Assessment of the Biorights mechanism in Demak: A community incentive for sustainable development and mangrove conservation

FINAL REPORT

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Acronyms and abbreviations

AESA	Aqua Ecosystem Analysis
ALS	Alternative sustainable livelihoods
BAPPEDA	District Planning Board (*Badan Perencanaan Pembangunan Daerah*)
BRMG	Peatland and Mangrove Restoration Agency (*Badan Restorasi Mangrove dan Gambut*)
BPD	Village Consultative Body (*Badan Permusyawaratan Desa*)
BwN	Building with Nature
CBNRM	Community-based natural resource management
CO	Village community organizers
CFS	Coastal Field School
CSR	Corporate social responsibility
DMAFA	District Marine Affairs and Fisheries Agency
GB	Greenbelt
GoI	Government of Indonesia
HE	Hybrid Engineering
LEISA	Low external input sustainable aquaculture
MEL	Monitoring, evaluation and learning
MMA	Mixed-mangrove aquaculture
MMAF	Ministry of Marine Affairs and Fisheries
MoEF	Ministry of Environment and Forestry
MOL	Local micro-organisms (*mikro-organisme lokal)*
MPWH	Ministry of Public Works and Housing
NGO	Non-governmental organization
Musrenbangdes	Village planning process (*musyawarah perencanaan pembangunan desa)*
PCE	Participatory Comparative Experiment
PES	Payments for ecosystem services
PKK	Family Welfare Movement (*Pemberdayaan Kesejahteraan Keluarga*)
PRA	Participatory rural appraisal
RT/ RW	Rukun tetangga/ rukun warga (RT: neightbourhood unit; RW: community unit, smallest administrative unit)
SBL	Sediment bed levels
ToT	Training of trainers
UNDIP	Diponegoro University

Executive summary

The purpose of this report is to document and analyze implementation of the Building with Nature (BwN) Indonesia Biorights program in Demak, explore the effectiveness, opportunities and constraints of the program, and develop recommendations for scaling-up. BwN is a design philosophy that aims to deliver water infrastructure that provides better services to society as a whole, while enhancing the natural environment. It accomplishes this by integrating the services that nature provides into water and marine engineering practice in an inclusive way. Biorights is a financial incentive mechanism that reconciles livelihoods with environmental conservation and restoration. Combining BwN with Biorights, therefore allows integration of the innovative approach of working with nature with poverty reduction goals. This report focuses on Biorights as the implementation mechanism of the BwN technical approach.

The BwN Indonesia program was implemented at the landscape level in the severely eroding setting of Demak district on the north coast of Java, from 2015 until 2020. The program, which involved a consortium of Indonesian and international organizations, aimed to use BwN solutions to halt land loss, bring back mangroves and revitalize aquaculture.

This assessment of BwN-Biorights was conducted by Lestari Sustainable Development Consultants Inc. over the period April to June 2021. It was qualitative in nature and involved an extensive review of documents and interviews with the program team, local governments and communities. The assessment followed a conceptual framework developed by the Lestari team in consultation with Wetlands International.

The BwN-Biorights program consists of four main components: (i) preparation and planning, (ii) capacity and trust building, (iii) implementation and monitoring, and (iv) sustainability. **The first component**, **preparation and planning**, covered a period of approximately two years and **resulted in increased local institutional capacity to plan coastal management and livelihood activities**. It included a range of activities, from selection of nine target villages through to formation of ten community groups. The component culminated with the signature of contracts with the community groups for implementation of a package of BwN-Biorights program initiatives.

The second component, **capacity and trust building**, was conducted in parallel to the first component and **resulted in increased local knowledge and skills on mangrove conservation and restoration, income generating options, group management and the Biorights mechanism**. This component involved a range of capacity building activities and intense engagement of field facilitators with local community members. An important result of this component was a strong foundation of trust between the communities and the BwN-Biorights field team. Equally important, the strong focus on capacity building meant that the implementing farmers were well equipped with technical skills and knowledge.

The period between the start of the program and implementation of BwN-Biorights contracts was approximately two years. The transparent contract negotiation process, which resulted in clear, detailed and agreed parameters, was key to avoiding conflict during the process of implementing BwN-Biorights package initiatives. This could not have been achieved without the trust that was built between the BwN-Biorights program and community members.

The third component, **implementation and monitoring**, was conducted from mid-2017 until the end of 2020, and **resulted in increased mangrove area and improved local livelihoods**. The community groups, under the technical guidance and supervision of the field team, implemented the BwN-Biorights workplans. Monitoring was conducted jointly and corrective actions taken as necessary. During this time, it is estimated that approximately 46.79 hectares of coastal and riverine mangrove greenbelt were restored, lower than the target of 100 ha. This was mainly due to subsidence being significantly more extreme than could have been expected at the beginning of the program; the level of subsidence was considered a force majeure.

Over the three and a quarter year period of implementing the Biorights contracts, approximately 379 hectares of aquaculture ponds were rehabilitated. It is estimated that aquaculture activities generated an average of 184 EUR/ ha/ year. While this was significantly less that the program's initial target of 5,000 EUR/ ha/ year, over the three and a quarter year period this represented a doubling of profits over what would have been expected under the baseline scenario. By the end of the program, productivity from sustainable aquaculture for 300 ha of ponds had increased well over the 50% final target value.

The fourth component, **sustainability,** was mainstreamed in all three previous components with the aim of **sustaining mangrove restoration and livelihood improvement results beyond the life of the program**. The main sustainability strategies were the integration of mangrove conservation measures into policy (i.e., village development plan) and regulation (i.e., village coastal regulations) and the functioning of community groups (and their funding mechanism) to lead and safeguard village mangrove conservation. All community groups actively advocated the integration of mangrove restoration measures into their village development plans. However, some villages did not incorporate these measures (at least during program implementation), mainly due to limited development budgets which were allocated to other more immediate village priorities.

The nine villages successfully enacted village coastal regulations which incorporate strong coastal and mangrove conservation measures. All community groups functioned well and championed mangrove conservation efforts in their villages. Some groups did well in their fund-raising efforts (through group business ventures), but others were still struggling. All the community groups joined forces to establish the Bintoro Forum with the aim of collectively sustaining the results of BwN-Biorights and promoting them to other areas. This Forum was newly established and thus, it was too early to see the results.

In conclusion, Biorights is a valuable mechanism to implement innovative mangrove restoration and conservation techniques such as BwN. As demonstrated by program results,

Biorights was also an effective approach for taking a landscape perspective towards integrating environmental restoration and improving community livelihoods. **Equally important results, yet inadequately measured, were strengthened community conservation capacity and confidence and thus, resilience.** This means that these results are not well reflected in this assessment. These results were greatly valued by local communities.

The program required a significant investment in preparation, planning, capacity and trust building. These, combined with flexible and adaptive implementation, were the program's strength. However, these are also a challenge for up-scaling. Government involvement is necessary for program up-scaling. It is also key to address broader policy challenges affecting coastal problems (e.g., land subsidence). However, government's rigid sectoral planning and budgetary processes do not match with the holistic and adaptive approach of BwN-Biorights. Therefore, any upscaling initiative may need to involve public-private partnerships in which each partner can have the roles and responsibilities that suit its development planning and budgetary processes and procedures.

Introduction

The purpose of this report is to document and analyze implementation of the Building with Nature (BwN) Indonesia Biorights program in Demak, explore the effectiveness, opportunities and constraints of the program, and develop recommendations for scaling-up. BwN is a design philosophy that aims to deliver water infrastructure that provides better services to society as a whole, while enhancing the natural environment. It accomplishes this by integrating the services that nature provides into water and marine engineering practice in an inclusive way. Biorights is a financial incentive mechanism that reconciles livelihoods with environmental conservation and restoration. Combining BwN with Biorights, therefore allows integration of the innovative approach of working with nature with poverty reduction goals. This report focuses on Biorights as the implementation mechanism of the BwN technical approach.

The BwN Indonesia program was implemented at the landscape level in the severely eroding setting of Demak district on the north coast of Java, from 2015 until 2020. In Demak district, coastal erosion was projected to result in land loss of up to six kilometers inland along a 20 km long coastal stretch by 2100, affecting over 70,000 people and causing the loss of 6,000 hectares of aquaculture ponds along with nine coastal villages. In the specific setting of Demak, engineers, experts and communities jointly designed BwN solutions to halt land loss, bring back mangroves and revitalize aquaculture.[1]

The Biorights incentive mechanism was first proposed in the late 1990s. Since that time, Wetlands International has been at the forefront of implementing the Biorights mechanism in Indonesia. Innovation and learning have been at the core of the concept since its inception, whether through implementation in different ecosystem types (mangroves and peatlands) or under different socio-economic and land tenure conditions across Indonesia (for example, in Aceh, Jambi, South Sumatra, Central Kalimantan, West Java, Central Java, and Flores). A further preoccupation has been sustainability, whether in terms of the results from individual Biorights interventions or how to integrate the concept into government planning processes in order to facilitate replication (scaling-up).

The BwN consortium of Indonesian and international organizations established the technical framework of preparedness, innovation, research and development and implementation. BwN activities in Demak were mainly implemented through the BwN-Biorights mechanism, which is the focus of this assessment.

The BwN-Biorights program provided community groups in Demak with technical and financial support for combining aquaculture and livelihood revitalization with mangrove recovery.[2] The BwN-Biorights program consisted of core initiatives such as: maintenance of permeable

[1] For more information on the vision and details of the overall BwN program, see the BwN Design and Engineering Plan, see: https://www.wetlands.org/publications/building-with-nature-indonesia-design-and-engineering-plan/

[2] The term “program” is used throughout the document to refer to BwN-Biorights in order to reflect the fact that activities were funded through several different funding streams, not just a single project.

structures built with local materials aimed at trapping sediment to encourage mangrove growth, converting aquaculture ponds to mangroves in coastal and riverine greenbelts, revitalizing aquaculture ponds, maintaining existing mangroves, and supporting alternate livelihoods for those whose ponds were no longer viable or had been lost to the sea because of subsidence. Supporting initiatives included: formation and strengthening of community groups to lead implementation of local activities, supporting engagement of community groups in local planning processes and the development of village coastal regulations, and monitoring implementation of activities. These initiatives were supported by a strong and on-going process of capacity building for community members.

The purpose of this report is to document and analyze implementation of the BwN-Biorights program in Demak, explore the effectiveness, opportunities and constraints of the program, and develop recommendations for scaling-up. More broadly, although this report focuses on the Biorights mechanism in Demak, which was part of Wetlands International's program, the experience it is expected to contribute to Biorights programming more broadly. The concepts and lessons learned from the experience in Demak can be applied elsewhere, with adjustments for different contexts.

Following this introductory section, the methodology used for the assessment is presented. This is followed by the conceptual framework that was developed over the course of the assessment. The framework is grounded in an analysis of documents and interviews with those who were involved in the program. Following this, each component of the framework is described and analyzed in detail, including identification and discussion of lessons learned and recommendations. This is followed by a discussion of cost effectiveness, after which the innovative aspects of the Biorights mechanism are presented. The report concludes with recommendations for scaling-up, including success factors.

Methodology

This report focuses on Biorights as the implementation mechanism of the BwN technical approach. The program's mangrove restoration framework and technical specifications were established by the BwN consortium partners and then implemented mainly through the Biorights mechanism. A key feature of the Biorights mechanism is implementing mangrove restoration with conditional financial support for livelihoods improvement. The report covers the period from the middle of 2015 until the end of December 2020.

The assessment was qualitative in nature, and made use of both primary and secondary sources, using the methods described below. Gender considerations were integrated throughout the assessment.

The main questions addressed in the assessment were:

1. How was the Biorights mechanisms implemented and what were the innovative aspects?
2. What were the impact, successes and failures of the mechanism?
3. How (cost-) effective was the program?
4. How sustainable are these results beyond the program lifetime?

The **main methods** included:

a. **Document review:** Wetlands international provided Lestari with access to approximately 875 files related to the BwN-Biorights program in Demak. These ranged from minutes of community meetings to technical guidelines reflecting the experience of the overall BwN program. Documents were in both Indonesian and English. For a list of the main categories of documents reviewed, see Annex 1. These documents provided a rich source of information about the details of the Biorights process in Demak.
b. **Interviews and on-going discussions** with Wetlands International staff (both in the Global Office and in Indonesia).
c. **Semi-structured interviews:** After reviewing the documents, the Lestari team identified key outstanding questions and drafted interview guidelines for different categories of stakeholders. Due to restrictions resulting from COVID-19, interviews were conducted on-line or by telephone (for a list of interviews, see Annex 2). This provided valuable information, but is no real substitute for face-to-face field interviews with farmers who were involved in the program.

