore focus on three different groups of households:

1. Direct beneficiaries (treatment group);
2. Non-beneficiaries in non-treated villages (control group);
3. Indirect beneficiaries: non-participants living in participant villages.

As for the indirect beneficiaries in each treated village we will select about 25% of the total sampled households from the list of inhabitants that did not directly participate in the project to ensure overall statistical power. A propensity score matching procedure conducted at household level, after the data are collected ,will allow the matching of households between treated and control villages. Moreover we expect to capture the main indirect effects produced by the project by including specific questions in the household and village questionnaire to investigate whether there were new activities/businesses implemented by non-participants thanks to the presence of the project, which may have led to favourable employment opportunities and income increases.

3.2 Quantitative sampling strategy

There are two aspects to consider for the sampling strategy of this impact assessment. First, the sampling strategy must ensure that the villages and household sampled are representative of the project. Second, given that we will use the statistical matching to produce the impact estimates, the treatment and control households sampled should be similar enough that high-quality matches can be produced. In terms of achieving representativeness, this impact assessment aims to assess the impact of CCDP intervention on all population exposed to this intervention.

As mentioned above, it is expected that about 19,200 households have benefited from the CCDP intervention. In order to determine the number of observations which are necessary to obtain a statistically representative sub-sample of these households, power calculations have been performed following Winters et al. (2010).

$$N = \frac{4\sigma^2(Z_\alpha + Z_\beta)^2}{D^2} \dots (1) \;\; ; \;\; N_{Corrected} = N[1 + \rho(m-1)] \dots (2)$$

Where σ denotes the standard deviation of the baseline outcome variable; Z_α the critical value of the confidence interval, Z_β the critical value of the statistical power, D denotes the minimum expected change in the baseline mean of the outcome variable of interest, ρ is the intra-cluster correlation of the unit of analysis as well as m denotes the number of units to be sampled within each cluster.

Following the available literature, it is assumed that the critical value of the confidence interval is Z_α=1.96 (95% confidence level), the statistical power Z_β=1.28 (80%) and the intra-cluster correlation to be 0.05. Furthermore it is expected to have on average 25 units sampled within each village (m).

To estimate standard deviation of the baseline outcome variable (σ) and the minimum expected change in the mean (D), the only available secondary data that could be obtained is a poverty data set of the CCDP treatment districts by the Statistics Indonesia (BPS) and provided through the CCDP project team. Unfortunately, the estimation of the parameters can only be based on the poverty share at the district level, given that no other key outcome variables relevant for this calculation are available in this data set. Using all of the aforementioned parameters, the poverty share variable in the available dataset, assuming a minimum detectable effect of 10%, it is sufficient to survey 2689 households. To ensure enough statistical power and maintain the possibility of assessing spillover effect we round this number to 2745.

Following the break-down of the sample as described above, 25% of the total sample will represent indirect beneficiaries in the treatment villages[2] . Table 1 highlights the number of villages to be selected whereas Table 2 highlights the households to be interviewed per district.

[2] If these are difficult to identify, a set of 30 villages in participant districts have been selected to source households for spillover effects.

Table 1: Number of villages to be sampled

District	CCDP villages	NON-CCDP villages	TOTAL
	Treated (& Spillovers)	CONTROL	
Ternate	9	-	9
Ambon	9	-	9
Kota Kupang	9	-	9
Lombok Barat	9	-	9
Kubu Raya	9	-	9
Maluku Tengah	-	9	9
Tidore	-	9	9
Kabupaten Kupang	-	9	9
Lombok Utara	-	9	9
Mempawah	-	9	9
TOTAL	45	45	90

Table 2: Number of Households to be sampled

District	CCDP villages		NON-CCDP villages	TOTAL
	Treated	Spillovers	CONTROL	
Ternate	207	135	-	342
Ambon	207	135	-	342
Kota Kupang	207	135	-	342
Lombok Barat	207	135	-	342
Kubu Raya	207	135	-	342
Maluku Tengah	-	-	207	207
Tidore	-	-	207	207

District	CCDP villages		NON-CCDP villages	TOTAL
	Treated	Spillovers	CONTROL	
Kabupaten Kupang	-	-	207	207
Lombok Utara	-	-	207	207
Mempawah	-	-	207	207
TOTAL	1035	675	1035	2745

3.3 Qualitative sampling strategy

Carrying out a qualitative survey enables one to gain additional information about project targeting, implementation, and contextualizing the socio-economic and cultural setting in which the projects had taken place. Further, previous studies argue that qualitative information usually provides additional insights to the channels through which the project activities may be associated with the changes in the key outcomes indicators of interest related to the project (Rao and Woolcock, 2004 and Ravallion, 2003).