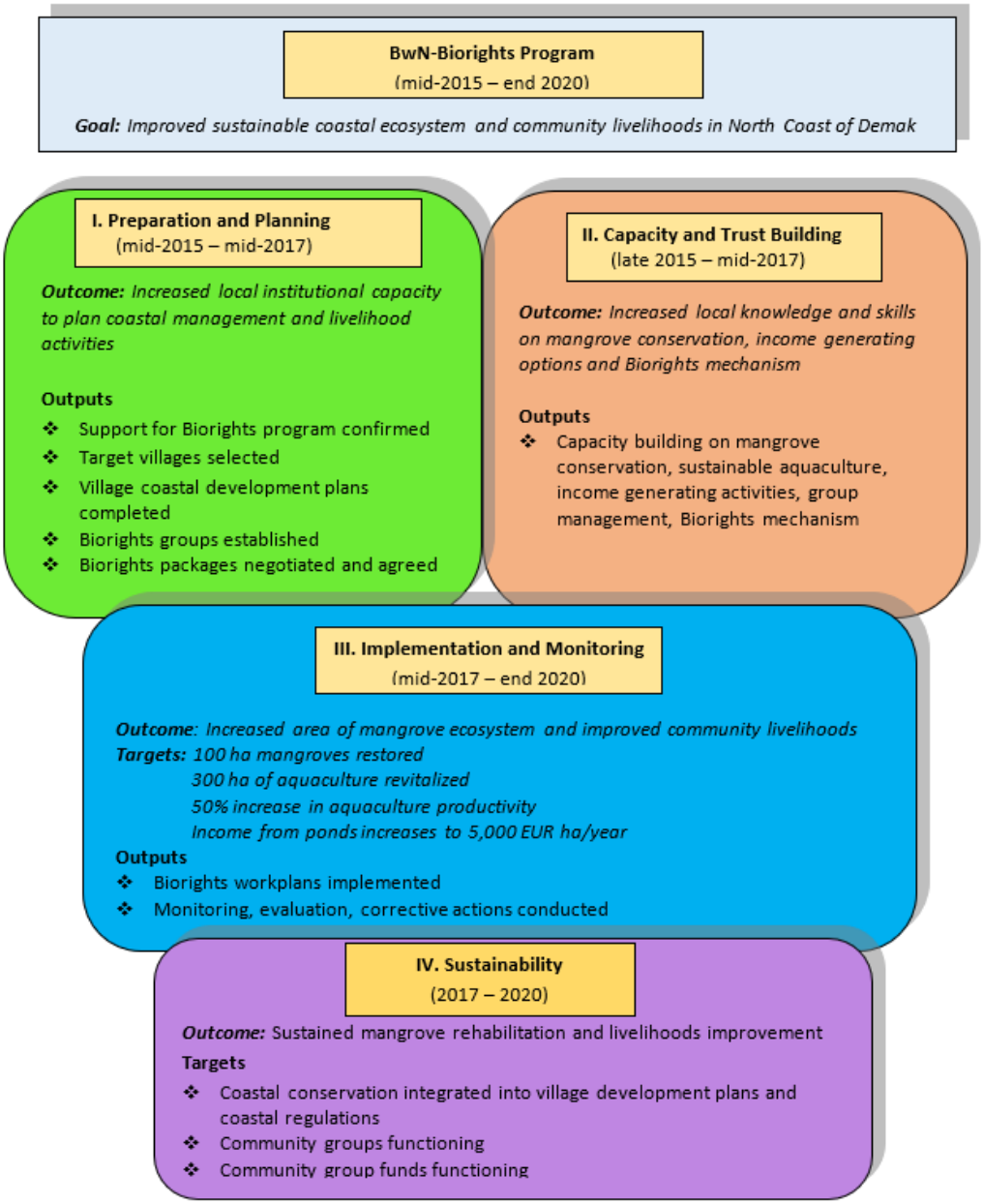
Based on the document review and information from the interviews, the assessment followed a conceptual framework and result/ activities matrix developed by the Lestari team in consultation with Wetlands International. The framework and matrix were used to structure the description and analysis of the mechanism. Once an initial draft of the report had been prepared by Lestari, it was reviewed by Wetlands International. Lestari then incorporated the feedback from Wetlands International as appropriate into the final version of the report.

Framework of the BwN-Biorights approach

The BwN-Biorights program, implemented in Demak from mid-2015 to the end of 2020, was comprised of four integrated components (Figure 1):

I. Preparation and planning
II. Capacity and trust building
III. Implementation and monitoring
IV. Sustainability

Figure 1: Components of Biorights in Demak



Component I (Planning and Preparation) and Component II (Capacity and Trust Building) were undertaken mostly in parallel, although elements of the capacity and trust building work carried on through to the final year of the program. Component III (Implementation and Monitoring) followed. Component IV (Sustainability) was built into all the program components as well as specific initiatives, e.g., the establishment of a community fund.

The results (i.e., outcomes and outputs) of each component as derived from this assessment, are shown in Table 1. An outcome results from a combination of outputs. Each output of the BwN-Biorights program was achieved through a set of activities. Table 1 shows the link between activities → outputs → outcomes.

One of the defining elements of the Biorights approach is its flexibility to respond to local socio-economic and bio-physical conditions. So, while Table 1 provides the elements of the process, these should not be viewed as a blueprint. Actual implementation processes were adapted depending on the local situation in individual sites and are explored in more detail in the sections which follow.

The implementation timelines were not fixed and activities supporting different outputs often took place in parallel. Additionally, there were synergies between the different activities and outputs, with some activities contributing to the achievement of multiple outputs.

The colour themes in the framework are used throughout this document when discussing the individual components.

Table 1: Results and activities of Biorights in Demak

Component I: Preparation and Planning ***Outcome:*** *Increased local institutional capacity to coastal management and livelihood activities*	
Outputs	**Activities**
1. Local community and government support for BwN-Biorights program confirmed	1.1 Hold village meetings to introduce BwN Biorights program to local communities 1.2 Introduce BwN-Biorights program to district government
2. Target villages selected	2.1 Conduct bio-physical and socio-economic feasibility survey 2.2 Map the status of aquaculture ponds in villages 2.3 Analyze problems and solutions for each village
3. Village coastal development plans completed	3.1 Identify long-term village development visions, problems faced, strategies to address problems, funding sources 3.2 Prepare coastal development plan for each village
4. Community-based Biorights implementing groups established	4.1 Select group members 4.2 Establish legally recognized groups 4.3 Establish group administrative and financial systems
5. Biorights packages negotiated and agreed	5.1 Design initiatives and prepare and negotiate Biorights packages 5.2 Sign Biorights contracts
Component II: Capacity and Trust Building ***Outcome:*** *Increased local knowledge and skills on mangrove conservation, income generating options and Biorights mechanism*	
Outputs	**Activities**
6. Capacity building on mangrove conservation, sustainable aquaculture, income generating activities, group management, Biorights mechanism	6.1 Conduct coastal field school on sustainable aquaculture 6.2 Conduct training and other capacity building activities 6.3 Introduce BwN-Biorights program
Component III: Implementation and Monitoring **Outcome**: *increased capacity of community group members to implement mangrove conservation and restoration (coastal and riverine greenbelt) and income generating activities*	
Outputs	**Activities**
7. Biorights workplans implemented	7.1. Prepare annual workplans 7.2. Implement Biorights initiatives
8. Monitoring, evaluation, corrective actions conducted	8.1. Monitor, evaluate and conduct corrective actions
9. Loan converted to grant, when criteria met	9.1 Conversion of loan to grant
Component IV: Sustainability Outcome: Sustained mangrove restoration and livelihoods improvement	
Targets	
1. Coastal conservation measures integrated into village development plans and coastal regulations 2. Community groups functioning 3. Community group funds functioning	

The Biorights mechanism in Demak

Implementation approach

The BwN program was implemented through a public-private partnership. Interdisciplinary collaboration among stakeholders was essential for the BwN solutions to be successful. Each partner brough in specific knowledge, experience and skills and had a unique role. In addition to the central role played by local communities in Demak in the design, implementation and maintenance of technical and socio-economic initiatives, the following partners actively participated:

Government agencies

Planning and implementation of measures in Demak took place in alignment with field programs of The Indonesian Ministry of Marine Affairs and Fisheries (MMAF) and the Indonesian Ministry of Public Works and Housing (MPWH). Both ministries aim to create an enabling environment for implementation of BwN nationwide. MMAF is the government body responsible for management of coastal and marine resources. MPWH is the government body responsible for technical and large infrastructure, including roads and coastal and river flood defenses.

Not-for-profit organizations

Wetlands International managed the partnership, coordinated outreach and field-based activities, strengthen the capacity of local communities, facilitated policy and stakeholder dialogue and contributed ecological expertise. Wetlands International is a not-for-profit global NGO dedicated to maintaining and restoring wetlands for nature and people.

EcoShape acted as the coordinating agency for the BwN community and co-managed the partnership with Wetlands International.

Blue Forest is a not-for-profit Indonesian NGO dedicated to community-based mangrove conservation and restoration. Blue Forest organized coastal field schools to develop and implement aquaculture and mangrove restoration initiatives with communities in Demak.

Kota Kita is an Indonesian NGO with expertise in urban planning and citizen participation. Kota Kita facilitated a series of Water Dialogues to address land subsidence on Semarang & Demak's coastal zones through the formulation of a roadmap with all actors in the wider watershed to reduce groundwater extraction.

Knowledge institutes

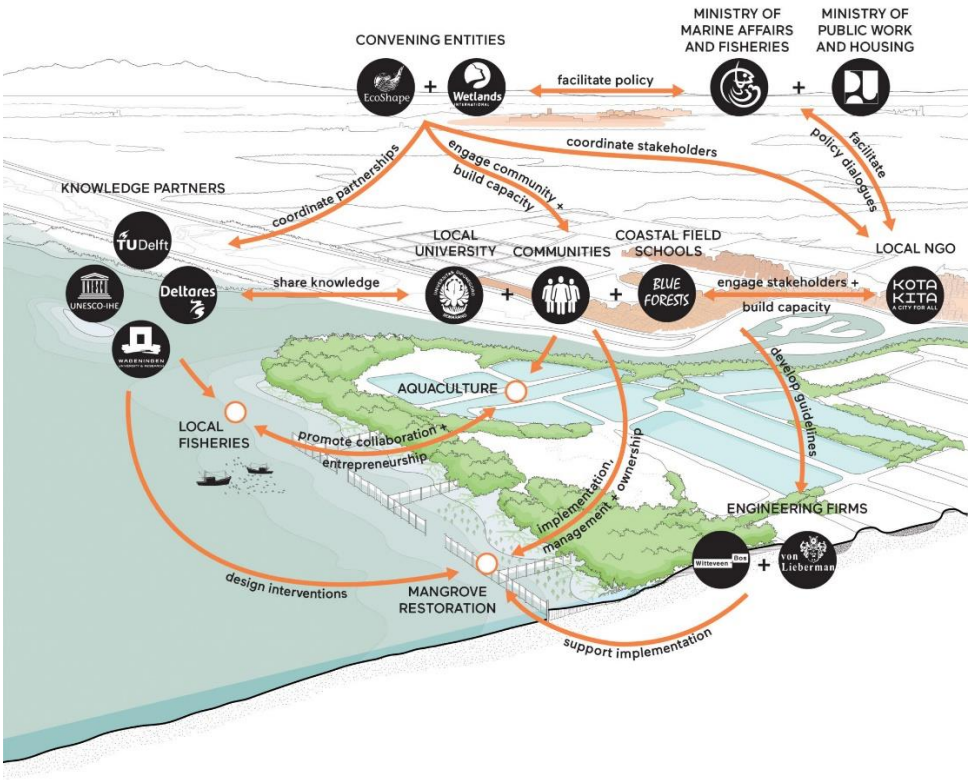
Deltares and Wageningen University & Research contributed and shared knowledge on coastal ecology and geomorphology, and aquaculture and alternative livelihoods. They were responsible for the design and monitoring of BwN interventions. Deltares further coordinated the BwN training program, together with the international water education facility UNESCO-IHE. The University of Diponegoro (UNDIP) in Semarang contributed local system knowledge to the design and supports on the ground monitoring.

Consultancy and engineering firms and contractors

Consultancy and engineering firm Witteveen+Bos was responsible for implementation of coastal safety engineering measures by Indonesian contractors and prepared an overall social cost benefit analysis. Witteveen+Bos also facilitated program replication in other settings. Two leading global dredging and maritime engineering contractors involved through the EcoShape consortium included Boskalis and Van Oord. The engineering company von Liebermann was also involved.

Figure 2 shows the types of activities for which different organizations provided support.

Figure 2: Areas of involvement of different organizations in BwN



Source: https://www.ecoshape.org/en/landscapes/muddycoasts/

Field implementation

The BwN-Biorights program was integrated into the multi-layered management approach of the BwN program. Wetlands International Global Office ensured linkages between the international consortium of partners and the field team in Indonesia. Wetlands International Indonesia was responsible for coordinating all BwN activities in Indonesia, including the BwN-Biorights program. The work in Indonesia was overseen by a Wetlands International Indonesia Project Manager, with technical staff supporting different activities as required. In Demak, local implementation was coordinated by a Wetlands International Indonesia Field Coordinator.

In implementing the BwN-Biorights components shown in Figure 1, Wetlands International Indonesia worked closely with Blue Forests, with the involvement of other partners. The component leads were as follows:

1. Preparation and planning: Wetlands International Indonesia
2. Capacity and trust building: Joint (Wetlands International Indonesia and Blue Forests)
3. Implementation and monitoring: Joint (Wetlands International Indonesia, Blue Forests and independent knowledge institutes and universities)
4. Sustainability: Wetlands International Indonesia

Initially Wetlands International and Blue Forests worked quite separately, but early on in the implementation process the decision was made to work as a team, with coordination by the Wetlands International Field Coordinator. So, while different activities might have been led by different organizations, both organizations were often involved. For the sake of clarity, this document uses the terms BwN field team or simply field team to refer to activities in which both organizations were involved. For activities in which only representatives from one organization were involved, the terms Wetlands International Indonesia field team or Blue Forests field team are used.

For most of the BwN-Biorights program both organizations engaged a field coordinator and two field facilitators in field work. The Blue Forests team joined the process slightly after the Wetlands International Indonesia team. The field teams stayed in Demak and spent most of their time in the target communities. In each community one or two village community organizers (*pemandu desa)* were also identified. Village community organizers were members of the BwN-Biorights community groups.

Ten community groups (with women and men members) representing nine coastal villages in Demak district were involved in field implementation across the four components. At a very late stage a women's group, Kartini Bahari, was added to address the imbalance in gender representation. This group was not part of the Biorights contracts.

As reflected in the description of activities below, the program often used participatory rural appraisal (PRA) techniques to engage local residents in identifying issues, designing and implementing solutions, and monitoring and evaluation.

Component I: Preparation and planning

Timeline: mid-2015 – mid-2017

Field work for the preparation and planning component of the BwN-Biorights program began in September 2015. Under this component, by mid-2016 nine villages in Demak had been selected for implementation of the Biorights mechanism and a plan for management of coastal areas of each village had been prepared. By mid-2017, 10 community groups with the technical, legal and administrative capacity to implement Biorights contracts were in place.

The period between the start of the program and commencement of BwN-Biorights field initiatives was approximately two years. At the time, there was some impatience within communities at this lengthy process; they were keen to get started with implementing field activities. However, by the end of the program there was a greater appreciation of the importance of the process. During interviews with local actors conducted as part of this assessment, there was a high level of appreciation for the comprehensive preparation and planning process. All interviewees expressed the belief that Biorights can only succeed if a similarly comprehensive process is undertaken.

Output 1: Local support for Biorights confirmed

Activity 1.1: Hold village meetings to introduce BwN- Biorights program to local communities

Securing community-level support for the BwN program and Biorights mechanism was a priority in the beginning months of the program. During this period the BwN field team engaged in an intense process of socialization.[3]

The socialization process began in the latter part of 2015 with the field team meeting representatives of village governments of communities along the coast of Demak. The team explained the objectives and approach of the BwN program and highlighted the need for support from the village government and residents. In each village it was agreed that the village governments would facilitate the convening of a village meeting to introduce the program to community members.

Village governments organized the socialization meetings and invited community members to participate. Invitations were sent to a range of community members, including those from:

- Village Consultative Bodies (*Badan Permusyawaratan Desa*)
- Different village administrative units (*dusun; RT/ RW)*
- Farmer groups

[3] In Indonesia the term "*sosialisasi"* is used to describe a process of securing acceptance of and willingness to actively support and participate in a new program or project. In this report the English word "socialization" is used to capture this meaning.

- Religious organizations
- Family Welfare Movement, PKK (*Pemberdayaan Kesejahteraan Keluarga*)

The purpose of the socialization meetings was to introduce the BwN approach to community members and learn more about the situation in the villages. During the meetings the field team provided a general overview of the program and the two main types of field activities: i) mangrove restoration through construction of permeable structures to restore sediment and pond conversions into mangrove ecosystems and, ii) the revitalization of aquaculture ponds in order to improve the livelihoods of coastal communities. The Biorights implementation mechanism and coastal field schools (CFS) approach were also introduced.

The communities in turn shared information about aquaculture activities in the villages, problems that the communities face and strategies to overcome them. This information also contributed to the selection of target villages (Output 2) and development of village coastal development plans (Output 3).

A similar process of socialization was implemented in 2016 for the village of Tugu, which was added as a target community after the others.

In addition to these activities, an important element of socialization and trust building in the early days of the program was the on-going presence of the Wetlands International Indonesia facilitators in the field, observing the conditions and engaging informally with residents.

Activity 1.2: Introduce BwN-Biorights program to district government

The key partner for the BwN program at the national level was the Indonesian Ministry of Marine Affairs and Fisheries (MMAF) and the Ministry of Public Works and Housing (MPWH). The MMAF, MPWH and BwN consortium agreed on Demak as the implementation district for the BwN program. Following this the program was introduced at the provincial level.

In Demak district, the key government partner was the district Marine Affairs and Fisheries Agency (DMAFA). Other district bodies such as the Environmental Agency, Planning Board (BAPPEDA), Forestry Agency and Community and Village Empowerment Agency were also involved in the program to different degrees.

At the beginning of 2016, following a feasibility survey (see activity 2.1), the BwN field team held a socialization meeting with the government of Demak district. In addition to representatives from different government agencies, representatives from village governments also participated. This was an opportunity for the field team to introduce the BwN program, including the Biorights approach and CFS. This meeting was followed with on-going formal and information meetings with the DMAFA and other agencies. Over the life of the program the field team was also invited to provide input to the Government of Demak and to participate in different forums. Support for the BwN program from the government was high.

In terms of Biorights, at the field level engagement with the DMAFA was most direct through the involvement of DMAFA extension workers in BwN-Biorights activities. Throughout the program extension workers participated in village-level Biorights and CFS activities.

Output 2: Target villages selected

Activity 2.1: Conduct bio-physical and socio-economic feasibility survey

The first activity implemented in the process of selecting target villages was a feasibility survey. The purpose of the feasibility survey was to collect preliminary data to inform selection of target villages for implementation of the BwN-Biorights program in Demak. In addition, the survey was intended to contribute to developing strategies for Biorights implementation.

The survey covered eight villages along the coast of Demak. During September and October 2015, a team from Wetlands International collected data and information using the following methods:

- Direct observation and data collection in the field
- Aerial photography using drones
- Interviews
- Focus group discussions
- Remote sensing data analysis
- Direct communication with experts in related fields
- Review of secondary data sources

The survey team collected and then analyzed information in the following categories for each village:

- Village profile: history, area, accessibility, population, livelihoods, education, governance, land use, institutions, public facilities, health and clean water.
- Biophysics: climate, topography, land cover, typology, geomorphology, morphology, water quality, natural resources.
- Coastal ecosystems: mangrove vegetation and coastal biophysical dynamics.
- Socio-economy: people's perception of environmental conditions, land ownership.
- Biodiversity (fauna): types of wildlife, domestic animals, dangerous animals, opinion of community towards animal conservation, use of habitat by animals, threats to flora and fauna.
- Policy documents: environment related policies, village medium term development plans, customary rules, religious rules, local wisdom, village development/ investment plans.

The survey identified which villages were considered potentially feasible for Biorights and listed the broad types of activities that might be suitable in each location.

During the period between the feasibility study and the final decision on target villages in February, 2016, the BwN field team continued to gather information. The team used approaches such as participatory mapping, focus group discussions and field observation to add to their understanding of both the bio-physical and socio-economic conditions in potential target villages. Both the survey and the follow-up also contributed to Output 3, development of strategic village coastal plans.

Activity 2.2: Map the status of aquaculture ponds in villages

During the feasibility survey described above, initial information was gathered on:

- Land tenure of aquaculture ponds (ownership and usage rights);
- Location of aquaculture ponds within the broader landscape (e.g., greenbelt areas);
- Condition of aquaculture ponds (e.g., highly degraded).

Following the survey, the field team continued to gather information through focus group discussions, participatory mapping and field observations. Clear ownership or usage rights to ponds was considered an important pre-requisite for restoration in order to ensure that ponds would not be converted to other uses and that results could be sustained.

In addition to contributing to the site selection decision, information on the status of aquaculture ponds contributed to the development of village strategic coastal plans (Output 3), selection of community groups members (Output 4), and the development of Biorights packages (Output 4).

Activity 2.3: Analyze problems and solutions for each village

In February 2016, the BwN team held an internal workshop focusing on social-economic initiatives. The workshop involved team members from Wetlands International Global Office, Wetlands International Indonesia, Blue Forests, Diponegoro University (UNDIP) and Wageningen University. It provided the opportunity for the team to share and analyze the data and information that had been collected up to that point.

During the analysis, the coastal section of Demak was divided into four sections. Of these, the highly degraded section closest to the city of Semarang was excluded because the deep waters and high levels of erosion rendered it unsuitable for the types of activities planned by BwN within the available budget. For the remaining three sections, a comparative analysis was conducted on:

- Types and degree of environmental problems
- Types and degree of socio-economic problems faced by residents
- Types of ecosystems
- Socio-economic potential

- Mangrove management and socio-economic initiatives that could be undertaken and their potential

In February 2016, eight coastal villages were identified as suitable target locations for the BwN program: Bedono, Timbulsloko, Surodadi, Tambakbulusan, Morodemak, Wedung, Purworejo, Betahwalang. In the middle of 2016 a ninth village, Tugu, was added. Tugu is not a coastal village, but it is located just behind the coastal community of Timbulsloko. It has large aquaculture ponds, and the BwN team assessed that there was a high risk that in future Tugu could face similar challenges to those experienced by the coastal communities.

During the February 2016 internal workshop, it was concluded that in order to plan appropriate interventions and to ensure their sustainability beyond the program's lifetime it was necessary to better understand details of the problems faced by the communities, potential solutions, and the material and non-material resources available in the villages and link this to formal village development planning (Output 3).

Output 3: Village coastal development plans completed

Activity 3.1: Identify long-term village development visions, problems faced, strategies to address problems, funding sources

In April and May, 2016, the BwN field team facilitated PRA events focusing on coastal areas in eight villages: Bedono, Betahwalang, Morodemak, Purworejo, Surodadi, Tambakbulusan, Timbulsloko, Wedung. A similar process was conducted in Tugu in August 2016. In each community these events were integrated into village planning processes (Musrenbangdes - *musyawarah perencanaan pembangunan desa*).

The purpose of the PRAs was to:

- Contribute to village coastal area planning processes
- Embed the BwN concept into village planning processes
- Obtain more detailed information about each target village in order to ensure appropriate BwN interventions
- Strengthen the critical thinking, analytical and planning skills of community members

In each community the village government invited residents from different societal groups to participate in the two-day process. The number of participants ranged from between 40 – 60 people.

During the process, tools such as telling village histories, visioning, seasonal calendars, trend analyses and participatory mapping were used to encourage participants to think critically and creatively about their village coastal environment and plan for the future. Results from the PRAs included:

- Agreed visions for the villages

- Maps prepared by community members of their local environment
- Analysis of the village assets, problems, strategies to address the problems, suggested activities and funding sources

Activity 3.2: Prepare strategic management plan for coastal areas of each village

Following the PRA events, in each village a small drafting team including representatives from the village government, the Village Consultative Body (BPD - *Badan Permusyawaratan Desa*) and community leaders worked with the BwN field team to analyze and organize the information from the PRA into a strategic management plan for the coastal area of the village. The strategic plans were intended to:

a. Provide input to the identification of priority activities for consideration of the government, the private sector and other parties wishing to develop programs in the village.
b. Determine the division of roles and responsibilities in the implementation of coastal area management in the village.
c. Identify joint steps to manage village coastal areas.
d. Ensure sustainability beyond program lifetime.

These plans provided both a framework for planning of BwN-Biorights activities, and were used in the annual village planning processes (Musrenbangdes).

Each plan included:

- A vision for the village.
- A matrix showing village assets, problems and their scope, strategies to address the problems, activities to implement the strategies, sources of support.
- A map of the village from an ecological perspective.

Output 4: Biorights groups established

This output involves a number of activities starting with the initial agreement to form the BwN-Biorights groups through to the signature of BwN-Biorights contracts.

Activity 4.1 Select group members

During the internal workshop on social-economic initiatives held in February 2016 (Activity 2.3), criteria for group membership were drafted. These included:

1. Aquaculture pond managers: owners (*pemilik*), renters (*penyewa*), yield sharing (*penggarap*)
2. Local community member (the village where the activity is located)
3. Vulnerable people

4. Representing one household
5. Involved in BwN activities
6. Care for the environment / mangroves
7. Willing to follow the process of formulating a village regulation
8. Representation of community and religious leaders
9. Representation of women
10. Willingness to follow group rules
11. Representation of village sub-administrative units

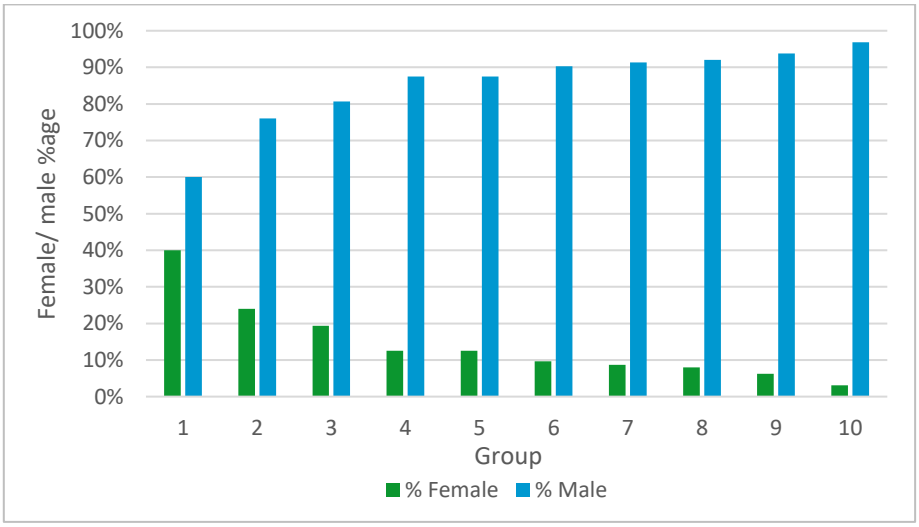
While the criteria above were one component guiding the selection of group members, there was also a form of "self-selection" that began with the meetings and capacity building activities that were held in communities starting at the beginning of 2016. Initially quite large numbers of people joined the activities, but over time the numbers of people who participated decreased. By the time group members were selected, only people who showed commitment to the BwN program remained.