The qualitative survey will follow a similar sampling strategy as the quantitative household survey. The qualitative survey will also follow a qualitative survey methodology consisting of semi-structured interviews in the forms of FGDs and KIIs.

As indicated earlier the qualitative analysis will serve the dual purpose of validating the sampling of villages through Key Informant Interviews and of providing new insights to guide the formulation of survey tools through FGDs.

Between 5 to 8 KIIs in each of the five districts of the CCDP in which the Impact Assessment will be conducted. The Key Informants should be the project facilitators, local KKP representatives, experts on the local fishery sector and markets (i.e. fisher and producers associations, agronomist, local representatives and leaders), women leaders of enterprise groups, representative of saving groups, of infrastructure group and of Natural Resource Management group. In Control districts KI should be village leaders and representatives of village administration, fisher groups (if they exist) and enterprise groups (if they exist). KII, in addition to being informative of livelihood conditions and of project implementation, should primarily serve the purpose of validating the sample in terms of village selection: i.e. identify out of the proposed control villages those that are good match for the selected treated villages.

With regard to the objective of providing project insights and guidance to formulation of survey tools, the data collection will begin with focus groups in two project villages and two representative control villages that have been selected with the help of the country

office, the PMU and key informants interviewed during the scoping mission. A total of six FGDs in selected villages within 2 districts in which the CCDP was active (Bitung and Makassar) and 3 FGD in Ambon district composed of 7 to 10 people each, whereby in control villages they should be composed by CCDP participants ensuring gender and youth representativeness. In both cases focus groups should include fishers, and people working on processing fish and fish derived products as well as, in the case of beneficiary villages, people working in the different types of interventions namely: infrastructure, Natural resource management, saving groups and enterprises.

3.4 Qualitative and quantitative instruments

The Impact Assessment will include both qualitative and quantitative analysis and data.

Qualitative survey:

The instruments for the qualitative survey are going to be shared with the PMU for their comments.

The FGD interview scripts included questions on the local environment (social and economic background, agricultural and other income sources and support received), the project implementation (distribution of fishing gears, setting up of aquaculture, of social groups, infrastructure created, saving groups and access to credit) and impacts of the project (income sources, food availability, gender empowerment, resilience, social cohesion, and other changes). The key themes of the KIIs with village leaders included questions on the local environment (social and economic background, fishery and other income sources and support received) and impacts of the project (income sources, food availability, gender empowerment, resilience, social cohesion, migration and other changes). The KIIs with the PMU will include questions on the targeting and implementation as well as similarities of pre-selected villages

Quantitative survey:

The main data collection instrument for this evaluation will be a household survey with detailed information on fishery and aquaculture, other sources of income, access to credit, enterprise association, income diversification, participation to groups and detailed information on associations, access to credit and commercial activity. We will also conduct community and association level surveys. An outline of the questionnaire can be found in Table 4.

3.5 Impact and Outcome Indicators

Following the Theory of Change and log frame of the CCDP as presented above, Table 3 depicts the main impact as well as outcome indicators of interest that will be estimate. The quantitative survey at the household level will serve as the main mean of verification. To estimate an increase in coastal protection at the village level, the area planted with mangroves and the normalized difference vegetation index (NDVI), satellite images will be computed using high-resolution satellite images.