In mid-2016, village governments of the BwN-Biorights target communities convened meetings to form groups to engage in the BwN-Biorights program. Those residents who had shown a commitment to the BwN-Biorights program were invited. The meetings were led by village governments, with the BwN field team on hand to lend support. During the meetings group membership was agreed by the community members present (village government and residents), with the BwN field team as observers. After group members were selected, other steps in the group formation process were undertaken, as described in the next section.

Ideally the criteria for group membership mentioned above would have been key to the selection of members. However, due to the fact that at this stage of the program there were still adjustments being made the design of the program and initiatives, criteria were not always followed closely. Ultimately other factors, such as which individuals had shown a high level of interest in the BwN-Biorights program over time (for example, participating in the coastal field schools) also played a role.

Group baseline data from 2016 shows that total membership across the 10 groups was 272 individuals, with 38 (14 percent) women and 234 (86 percent) men. As shown in the Figure 1 below, the proportion of women to men varied between groups.

Figure 3: Baseline proportion of females and males in groups[4]



The original BwN program documentation aspired to include a higher proportion of women in community groups than was actually realized. The fact that this aspiration was not achieved may be attributable to a number of factors, including cultural norms. It also seems that in the early stages of the program the BwN field team was not aware of the level of women's participation desired, so did not set this as a requirement when communicating with village representatives. Later during the program, a women's group was established which BwN supported with capacity building activities.

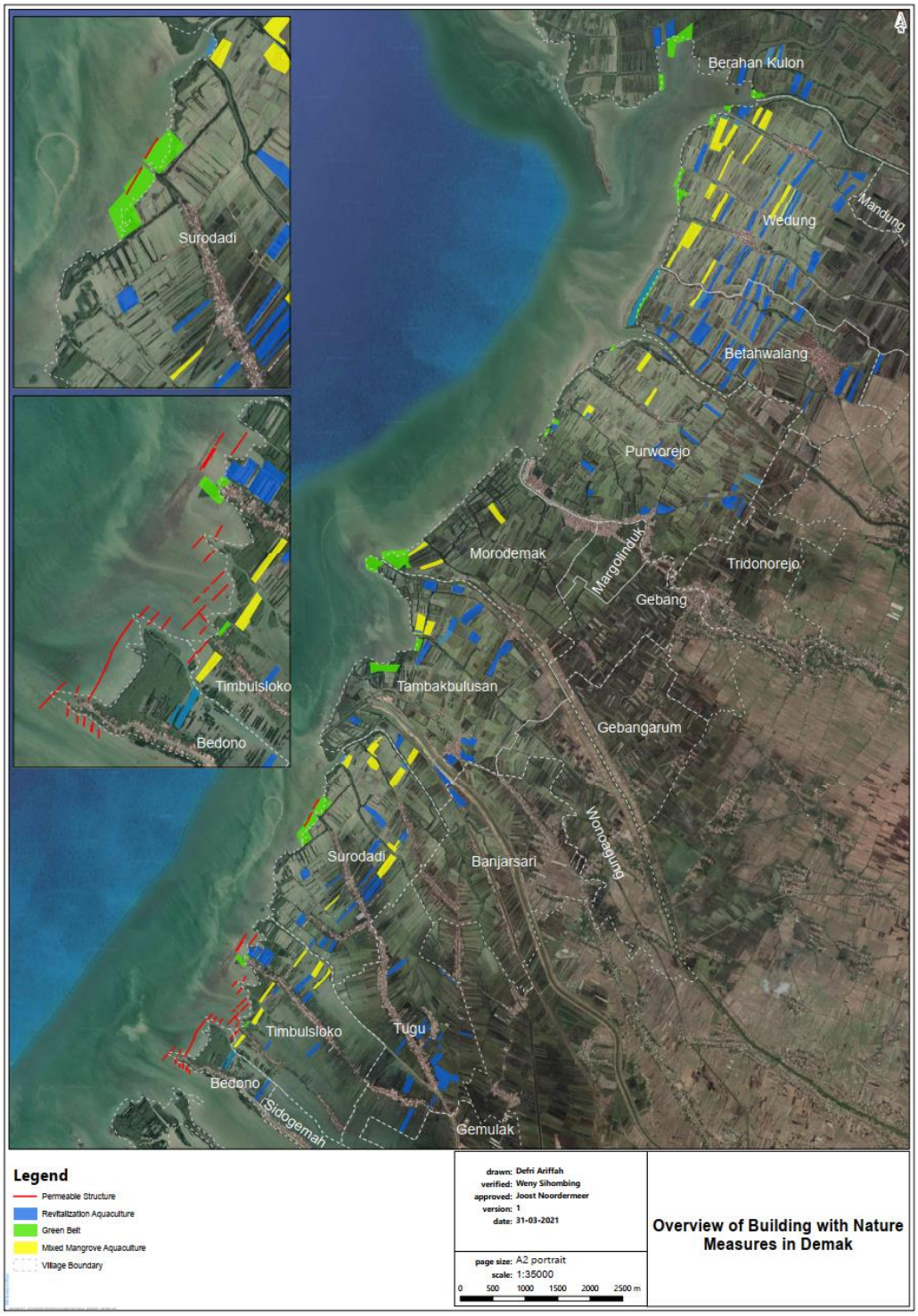
Additionally, the selection criteria for group members highlights certain tensions that were identified as problematic in terms of involving women. For example, according to the criteria, group members had to be either an owner, renter or yield sharing partner in an aquaculture pond (pond manager). In Demak, as is the case is most parts of Indonesia, pond managers are typically male household members. A second criterion stipulates that there can only be one group member from each household. This combination of the pond manager and only one member per household criteria strongly biases the selection criteria towards males, despite the fact that there is a criterion highlighting representation of women.

The pond management criterion may have contributed to the unplanned situation of the Biorights ponds being scattered across the landscape (see Figure 4). Another factor contributing to this was likely the fact that selection of participants for the coastal field schools (see component 2) focused on aquaculture farmers. This was different to the broader focus of Biorights on landscape transformation.[5] Participants of coastal field schools, having developed an interest in the BwN-Biorights program, often went on to become members of the BwN-Biorights community groups. .

[4] Group names are intentionally anonomized in this table.

[5] The coastal field school was led by Blue Forests while Wetlands International Indonesia was the lead for the Biorights mechanism. As mentioned in the section on field implementation approach, it took some time before the work of the two organizations was well integrated.

Figure 4: Map of initiatives - revitalized aquaculture and coastal and riverine greenbelt



Note: Green belt in the legend refers to coastal greenbelt; mixed-mangrove aquaculture refers to riverine greenbelt. These initiatives involved mangrove restoration.

Activity 4.2: Establish legally recognized groups

In mid-2016 10 community groups were either established or identified to implement the BwN-Biorights mechanism (see Table 2). Once new groups were formed, they then applied to be recognized as legal entities by the Ministry of Law and Human Rights.

The steps in establishing the groups included:

- Agreeing on group membership (see the previous section for more details)
- Establishing the structure of the group
- Choosing the group's management team (Head, Secretary, Treasurer)
- Agreeing on a name for the group
- Deciding a logo for the group

Table 2: Biorights community groups

Village/ *dusun*	Group name	Established	Group form	# members[6]	Recognized as legal entity
Wedung/ Gojoyo	Onggojoyo Jaya	Jun 2016	New	32	Feb 2017
Wedung/ Seklenting	Rejo Mulyo	Jun 2016	New	32	Nov 2016
Betahwalang	Sido Makmur	Jun 2016	New	31	Aug 2017
Purworejo	Purwo Gumilar	Jun 2016	New	31	Jul 2017
Morodemak	Mina Sido Mumbul	Jun 2016	Existing	24	Sept 2015
Tambakbulusan	Jaya Bahkti	Jun 2016	New	24	Nov 2016
Surodadi	Berkah Alam	Jun 2016	New	25	Oct 2016
Timbulsloko	Barokah	Jun 2016	New	25	Jun 2017
Bedono	Bedono Bangkit	Jun 2016	New	23	Mar 2017
Tugu	Semi Jaya Al Barokah	Aug 2016	New	25	Aug 2017

Once the community groups had been established, they started the process to obtain legal recognition from the Ministry of Law and Human Rights. Recognition as legal bodies was necessary so that groups could access financial and other support, including through the BwN-Biorights mechanism.

Steps in obtaining recognition as a legal entity included:

a. Obtain a letter stating that the group has been recognized by the village government (*SK desa*).
a. Notary requests the necessary documentation from the group and prepares and submits an application file to the Ministry of Law and Human Resources. In applying to the Ministry, each group has to have a unique name, different from any other registered group in Indonesia.

As Table 2 shows, the timelines for obtaining legal recognition varied between groups.

[6] Based on 2016 baseline data (file: Baseline data kelompok).

After receiving legal status, groups applied for a tax number. Groups also opened bank accounts.

Activity 4.3: Establish group administrative and financial systems

Once the BwN-Biorights community groups had been established, they started holding regular monthly meetings. This happened in parallel to the process for obtaining legal recognition described above. The monthly meetings, which were also attended by BwN field facilitators, were key opportunities for building the capacity of the groups, both on technical matters and in terms of group management. With respect to the latter, it was important that the groups had the administrative and financial systems to be able to manage future Biorights contracts.

In addition to the monthly meetings, the BwN program also provided dedicated administrative training for groups, focusing on the following topics:

- Developing a common understanding of the purpose and benefits of the groups
- Understanding the elements necessary for a well-run group
- Problem solving skills
- Preparation of Articles of Association and Bylaws
- Financial management and reporting
- Annual workplanning, including budgeting

Output 5: Biorights packages negotiated and agreed

The BwN-Biorights program adopted a landscape approach, instead of working with individual farmer's plot. Every community group has a collective responsibility to implement restoration activities in the area assigned in its contract. Group members, whether or not they had a pond, were involved in mangrove restoration activities. For example, pond managers might focus on practicing low external input sustainable aquaculture (LEISA)-based revitalized aquaculture or mixed-mangrove aquaculture. The group members who did not have a pond (if any) might be involved in the maintenance of permeable structures. For Tugu village, which does not have a coastline, the community group was involved in helping permeable structure maintenance along the coastline of Timbulsloko.

Activity 5.1: Design initiativs and prepare and negotiate Biorights packages

BwN-Biorights consisted of a set of mangrove restoration and livelihoods improvement initiatives. The main financial costs were to provide compensation for farmers whose ponds were designated as coastal greenbelt, mixed-mangrove aquaculture and revitalized aquaculture. The program prepared Biorights packages, in close consultation with each of the community groups. The preparation and negotiation of Biorights packages were important milestones that determined if the program would proceed to the next phase. The negotiation

process took approximately one year after the community groups were established in mid-2016. The negotiation was the most challenging phase of the program for the field facilitators.

In early negotiations, community groups proposed financial compensation higher than the program's original estimates. The program counter offered (based on a careful cost analysis), and suggested that some costs could be absorbed by the groups as in-kind contributions. After several meetings, both parties reached financial and in-kind agreements. The extensive negotiations raised community awareness that the intent of BwN-Biorights was to improve community well being, and hence it was appropriate for community groups to bear some of the costs.

The most difficult and time-consuming negotiations were with farmers who had ponds in coastal and riverine greenbelts. During the negotiation process, a few farmers withdrew as they were not ready to give up their ponds for mangrove restoration. Their reason was because the ponds were still productive and the only source of family income.

As described in the next section, the Biorights packages specified initiatives to be undertaken by the groups, specific activities for each initiative, funding sources, cost calculations (monetary and in-kind contributions), fund disbursement and repayment mechanisms and division of roles and responsibilities between community groups and the BwN-Biorights program (e.g., who does what, who bears which costs).

Biorights initiatives

The Biorights initiatives are divided into "measures" and "non-measures", each of which consist of a set of field activities (Table 3). The "measures" refer to mangrove restoration and livelihoods/ income generating initiatives. Hereafter these will be called "core" initiatives. The "non-measures" refer to communication, policy advocacy, capacity building and monitoring activities required to effectively implement and sustain the "measures". Hereafter, these would be called "supporting" initiatives.

Table 3: Typical Biorights Initiatives

Core Initiatives (Measures)		Field Activities
1.	Coastal Greenbelt (HE/ permeable structures)	- Monitor and maintain HE/ permeable structures (e.g., monitor regularly, repair the structures' poles, filling material/ brushwood, install/ fasten the wires, safeguard the sediment). - Convert ponds into mangroves, e.g., land leveling (sediment dredging, fill material), hydrology restoration (breaching of dike walls, plugging or filling of drainage channels). - Maintain existing mangroves.
2.	Riparian greenbelt (Mixed-mangrove aquaculture)	Implement mixed-mangrove aquaculture techniques on ponds adjacent to the river. A portion of ponds bordering waterway was converted into mangrove restored areas.
3.		*Individual ventures*: - Revitalize existing aquaculture, e.g., implementing LEISA, with or without innovative methods (e.g., polyculture).

Core Initiatives (Measures)		Field Activities
	Livelihoods	- Other income generating activities, e.g., procuring fisheries gear, chicken raising, retail.
		Group ventures: Procure fisheries gear, cat fish aquaculture, build mangrove tracks for tourism (as a group venture), saving-lending, etc..
Supporting Initiatives (Non-Measures)		**Field Activities**
4.	Group legal status and functioning mechanisms	- Obtain community group's legal status from the Ministry of Law and Human Rights. - Hold regular group meetings.
5.	Annual workplans	- Annually develop and update group workplans.
6.	Village development plans	- Involve in the preparation of village development plans. - Advocate coastal conservation into village development programs.
7.	Village regulations	- Involve in the preparation of village coastal regulations. - Village coastal regulation information dissemination to other community members. - Actively participate to enforce village coastal regulations.
8.	Monitoring	Monitor overall implementation of the BwN-Biorights initiatives.
9.	Capacity building	Participate in training and other capacity building measures for implementation of livelihoods and other activities.

- **Core initiatives**

All community groups conducted the same **mangrove restoration initiatives,** consisting of greenbelt restoration (i.e., maintenance of hybrid engineering/ HE permeable structures, pond conversion into mangroves, mangrove maintenance) and mixed-mangrove aquaculture. However, the areas differed from one village to another. According to the Biorights contracts, the total targeted coastal pond greenbelt restoration area (excluding restoration through the permeable structures) was 55 ha, distributed over nine villages. Bedono village, for example, covered 1.70 ha and Surodadi 11.85 ha. Village community groups were typically responsible (and were compensated) for greenbelt restoration within their own villages. However, for Tugu village – which does not have a coastline – the community group was compensated for the maintenance of permeable structures.

Livelihood initiatives consisted of individual and joint venture income generating activities run collectively by group members. Every group was required to implement one joint business venture of their own choosing. Group members with aquaculture ponds were required to adopt LEISA.

Some group members who did not have ponds focused on other income generating activities including capture fisheries, chicken raising, vegetable farming. Group's joint businesses also

included some non-aquaculture initiatives such as goat and chicken raising, mangrove eco-tourism, saving-lending service, fish feed production, etc..

- **Supporting initiatives**

All community groups also conducted the same **supporting initiatives,** which included contractual obligations to obtain the group's legal status, hold regular meetings, prepare annual workplans, participate in village development plan and coastal regulation preparation, conduct monitoring, and participate in training and other capacity building activities.

The group's legal status and regular meetings were considered pre-requisites for group functioning and collective action mobilization (see activity 4.2). Legal status was also instrumental for soliciting funds and other development assistance from non-BwN sources, especially government. The program encouraged and helped community groups to access other funding sources whenever possible.

The community groups were also required to advocate for coastal ecosystem sustainability integration into broader village development plans and coastal regulations. These two mechanisms were expected to provide long-term coastal ecosystem legal protection, at least at the village level.

Capacity building activities (Component 2) were conducted, as needed, to support coastal restoration and livelihoods implementation. These included a coastal field school on LEISA and a number of trainings on various mangrove restoration, aquaculture and group management topics.

<u>Biorights funding mechanisms</u>

- **Financial package**

BwN-Biorights community group financing consisted of direct financial compensation, reimbursable costs, and conditional loans – each of which was tied to the implementation costs of "core" and "supporting" initiatives. In each initiative, community groups provided in-kind contributions (e.g., time, labor, local materials). Conditional loans would be converted into grants if certain criteria were met (see the next section).

The BwN-Biorights funding mechanism specified the cost of each BwN-Biorights package, the funding sources (program and community group monetary and in-kind contributions), fund disbursements, fund management and repayment criteria. The Biorights' packages monetary value included:

- *Direct financial compensation* for monitoring and maintaining the permeable structures. These funds were managed by the program, and disbursed directly to group laborers.

- *Conditional loans* for group members whose ponds were to be converted into mangrove coastal greenbelt. The loans could be for renting pond(s) outside the greenbelt, or for starting new income generating activities. Funds were managed by the community groups.
- *Conditional loans* for group members whose riverside ponds adopted mixed-mangrove aquaculture. These funds were managed by the community groups.
- *Conditional loans* for individual and group-operated LEISA livelihoods/ income generating initiatives, with or without innovative aquaculture methods. These funds were managed by the community groups.
- *Reimbursable costs* to implement "supporting initiatives". These funds were managed by the program.
- Community group's in-kind contributions in the form of time, labor and local materials.

Biorights funding differed from one community to another, depending on the coastal/ mangrove ecosystem characteristics in which the group lived, and the types of income-generating activities that they focused upon. For example, a community group with sizable ponds located in a degraded coastal greenbelt area had a larger Biorights financial package than groups with fewer degraded ponds. This is because pond conversion costs/ financial compensation are significantly higher than other types of activities.

➢ Conditional loans

As described above, some Biorights funds were managed by the program, while others were disbursed to community groups as conditional loans. The loans covered the cost of converting ponds to greenbelt, improving aquaculture practices (e.g., mixed-mangrove aquaculture, LEISA) and aquaculture and non-aquaculture income generating activities.

The loan amount differed from one group to another, depending on the amount of pond area covered by Bwn-Biorights. Loans for non-aquaculture income generating/ livelihood activities were received as a lump sum, both for individual and group business ventures. Table 4 summarizes the financial compensation (i.e., conditional loans) for each category of pond and livelihood non-aquaculture income generating activity.

Table 4: Financial compensation/ conditional loan for each initiative type

	Type of initiative	Financial compensation (i.e., conditional loan) in Rupiah
1.	Pond converted to greenbelt	18,000,000/ ha
2.	Mixed-mangrove aquaculture pond with LEISA	9,000,000/ ha
3.	Revitalized aquaculture (i.e., non-mixed-mangrove aquaculture pond with LEISA)	4,500,000/ ha
4.	Non-aquaculture alternative livelihoods (individual)	5,000,000/ person
5.	Group business venture	20,000,000/ group/ village

The loans for the 10 community groups ranged from IDR 170,000,000 to IDR 660,000,000, disbursed in four instalments: 50 percent for the first instalment, 25 percent the second, 20 percent the third and 5 percent the last. Certain conditions were necessary for each instalment. For example, the first instalments (i.e., 50 percent of the total loan) would only be disbursed if:

- Contracts were signed by both parties (the program and community group leader).
- All the requirements for group formation were met (see Output 4).
- Biorights annual workplans were completed.
- All group members showed proof of pond ownership (or user rights).

➢ Conversion of loans to grants

Loan conversion to grants was dependent on satisfactory implementation. Every initiative had scores that cumulatively totaled 100 percent (see Table 5). These consisted of several parameters, each of which had a weight. The parameters and scores were developed by the field team in consultation with the community groups. Table 5 provides an example of a scoring table.

Table 5: Example of BwN-Biorights scores

Initiative	Initiative score	Parameter	Parameter score
1. Aquaculture using LEISA	10	Compost use	25
		MOL (Local micro-organisms) use	25
		No chemicals	25
		Recording of pond activities (log book)	25
2. Mixed-mangrove aquaculture	10	Integrate pond construction with mangroves	20
		Use of compost as needed	20
		MOL use	20
		No chemicals	20
		Log book	20
3. Maintenance of permeable structures	20	Monitor permeable structures	20
		Repair of holes under permeable structures	10
		Tighten loose ropes	20
		Replenish fill materials (twigs) when needed	20
		Reinforce or replace unstable posts	20
		Record permeable structure related activities in log book	10
4. Mangrove greenbelt	10	Land preparation	40
		No opening of ponds in greenbelt	20
		No mangrove cutting in greenbelt	20
		Natural restoration of mangroves	20
5. Group/ individual alternative livelihood activity	5	Productive alternative livelihood activity managed by group	50
		Productive alternative livelihood activity manage by group (non-aquaculture)	25

Initiative	Initiative score	Parameter	Parameter score
		Alternative livelihood activity management in environmentally friendly manner	25
6. Legal status from Ministry of Law and Human Rights	5	Articles of Association and bylaws	100
7. Routine group meetings	10	All group members attend	50
		Held at least once per month	50
8. Yearly workplan	5	Village Head informed	100
9. Participate in village development planning meetings (*Musrenbangdes*)	10	Actively involved in Musrenbangdes	25
		A minimum of two group members (woman and man)	25
		Propose group activities in the Musrenbangdes	25
		Activities proposed by group contained in village medium term development plan	25
10. Active in preparation and socialization of village regulation	10	Group representative in drafting team	50
		Contribute suggestions from group	25
		Activities proposed by group included in draft regulation	25
TOTAL	100		

Loan repayment depended on the Biorights total scores:

- 80 percent or more, and the loan was 100 percent converted into grant.
- 61-80 percent, and the group must repay 20 percent of the total loan.
- 41-60 percent, and the group must repay 40 percent of the total loan.
- 21-40 percent, and the group must repay 60 percent of the total loan.
- Less than 20 percent, and the group must repay 80 percent of the total loan.

Repayments were to be allocated to other groups that demonstrated satisfactory performance. This condition was an additional incentive for every group to perform well.

Activity 5.2: Sign Biorights Contract

Agreement to implement the Biorights package was sealed through a contractual agreement between the program and the community groups. Thus, even though some of the Biorights funds directly benefited individual group members, the contract was between the community group and the program. The contract signing was witnessed by the village government in which the group was located. Funds to help group members improve their sustainable aquaculture and livelihoods were disbursed through the group bank account.

As indicated above, the main components of the Bioright contract are “core and supporting” initiatives, costs to implement these initiatives, phased fund disbursement and repayment mechanisms. The contracts also required information on the mangrove restoration land tenure status (e.g., ponds which would be converted into mangroves, mixed-mangrove aquaculture, revitalized aquaculture) and what livelihood initiatives were to be conducted.

In general, the contracts contained the following information:

- Description of project areas
- Description of potential participants
- Services delivered by local community group, including the quantity and duration of service
- Resources/ supports provided by the program, including financial and non-financial (e.g., training, facilitation) support
- Field activities to be implemented under mangrove restoration, livelihood and capacity and institutional building initiatives
- Engagement of third parties, including local village government and private sector
- Conditions for phased fund disbursement
- Conditions for conversion of funds to become grants
- Monitoring and reporting
- Liability
- Force majeure clause
- Contract duration

An example of Biorights contract is provided in Annex 3.

Lessons learned and recommendations: Preparation and planning

Criteria for group membership

It is suggested that the criteria for group membership used in 2016 be reviewed and revised for use in future programs. The criteria should be developed as early as possible in the program. Some recommendations and key questions that could be asked are listed below and there will no doubt be other relevant questions depending on the specific priorities of the program being implemented:

1. The main criteria should include who are the community members (i.e., their activities) who have the most direct impacts on (or are impacted by) the coastal environment. They could be pond managers, or coastal fishers who do not have ponds.
2. Who are the most vulnerable groups (especially women) most dependent on the coastal environment and who are the most vulnerable groups (especially women) who would be impacted by program activities? For example, some mangrove restored areas were closed for fishing. Were there any fishers/ women impacted by this newly restricted access?
3. Where in the landscape do we want to encourage mangrove restoration activities?
4. Is it likely that the areas selected can be successfully restored (i.e., excluding ponds for which restoration is unlikely)?
5. What level of women's involvement is desirable in the community groups?
6. Is it required that group members be pond managers?
7. Are any of the criteria contradictory? For example, if we want to encourage membership of women in the groups, it might be necessary to modify the criterion requiring

members to be pond managers as rights to ponds are typically held by male household members.

8. Are the criteria specific and do they adequately reflect the design for implementing initiatives in the field? Several of the criterion from 2016 were quite open, for example, "vulnerable people", "representative of community and religious leaders", "representation of women". It was unclear what the aspiration was for each of these criteria.

In addition to reviewing the criteria, there may be a need to weigh the criteria to reflect the fact that some criteria may have higher priority than others.

Gender

Gender analysis should be an integral part of the program design and a gender strategy developed in the early stages to guide implementation. Gender considerations could then be mainstreamed into all components of the BwN-Biorights program, reducing reliance on separate or add-on activities or processes specifically for women. For example, a gender scan could be integrated into the feasibility survey. This would help in identifying limiting gender and sociocultural norms, dynamics, and power relations within the local communities, and pave the way for developing approaches that address these throughout the BwN-Biorights process. It would also form the basis of a gender baseline that could be used in monitoring program results. Related to this, women's involvement should also be reflected in all program documentation – e.g., the results framework.

The BwN-Biorights field team included a female project manager and a female field facilitator. In future programs, it is also important to actively involve female field facilitators.