Table 3: Impact and Outcome Indicators

Impact Indicator	Measure
Increased economic mobility and reduction of poverty	Amount of total net income aggregated by different sources; amount of total asset values
Higher food and nutrition security	Food Insecurity Experience Scale (FIES), Dietary Diversity Index Score
Resilience , mitigation and biodiversity	Exposure to shocks and adaptive capacity; NDVI of mangrove in coastline areas; Amount and diversity of fish species caught
Women empowerment and social capital	Household decision making and participation (frequency, numbers and roles) in social groups disaggregated by gender
Outcome Indicator	**Measure**
Increased catch and productivity	Catch per unit of effort, Nr. of months of fishing, Net revenue from sales of fish
Increased market participation for high potential products	Nr. of pre-established contracts, Price of sale, Gross margin, Transaction costs, nr of market infrastructure and cooling facilities; number of food certification released.
Increased conservation of natural resources	Nr of new protected areas, areas of rotational plans and frequency of fishing;
Increased access to credit	Nr. of loans and grants obtained, Costs, uses and amounts of loans; amounts of savings and reduction of middle man credit
Increased income diversification	Number and amounts of income sources and income diversity;

3.6 Data Collection

The IA will include both qualitative and quantitative data collection. The qualitative data shall serve the purpose of collecting information from the experience of the beneficiaries and validate the findings from the quantitative analysis. The sample will consist of Focus Group Discussions (FDGs) and Key Informant Interviews (KIIs) with key members of the PMUs and of non-treated villages. The qualitative analysis, complemented by data from

the National Statistical office and data provided by the PMU will serve the purpose of providing support to final sample selection (at village and household level) as well as of finalizing the questionnaire for quantitative data collection. A GIS validation will also be performed for comparison of the Natural Vegetation index between treated and control villages at baseline as well as for its impact.

Table 4: Structure of the Survey Instrument

Section 1	Socio demographic household members characteristics
Section 2	Education
Section 3	Dwelling conditions
Section 4	Ownership of durable goods
Section 5	Food security and consumption assessment
Section 6	Resiliency
Section 7	Acuaculture: inventory, feeding practices, breeding strategies, health and vaccination, production of by-products.
Section 8	Capture fishery including vessels, organization of labor and input use
Section 9	Other income sources, self employment, wages, enterprises
Section 10	Access to credit and utilization
Section 11	Social capital (associations and women income generating activities)

4. Budget, deliverables and work plan

4.1 Planned budget

The data collection activities will be carried out by C4ED, a data collection firm that has been selected through a competitive tender process. C4ED has proposed the following budget for the data collection activities (Table 5).

Table 5: Tentative itemized budget

BUDGET ITEMS	Total cost (US$)
Comments and Inputs to the Survey Strategy	5,350
Data Quality System	9,500
Comments and Inputs to Survey Tools for Qualitative Data Collection	3,030
Enumeration exercise	6,600
Qualitative Data Collection	4,985
Comments and Inputs to Survey Tools for Quantitative Data Collection	3,210
Data Collection System and Organization	9,245
Pre-test, enumerator training, survey pilot	51,754
Quantitative Data Collection: Household and Village Level Surveys	94,735
Data Cleaning	9,125
Final Report	8,100
TOTAL	**205,634**

4.2 Research team and main counterparts

The Impact Assessment of the CCDP will be led by Romina Cavatassi, Senior Technical Specialist in RIA.

Table 6: Team responsible for Impact Assessment

Name	Role	Affiliation
Romina Cavatassi	Principal Investigator	RIA, IFAD
Mabiso Athur	Co-Principal Investigator	RIA, IFAD
Peter Brueckmann	Research Analyst	RIA, IFAD
Kristen McCollumn	Research Analyst	RIA, IFAD
Sarah Hessel	Evaluation Specialist	IFAD
Ron Hartmann	Regional Director	IFAD

4.3 List of deliverables and workplan

Table 7 depicts the expected timeline for the CCDP Impact Assessment and incorporates the agreements made with the data collection firm C4ED. It is expected to have the final report completed in December 2018.

Table 7: Expected Timeline

Activities	IA calendar July 2018 – December 2018					
	July 18	Aug 18	Sept 18	Oct 18	Nov 18	Dec 18
Finalize IA design and survey instruments						
Listing exercise						
Enumerator training and piloting						
Data collection						
Data cleaning						
Data analysis						
Draft report						
Validation of results						

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