Spatial arrangement in the landscape

The experience in Demak indicates that where target ponds are located in the landscape can serve different purposes. For example, clustering ponds could lead to higher environmental impacts (for example, adjacent ponds in riverine greenbelts). On the other hand, having ponds scattered across the landscape could increase the visibility of the program and be part of an awareness raising strategy. In planning future activities, it is suggested that the pros and cons of both approaches be considered explicitly. It may not be a case of either one or the other – it is possible that the best option might be to go with a strategic combination of "clustering and scattering" to achieve different objectives.

Documentation

The BwN-Biorights process at the field level was extremely well documented. In addition to the type of documentation that one would expect, such as community group progress reports, the field team prepared field activity reports documenting their formal and informal interactions with community and district stakeholders. These notes allowed the Wetlands International Indonesia Field Coordinator and Project Manager to keep abreast of

developments in the field. They also provide a rich source of information about the implementation process, something which is particularly valuable for a program that is considered as a pilot project with aspirations for significant upscaling, both in Demak and in Indonesia more broadly.

In future, ways should be sought to integrate this type of documentation into a broader knowledge management system to contribute to program wide monitoring, evaluation and learning (MEL). This would go beyond collecting and organizing documents from program partners. Rather, it would aim to extract clear, reliable and consistent information to support, for example: tracking progress at different levels, monitoring results, adaptive management, evaluation, extracting lessons learned.

During the course of this assessment, it was observed that there were some inconsistencies in data from different partners, specifically related to area of mangrove restoration and aquaculture pond rehabilitation. Having a system where data is shared and analyzed systematically would help with identifying and addressing such issues early. This could help in fostering a joint understanding of results at the program level.

Trust building between the program and local community

The success of BwN-Biorights implementation depended on the active participation of the local community, which was only achieved once the community trusted the program. This trust building process was rather rocky in the beginning, partly due to rather inconsistent information community members received from the program. For example, at the beginning of the program implementation, the group membership criterion on pond managers was unclear for the field team. Therefore, a few non-pond managers also joined the groups. When it became clear that being a pond manager was a "must" criterion, it was impossible to ask these non-pond manager members to resign.

Community group negotiations began even though "core" and "supporting" initiatives had not yet been finalized. The field team had to thus further communicate with the community groups when package modifications were completed. Retracting important information, which had already been discussed/ used for negotiations, was not easy for the field team as this could cause community confusion and distrust. This was especially sensitive during the early stages of the trust building process. Future programs should consider finalizing the Biorights package prior to community group negotiations. This will undoubtedly expedite trust building and negotiations.

This dynamic (i.e., inconsistent information) was partly due to a different process and focus between the BwN international consortium and the field team. The former focused on internal program planning and innovation to ensure the technical feasibility and applicability to local conditions. The latter focused on program implementation, for which community trust and participation were key. Future programs should consider how to improve the communication between the design and implementation/ field teams and reconcile their different foci.

Component II: Capacity and trust building

Timeline: early 2016 – early 2020

Capacity building of local communities' coastal conservation and sustainable livelihoods knowledge and skills were conducted for most of the program.[7] From early 2016 – mid-2018, the focus was on the coastal field schools (CFS) and training on such topics as mangrove restoration, environmentally friendly aquaculture, income generating options, group management. The Biorights mechanism was also introduced and discussed in many CFS and training events. From late 2018 to early 2020, the focus turned to monitoring and evaluation of the mangrove restoration and livelihoods development.

The capacity and trust building objectives were:

- To increase (potential) group members' understanding/ knowledge of coastal and mangrove conservation, environmentally friendly aquaculture and other livelihood options, and group management.
- To improve (potential) group members' understanding of, and trust in, the BwN-Biorights program so that they could make informed decisions on whether to join a group.
- To solicit local input to the BwN-Biorights design, and to adapt to local conditions as needed.

The program reported that the coastal field school and other capacity building activities resulted in the following changes:

- Increased participant awareness of mangrove ecosystem values and importance
- Increased participant awareness and skill on sustainable aquaculture
- Increased knowledge of how to systematically prevent coastal erosion
- Broader perspectives of diverse livelihoods options
- Increased capacity in organizational administration and management, as well as community engagement
- Local government financial support for BwN-Biorights.

[7] The coastal field schools, which comprised a large part of the capacity building work under component II, were led by Blue Forests. However, most activities were conducted in close collaboration with Wetlands International Indonesia. Some training was also led by Wetlands International Indonesia.

Output 6: Capacity building on mangrove conservation, sustainable aquaculture, income generating activities, group management, Biorights mechanism

Activity 6.1: Conduct coastal field schools on sustainable aquaculture

Coastal field schools

Socialization of the coastal field schools (CFS) was conducted at the start of the BwN-Biorights program (see Activity 1.1.). The socialization process was also a way to identify local CFS needs, problems, potential solutions and potential participants. Regular CFS meetings and collective learning was expected to help build farmers' technical capacity on sustainable aquaculture as well as trust in the program and with each other. The CFS's initial focus on sustainable aquaculture was later broadened to include mangrove restoration. This was to ensure participants' readiness to implement BwN-Biorights mangrove restoration.

The CFS was the most intensive capacity building activity, and took place from early 2016 to mid-2018. The CFS aimed to empower coastal communities by increasing their technical and social know-how. Instead of instructing farmers on production systems' technical steps, the CFS used experimental, participatory and learner-centred techniques to build farmers' capacity to observe and analyse their aquaculture production system and make evidence-based on-farm decisions.

The CFS had regular group meetings at agreed-upon intervals during the cropping season. The primary learning medium was the aquaculture/ pond ecosystem. Training focused on facilitating hands-on and discovery-based learning that enabled farmers to be active learners and experts. The integrated and participant-defined curriculum covered the full production cycle. In every CFS session, participants conducted a demo-pond Participatory Comparative Experiment (PCE), applying both LEISA and a traditional pond management system (control). One CFS learning unit consisted of 20 to 30 coastal villagers who shared a common interest (same livelihood activity) and came from the same or nearby area.

A similar approach was used to improve farmers' knowledge in sustainable development and to increase mangrove restoration skills. Using participatory methods, community groups were coached on how to analyse village ecosystem changes, identify problems, and find potential solutions. Community groups also then prepared BwN-Biorights implementation workplans (see Activity 8.1).

The CFS's overall focus was thus on group observation, analyses, discussions, presentations, and collective decision making. CFS participation was also important for improving social cohesion and farmer-to-farmer knowledge sharing, including after program activities ended.

The CFS covered a number of sessions, as described in Table 6 below.

Table 6: Coastal field school sessions and objectives

No	Topic	Objectives
1	Ecosystem mapping	Identify and map village resources and ecosystems and causes of ecosystem degradation.
2	Needs analysis and calendar	Calculate the pond's daily needs and production costs; understand local livelihood activities during the seasons.
3	Problem prioritization, institutional analysis.	Prioritize problems and identify potential solutions; identify stakeholders using institutional analysis.
4	PCE planning and design	Introduce LEISA and PCE; agreement on steps and timeline for fish or shrimp raising; selection of demo-ponds, one for control and the other for LEISA.
5	Coastal dynamics and safety	Understand coastal dynamics and the need for coastal protection; identify coastal protection / restoration measures.
6	Compost with local micro-organisms/MOL	Understand the function of organic fertiliser in maintaining soil and water quality, and produce compost (MOL) with local ingredients.
7	Fingerlings selection	Understand good quality fingerlings and stocking techniques.
8	Introduction to Aqua Ecosystem Analysis (AESA)	Learn to examine, monitor and compare the improved and traditional demo-ponds, using such techniques as water colour assessment.
9	AESA	Practice pond and stocks monitoring; water quality and animal health management.
10	Soil ecology	Understand the role of soil in aquaculture, and how to maintain its fertility.
11	Diseases	Understand factors affecting pond and stock health; diseases.
12	Feed and Compost	Identify fish/ shrimp needs and feed; make feed and compost from locally available ingredients.
13	Assess restoration opportunities	Familiarization with flexible and affordable methods to identify and analyse (mangrove) landscape restoration opportunities.
14	Harvest	Measure control and demo-pond yields.

Advanced coastal field school

Upon the completion of the CFS in mid-2018, it was observed that there were some groups that required further facilitation to seek solutions for their aquaculture problems. In mid- to late 2019, another (advanced) CFS was conducted for two farmer groups. The training objective was to further equip farmer participants with adaptive aquaculture management skills. This advanced CFS included the Kartini Bahari, a female-only group, which was selected to continue the group's previous experimentation on polyculture management. The participation of Kartini Bahari was mandated by the Ecoshape program to increase women's participation in the BwN-Biorights program.

Activity 6.2: Conduct training and other capacity building activities

In addition to CFS, other capacity building activities included training and mentoring on a variety of topics on mangrove conservation, aquaculture, and group management. Some of these topics were suggested by community members. As described below, a Training of Trainer (ToT) for village community organizers (COs) was also delivered as an upscaling model and way to secure sustainability beyond the program lifetime.

Training of Trainers

CFS implementation was greatly facilitated by village community organizers. The BwN program recruited 21 village community organizers (*pemandu desa*), who were instrumental in organizing and assisting the BwN program's trainers and field facilitators to conduct the CFS and training sessions. The community organizers were required to possess CFS and LEISA knowledge, as well as facilitation skills. They received training of trainers (ToT) assistance. It was hoped that the village community organizers would continue championing mangrove conservation in their village even after the program ended. This is realistic, given that these community organizers were chosen by community members largely due to their social standing and leadership.

Other Training

Farmers also received "conventional" training to improve their organizational skills and technical capacity in sustainable aquaculture, mangrove restoration and other environmental issues. The training was on:

1. Ecological mangrove restoration, including mixed-mangrove aquaculture techniques;
2. Monitoring of mangrove restoration areas;
3. Study tours to learn mangrove management in other areas;
4. Cat fish aquaculture;
5. Fish food production;
6. Mangrove non timber forest products;
7. Community group basic management (see activity 4.3);
8. Cooperatives;
9. Waste management.

Monitoring and Evaluation Mentoring

CFS and training were completed by late-2018. However, program support for group capacity building continued, although not as intensively. After receiving monitoring training in late 2018, community groups were coached on how to monitor mangrove restoration progress in coastal and riverine greenbelts. Every month program field facilitators and group members monitored sediment levels and the mangrove recruitment progress. The program also facilitated quarterly sessions for the 10 community groups to share experiences and discuss/ evaluate monitoring results (see Activity 9.1).

The program also supported individual farmer revitalized aquaculture monitoring (see Activity 9.1). LEISA technical assistance was given as needed. Every farmer was responsible to monitor (and record in a logbook) his/ her own pond. The village COs also collected weekly monitoring data of 50 sampled ponds.

Activity 6.3: Introduce BwN-Biorights program

The CFS and training events also provided an opportunity to improve (potential) group members' understanding of the BwN-Biorights program so that they could make informed decisions on whether to join a group. This was key to the program's success. Depending on pond location (i.e., if adjacent to the coast or river), farmers who agreed to join a group would be required to give up their pond for coastal mangrove restoration, to allocate a portion of their pond for riverine mangrove restoration, or to apply LEISA methods in their ponds. They also had to abide by group rules, and participate in program activities as per the BwN-Biorights contract. Joining a group, therefore, was a big decision in which trust in the program was an important deciding factor.

Lessons learned and recommendations: Capacity and trust building

Community social assets

Among other things, local capacity building (e.g., CFS, training) for over a year served to introduce BwN-Biorights, rules, responsibilities, etc.. This also helped local communities to make informed decisions on whether to join a BwN-Biorights community group. The program had pre-determined criteria for becoming a member, but these were not strictly followed. Instead, the capacity building process helped with "natural selection" – those with low commitment were unlikely to join after learning of all the responsibilities. Thus, the capacity building process helped with obtaining participants' informed consent.

Capacity and trust building should be an integral part of any long-term development program. This is important to build community trust and assess individual commitment. More significantly, it is an important pathway to strengthen both individual and community social capital such as environmental awareness, technical knowledge, confidence, social communication, networking and collective trust. Worldwide experience[8] demonstrates that social capital often drives collective action, which is essential to the sustainability and governance of common property resources such as mangroves.

[8] Worldwide examples on how social capital drives collective action for biodiversity conservation are provided by Pretty, Jules and David Smith. 2004. Social Capital in Biodiversity Conservation and Management. Conservation Biology, Volume 18 (3); 631-638.

Critical role of field facilitators

BwN-Biorights dealt with the contentious issue of land rights. In coastal greenbelt areas the program provided farmers with negotiated compensation in exchange for converting their largely unproductive aquaculture ponds into mangrove restoration. Farmers were initially suspicious of the program, questioning the motivation behind the requests. The suspicion was largely because villagers had previous unpleasant experiences dealing with NGOs that gave empty promises. These NGOs came to villages with a promise of development assistance, collected information, and never came back. This experience, combined with the sensitive issue of land rights, made villagers cautious.

The Wetlands International Indonesia field team spent considerable time in the early stages of program preparation/ planning staying in the different villages, engaging in formal and informal discussions with village government representatives, aquaculture pond managers and other residents. This was critical to the trust building and eventual agreements that were reached for pond restoration. Interviews with some of the groups' members confirmed the critical role of the field team in building villagers' trust in the program.

Non-aquaculture income generating activities

Villagers received significant training and capacity building in mangrove restoration and environmentally friendly aquaculture. Some community groups decided, however, to focus instead on non-aquaculture businesses (e.g., chicken raising, fish flour), but they appear to have struggled. These were alternative livelihoods from aquaculture. Some farmers were no longer engaged in aquaculture production because their ponds were either no longer productive or were submerged by the sea as a result of land subsidence.

It is recommended that future programs should provide non-aquaculture assistance, including on business economic and market feasibility. This would help groups to choose business ventures with promising markets and profit margins.

Local product marketing

There was no marketing component to the capacity building. Community group businesses appear to have been limited to local/ village markets. The long-term economic viability of these business ventures is unknown.

Future programs should conduct marketing and value chain analyses of main aquaculture commodities. Increased pond productivity is not the only factor in determining profits and thus, farmer well-being. It is not uncommon that value chain bottlenecks (e.g., rent seeking intermediaries) prevent farmers from obtaining fair profits, irrespective of their productivity levels. Understanding these bottlenecks could help to address them.

A future program should also consider assisting farmers with product marketing. For example, LEISA could be used as a unique selling point. Thus, the LEISA fishery products from revitalized

aquaculture areas could be promoted/ marketed as an environmentally preferable alternative to conventional aquaculture. If the price of conventional and LEISA products is similar, consumers may choose the latter. It is also possible that the urban middle class (e.g., in Semarang) would be willing to pay a price premium for LEISA aquaculture.

To increase LEISA legitimacy and prevent counterfeiting, an authenticity certificate could be requested from the Fishery Office or other relevant government institutions. Marketing collaboration with local/ urban NGOs could also prove beneficial.

Component III: Implementation and monitoring

Timeline: mid-2017 – end 2020

Community groups started implementing their BwN-Biorights field activities after the contracts were signed in September 2017.

Output 7: Biorights workplan implemented

Activity 7.1: Prepare annual workplan

Each community group was required to prepare a workplan, which is one of the conditions of the first fund/ loan disbursement. The workplan outlines actions/ field activities to implement the core and supporting initiatives described in the Biorights contract (see Table 3). The workplan also includes targets and a work schedule for a one-year period.

The preparation of the workplan was completed even before the Biorights contract was signed. As soon as the community groups were established, the BwN-Biorights initiatives and phased financial compensation and repayment became the main discussion topic of the groups' regular meetings. These discussions became the basis of the groups' annual workplan (see Activity 6.1).

Activity 7.2: Implement Biorights initiatives

The groups' BwN-Biorights annual workplans were implemented with program technical and financial support and supervision. Regular communication among group members (through monthly group meetings) and program field facilitators helped with the implementation process, as they allowed early problem detection and corresponding corrective action.

While contract signing formally marked the start of the Biorights mechanism, some BwN activities linked to Biorights – such as maintenance of permeable structures – were implemented prior to the contract signing. As indicated earlier, the permeable structures were first constructed in late 2015, while the BwN-Biorights contracts were signed in mid-2017.

Core Initiatives: Mangrove Rehabilitation and Livelihoods Activities

- ***Greenbelt***

The main BwN-Biorights coastal and riparian greenbelt[9] restoration initiatives were: the permeable structures to trap sediment along the coast, pond conversion into mangroves along coast and rivers (including mixed-mangrove aquaculture), and mangrove maintenance.

Monitor and maintain permeable structures

To restore the coastal mangrove greenbelt, it was vital to reduce erosion and restore the sediment balance. This was done by placing engineered permeable structures for wave breaking and sediment capture. Permeable structures were made from such local materials as bamboo, twigs, other brushwood and were placed in front of the coastline to reduce sediment loss. The permeable structures sediment capture also acted as a substrate to permit natural mangrove growth.

The permeable structures were constructed in late 2015 under the BwN program, prior to introduction of the BwN-Biorights program because of the severity of erosion. A total of 4.7 km of permeable structures were originally constructed and maintained by the BwN program. The structures extend along the coastline of Bedono, Timbulsloko and Surodadi villages. Additionally, the government partner, MMAF, supported construction of 4.4 km of permeable structures at the seafront of Timbulsloko, Purworejo and Babalan villages. The structures were not all constructed at once. They were built by local contractors who were required to hire village construction labor. This was to ensure that local communities understood the construction and maintenance process, and also to foster their sense of ownership.

In mid-2018 the program formally handed over the permeable structures to community groups and village governments. Maintenance of existing structures and construction of new ones become the responsibility of community groups. The expectation was that community members, unlike contractors, could conduct daily monitoring and take immediate remedial action.

Regular structure maintenance was needed to ensure that they remained intact and were functioning effectively. In the few locations with heavily damaged structures (e.g., washed out by strong waves), they were re-built. Group members conducted the following monitoring and maintenance activities:

- Recording all permeable structures
- Replacing and/ or tightening the structures' loose ties
- Replenishing missing fill material (e.g., brushwood)
- Repairing or replacing damaged poles

[9] Indonesian government regulation No.32 (1990) designates coastal mangrove greenbelts as a minimum width of 200 meters from the lowest tide and riparian greenbelts 50 meters along riverbanks.

- Safeguarding the trapped sediment and growing mangroves by not engaging in such activities as fishing or tree planting (unless approved by a program field facilitator

Pond Conversion into coastal mangrove greenbelt

Ponds identified for mangrove restoration were both adjacent to the coast (i.e., coastal greenbelt) and next to rivers (i.e, riverine greenbelt) to enhance delivery of ecosystem services. Group members with ponds located in the coastal greenbelt zone, defined as a zone of at least 200 m wide, were required to give them up for greenbelt restoration. They had to sign an agreement with the village government to not open up the restored ponds for at least 15 years to ensure sustainability beyond program lifetime.

Of the 10 community groups, more than two dozen farmers gave up their (degraded) ponds for coastal greenbelt recovery, covering approximately 55 ha as per the original contracts. This exceeded the program target of 50 ha. Convincing group members to give up their ponds could be challenging, especially if the ponds were still productive and the main source of farmer income. This was despite the program's provision of financial compensation for pond rental outside of the greenbelt area, or start-up capital for new income generating activities.

As per the BwN-Biorights contract, pond conversion to coastal greenbelt involved the following actions:

- Restoring pond soil conditions (e.g., sufficient sediment, suitable salinity, presence of mangrove propagules, etc.) to be suitable for mangrove recruitment.
- Assisting natural mangrove regeneration (e.g., replanting of specific species that would otherwise not recruit) with field facilitator guidance.
- Safeguarding the restored areas by, for instance, erected billboards in some spots along the greenbelt, to notify people not to disturb the mangrove regeneration process.

Group members provided time and labor to implement the above activities. The program provided technical guidance and supervision, as well as absorbed any necessary financial costs. These were in addition to financial compensation given to the farmers due to income loss from pond conversion.

Mixed-mangrove aquaculture

Mixed-mangrove aquaculture is a concept for associating aquaculture with forestry by creating a mangrove greenbelt along estuary shorelines. For mixed-mangrove aquaculture, farmers need to give up some (i.e, ranging between 10 to 20 percent) of their aquaculture ponds to make space for riverine mangroves. With mixed-mangrove aquaculture, the mangroves are located outside the areas of the pond used for raising fish or shrimp; with the more typical silvo-aquaculture systems, the mangroves are planted on the dykes and in the ponds.

The greenbelt legal requirement is 50 m along the riverbanks. The optimal area of mangrove in mixed-mangrove aquaculture depends on the adjacent ponds' effluents. For intensive shrimp farming, the mangrove area should be at least as large as the pond. For LEISA mixed-mangrove aquaculture, the requirement is smaller. The optimal greenbelt width depends on many factors, but 10 m seems sufficient for individual farmers.

About four dozen farmers allocated portions of their ponds for riparian setback to create mixed-mangrove aquaculture, covering an area of approximately 110 ha according to the original contracts. In addition to giving up a portion of their ponds, farmers also invested in building extra dykes and gates. Proper sluice gate management was key to allow natural sedimentation and mangrove recruitment, with farmers properly trained in coastal field schools (CFS). The mixed-mangrove aquaculture farmers also applied LEISA and other good aquaculture management practices (see Component II).

As per the BwN Biorights contracts, mixed-mangrove aquaculture implementation included the following field activities:

- River dyke set backs, and sluice system adjustments to create a river mangrove greenbelt
- LEISA (e.g., using compost, MOL)
- Fixing broken sluice gates (using bamboo)
- Purchasing nets
- Pumping out pond water
- Providing fish/ shrimp seeds
- Providing environmentally friendly fish food
- Harvesting,
- Innovative fishery methods (e.g., cultivating more than one type of fish/ polyculture) with field facilitators' approval and guidance

Farmers provided time, labor, and local materials to complete the above activities. The program provided technical guidance and supervision, as well as financial resources.

- **Livelihoods**

Livelihoods/ income generating activities consisted of individual and group business ventures. All aquaculture businesses adopted LEISA, also called revitalized aquaculture, sometimes with innovative methods (e.g., polyculture). Non-aquaculture businesses included chicken and goat raising, fish feed production, saving lending services, retail, mangrove eco-tourism.

Revitalized Aquaculture

Aquaculture revitalization is the conversion of conventionally managed aquaculture into environmentally friendly and other good management practices using LEISA principles. All group members with aquaculture ponds, including those subject to mixed-mangrove

aquaculture, applied LEISA methods. The total revitalized aquaculture area of 10 community groups was approximately 311 ha according to the original contracts.

LEISA for brackish water farming aims to optimize the use of locally available natural resources (soil, water, plants) and inputs (e.g., animals, organic wastes) to improve the pond's agro-ecosystem. Inappropriate or excessive use of external inputs, particularly synthetic chemicals, is avoided to minimize pest resistance and soil ecosystem degradation. Groups implemented LEISA by:

- Using compost and local micro-organisms (or *mikro-organisme lokal*/ MOL) to maintain and enhance pond soil fertility. Group members prepared the compost and MOL – skills they acquired from the coastal field schools (CFS).
- Not using chemical pesticides, while using plant-derived saponin.
- Keeping farm records. Every group member kept a farm diary which recorded farm activities (e.g., drying ponds, fixing water gates, spreading fish and shrimp seeds, harvesting).
- Daily monitoring. Every farmer observed and recorded daily the condition of his/ her pond (e.g., water PH, salinity, temperature, etc.).

Group Business Ventures

In addition to individual income generating activities, every group was encouraged to start a collectively run business venture. The business, which could be fishery or non-fishery based, was chosen in consultation with the program. Groups were also encouraged to consider businesses recommended by the program advisors on polyculture. If a group choose not to do so, the capital was re-allocated to individual business ventures.

Group businesses were relatively new, and thus profits generally meager. Some, such as a saving-lending service and a mangrove eco-tourism initiative, started well and generated profits almost immediately. Others, such as goat raising, failed due to poor markets and were converted to e.g., fish feed production.

<u>Supporting Initiatives: Communication and Policy Advocacy</u>

All 10 community groups completed "supporting initiatives" with program financial (e.g., transportation costs) and technical support. The "supporting initiatives" were vitally important to the successful implementation and sustainability of the "core initiatives". They focused on group internal and external communication, policy advocacy, monitoring and capacity building, as described below:

- **Groups' legal entity** (also see activity 4.2)
  All groups obtained legal status from the Ministry of Law and Human. Legal status allowed groups to have their own bank accounts, and helped to access financial and development assistance, especially from government. Government rural

development programs usually require legally established community groups to channel the programs' benefits.

- **Regular meetings**
  Every group held monthly meetings to discuss the "core and supporting initiatives" progress, which were recorded. The majority (at least 80 percent) of group members generally attended the meetings. This communication was important to increase group solidarity, trust and collective action. Field facilitator(s) often participated in these meetings.

- **Preparation of village development plans and village coastal regulations**
  Every group sent representatives to their village's annual development plan preparation. They were encouraged to advocate for the integration of coastal conservation measures into village plans. This helps access government budgets, especially for post-BwN-Biorights' conservation efforts. For example, one group successfully lobbied for insertion of mangrove track construction into the village plan, and subsequently received government funding to complement what was initially built via BwN-Biorights funding.

  Groups also led formulation of their villages' coastal management regulations. For villages which already had regulations, community groups helped the village government with revisions. Group members were also responsible for socializing village coastal regulation to other villagers.

- **Capacity building**
  Capacity building such as coastal field schools (CFS), training, study tours, etc. were conducted even before BwN-Biorights contract signing. This topic was discussed in the previous section (Component 2).

Output 8: Monitoring, evaluation, corrective actions

The program, together with community groups, monitored the implementation of "core and supporting" initiatives. Community groups were responsible for monitoring and recording progress of their contractual BwN-Biorights mangrove conservation and livelihoods activities.

The program (under the lead of Wetlands International Indonesia) also monitored groups' overall BwN-Biorights contractual performance. Monitoring results determined whether a group would receive the next tranche of BwN-BioRights financial disbursement. Groups were required to attain a Biorights score of at least 80 percent to receive the next disbursements. Monitoring was conducted four times to correspond with the four disbursement phases.

Although formal group performance monitoring/ assessment was conducted semi-annually, field facilitators often participated in group monthly meetings where implementation progress

and challenges were discussed. This greatly helped with communication between the community groups and the program, allowed early problem detection and corrective action.

Activity 8.1 Monitor, evaluate and conduct corrective action

Regular monitoring, evaluation, and learning was conducted. Monthly monitoring of the coastal and riparian greenbelt was conducted jointly by community groups and program staff. Greenbelt monitoring results were discussed quarterly, facilitated by the program and involving all 10 groups. Lessons learned were drawn to take corrective actions. Monitoring of revitalized aquaculture and aquaculture in mixed-mangrove aquaculture was conducted daily by the pond owner/ user.

Core Initiatives

- ***Greenbelt***

  - *Permeable structures*

    The monitoring of permeable structures was conducted weekly, especially after extreme weather such as big waves and tidal floods (such as occurred in June 2020). Group members did repairs, with program technical and financial support (e.g., compensation for labor and materials). After the repairs, program staff checked and approved the results. Some damaged structures were abandoned, however, as bio-physical conditions were deemed unsuitable for the structures. Of the 4.7 km of structures that were initially constructed by the BwN program, by the end of 2020 1.8 km remained. Originally the aim was to restore approximately 20 ha of mangrove behind the permeable structures through sediment trapping, but this became more difficult due to subsidence (for more on subsidence, see the section on "Cost effectiveness").

    Every group was responsible to monitor the permeable structures located in front of their villages. The groups also documented all structure maintenance. Monitoring poles were erected in certain locations to regularly observe progress in sedimentation and mangrove recruitment. Notification boards to prohibit damaging activities (e.g., fishing) were erected in certain locations.

  - *Pond conversion*[10]

    Pond conversion into coastal greenbelt was monitored monthly in order to observe progress in sedimentation and mangrove recruitment. It was jointly conducted by group members and the field team. Monitoring poles were erected in certain spots to regularly

[10] Coastal greenbelt monitoring was led by Blue Forests.

measure sediment levels. Notification boards to prohibit logging/ land clearing in the area were erected in certain locations.

There were 28 ponds converted into mangrove greenbelt, covering 75.51 ha. At the end of the monitoring period (mid-2020), 32 percent of the ponds were categorized as "protect", 14 percent as "restore" and 53 percent as "explore". "Protect" refers to ponds where natural regeneration has occurred; "restore" to those requiring intervention/ restoration with a high probability of success; and "explore" where restoration was unlikely to be successful. The last category triggered the need for further study to identify more effective restoration techniques, including placement of permeable structures or mud nourishment.

Overall, average sediment bed levels (SBL) increased, albeit with significant variation. More than half of the sites experienced accretion, while the rest had sediment loss. Morodemak had the highest accretion of 12.04 cm, while Tambakbulusan experienced sediment loss of 5.46 cm.

The mangrove recruitment success rate for the coastal greenbelt was reported to be 63 percent. Based on this figure and using mangrove area data from Wetlands International, the total mangrove recruitment area was 39.10 ha.[11] Monitoring by Blue Forests showed that coastal greenbelt mangrove recruitment rates increased everywhere except for Bedono. Betahwalang had the highest recruitment rate, nearly 1.6 per square meter. Mangrove recruitment in Bedono declined to less than 0.2 per square meter by the end of monitoring period.

- *Mixed-mangrove aquaculture* [12]

Monitoring of the 46 mixed-mangrove aquaculture ponds was conducted monthly.[13] Results were divided into three categories: green, orange and red. Green for sites where mangrove restoration was progressing well, yellow and red for slow and very slow progress respectively and thus, requiring further intervention. 15 sites were green, 13 yellow and 18 red.

Monitoring showed a gradual sediment bed level (SBL) increase in the mixed-mangrove aquaculture ponds. Morodemak had the highest SBL, with 24.69 cm in the platform and 17.19 cm in the ditch. Purworejo experienced the lowest SBL, with SBL in the ditch (8.16 cm) dramatically exceeding the platform (1.42 cm).

[11] For details on how this figure was calculated, see Table 13: Estimated mangrove recruitment area, coastal and riverine greenbelts (cost effectiveness section).

[12] Monitoring of mixed-mangrove aquaculture was led by Blue Forests.

[13] Information on the number of ponds included in the final analysis was slightly unclear from the Blue Forests final report (contradictions between the figures in the body of the text and Annex 5 and some lack of clarity within the text). The information used was taken from the breakdown of pond conditions in the textual description provided on page 18 of the Blue Forest final report.

The mangrove recruitment success rate for the riverine greenbelt (mixed-mangrove aquaculture areas) was reported to be 75 percent. Based on this figure and using mangrove area data from Wetlands International, the total mangrove recruitment area was 7.69 ha .[14] Monitoring by Blue Forests showed that mangrove recruitment increasing during the first three months of the monitoring period, followed by a gradual decline until the end of the monitoring period. Timbulsloko had the highest average mangrove recruitment, with nearly 2,000 recruited mangrove seeds per square meter. Wedung Seklenting was the lowest, with fewer than 500 seeds recruited per square meter.

The 10 groups met quarterly to discuss the monitoring results and draw lessons learned.[15] These meetings were also useful for farmers to exchange information and ideas on other potential community coastal conservation efforts. By mid-2020, four meetings were conducted. This sharing and learning process has enabled participants to better understand restoration progress and challenges.

- **Livelihoods**

  - *Revitalized aquaculture*[16]

    Monitoring of revitalized aquaculture ponds (e.g., water salinity, PH, temperature, DO) and pond maintenance (e.g., sluice gate maintenance) was done daily by the pond owner/ user. Every farmer kept a log book to record his/ her monitoring results.

    255 farmers conducted revitalization aquaculture activities, with the ponds totaling 354.9 ha. Pond bio-physical/ ecosystem quality varied: 23.7 percent were good, 56.9 percent medium and 19.4 percent poor. Pond monitoring was done daily by the pond owner/ user, with the program further monitoring at a 20 percent sample rate (i.e., 51 farmers), monthly.

    Farmers applied improved pond management practices to different degrees. These included application of liquid fertilizer/ local micro-organisms (MOL), compost, both MOL and compost, natural feed, additional (artificial) feed application, synthetic fertilizers, and land drying.

    Most farmers produced milkfish, and 40 percent of farmers also produced shrimp. At the end of 2020, it was reported that the percentage of farmers implementing LEISA best practices had reached 63% for milkfish. It was also reported that over the duration of the program, the production of milkfish increased from 192 kg to 1,030 kg, which was greater

[14] For details on how this figure was calculated, see Table 13: Estimated mangrove recruitment area, coastal and riverine greenbelts (cost effectiveness section).
[15] The meeting was led by the Blue Forests.
[16] Monitoring of revitalized aquaculture was led by Blue Forests.

than a 500 percent increase in 270 ha. Production of shrimp increased from 43 to 350 kg, which was a greater than an 800 percent increase in 100 ha.[17]

Communication and policy advocacy

Monitoring of communication and policy advocacy initiatives was conducted at least semi-annually (from contract signature to the end of 2020). This was part of the overall assessment to determine group eligibility for the next disbursements of BwN-Biorights funds. All 10 groups passed the 80 percent threshold in every monitoring/ assessment.

Summary of communication and policy advocacy monitoring (mid-2018 – late 2020):

- *Group legal status and functioning*. Every group received legal status from the Ministry of Laws and Human Rights and functioned well (e.g., met regularly, members followed group rules, achieved consensus, and participated in BwN-Biorights workpkan implementation).
- *Annual workplans*. Every group prepared annual workplans.
- *Village development plans*. Every group sent representatives to actively participate in village development plan preparation. Some groups successfully advocated for mangrove conservation.
- *Village coastal regulations*. Some groups successfully led the formulation, or revision, of their villages' coastal regulations. Groups from villages with adequate coastal regulations conducted awareness raising with local communities. Village coastal regulations typically:
    - Designate village coastal zones (e.g., protected, semi-protected, restored areas, etc.).
    - Regulate access and specifies the types of activities that are (not) permitted. These include destructive fishing, mangrove cutting, sand mining, etc.. Villages with seafront permeable structures, like Bedono, Timbulsloko and Surodadi, also restricted activities in the area behind the structures.
    - Impose sanctions on those who breach the rules.
    - Assign an entity(ies) to monitor implementation and enforcement.
- *Monitoring*. See the previous section.
- *Capacity Building*. See Component 2 on capacity and trust building

[17] Source: 2020 progress report to the International Climate Initiative.

Output 9: Loans converted to grants, when criteria met

As described under activity 5.1, BwN-Biorights funds were disbursed in four phases. Groups were required to achieve scores of at least 80 percent in the Biorights assessments to receive subsequent disbursements. The loans were converted entirely to grants if all initiatives were implemented satisfactorily. This meant that group performance scores reached at least 80 percent in all four phases.

The program's fourth/ last monitoring and assessment, conducted in late 2020, showed that all 10 groups ultimately implemented all initiatives satisfactorily, sometimes this required implementation of corrective actions. Of the 10 community groups, the lowest score was 82.2 percent and the highest 97 percent (Table 7).

Table 7: BwN-Biorights Scores

	Villages	Community group	Scores (%)
1.	Bedono	Bedono Bangkit	89.90
2.	Betahwalang	Sido Makmur	97.00
3.	Morodemak	Mina Sido Mumbul	86.92
4.	Purworejo	Purwo Gumilar	82.20
5.	Timbulsloko	Barokah	85.00
6.	Tugu	Semi Jaya Al Barokah	88.00
7.	Wedung Seklenting	Rejo Mulyo	82.20
8.	Wedung Gojoyo	Onggojoyo Jaya	91.61
9.	Surodadi	Berkah Alam	88.86
10.	Tambak Bulusan	Jaya Bhakti	83.00

Lessons learned and recommendations: Implementation and monitoring

Land tenure

A BwN-Biorights participation requirement was clear land tenure status (i.e., ownership or user rights). This could be a challenge, especially for those with ponds designated as coastal greenbelt. They had to give up the pond and contractually agree not to re-open for at least 15 years. The BwN-Biorights program would financially compensate the farmer, depending on pond size and negotiations. Farmers were more willing to cooperate when the ponds were no longer productive. It was different if the ponds were still productive and the main family income. Thus, community participation may be easier to obtain in the areas with unproductive ponds. However, these areas were usually severely degraded and more challenging for mangrove restoration.

Another challenge was if the pond owner did not live in the village. Even if the owner could be found and agreed to compensation, s/he could not join the community group and thus was not subject to a BwN-Biorights contract and associated obligations.

Land tenure is a critical challenge in coastal mangrove restoration. Mangrove planting in Indonesia is often done in the intertidal zone, where there can be no land claims, but these are often ecologically unsuitable zones for mangrove restoration. BwN-Biorights offered a partial solution by providing financial compensation to farmers who gave up their ponds and agreed not to re-open for at least 15 years. However, what will happen to the mangroves after those agreed 15 years is questionable.

To avoid mangrove clearance and new land claims (over the newly established land from accretion i.e., *tanah timbul*), it is vitally important to enforce government greenbelt and coastal village regulations.

Greenbelt compensation

Compensation for coastal greenbelt and mixed-mangrove aquaculture ponds varied depending on the pond size. Thus, the same size pond received the same amount of financial compensation. However, as ponds were being restored, it became obvious that some ponds were more severely degraded than others. A few were even too degraded and merged with the ocean and thus, were not feasible for restoration. The financial compensation should have factored in this issue. For example, the more severely degraded the pond, the less the financial compensation.

Supra-village policy

BwN-Biorights interventions focused at the village level. However, some key drivers of coastal degradation are from outside village boundaries. For example, the opening of ponds in the greenbelt zone is driven by farmers' livelihoods needs but also by urban and international markets. Although government greenbelt protection regulations are clear, they are rarely enforced. Government aquaculture subsidies also sometimes indirectly incentivize mangrove conversion into aquaculture.

Similarly, land subsidence is due to a combination of factors (e.g., excessive water withdrawals in and outside of the villages, highrise buildings too close to the seafront, etc.). These are partly a result of inappropriate (and/or unenforceable) government land use policies.

Supra-level sustainable coastal and land use policy and management is critical for coastal mangrove sustainability. Future programs should ensure that local-level mangrove conservation achievements are formally endorsed at the supra-village level, at least at the sub-district and district levels. For example, awareness raising of village coastal management regulations could be extended to the sub-district and district levels. Government officials could also be invited to participate in regular program monitoring.

Monitoring

Local community involvement in monitoring was critical to implementation success since problems could be detected early and corrective measures taken promptly. This was especially true for the permeable structures which required regular monitoring and maintenance. Biorights contracts provided financial and legal monitoring incentives. It will be interesting to see if local communities still conduct regular monitoring when these incentives cease to exist.

Component IV: Sustainability

BwN-Biorights included initiatives to advocate for program sustainability, as described below.

Target: Coastal conservation measures integrated into village development plans and coastal regulation

Community groups were contractually obligated to advocate for the integration of coastal conservation measures into village development planning and coastal regulations. This was to help ensure coastal conservation legal protection, at least at the village level. Coastal conservation integration into village development plans provided the BwN-Biorights policy umbrella. It also helped to leverage government development funds.

Village development plan priorities, however, changed every year. This was in contrast with village coastal management regulations, which remained the same. Regulations banned certain activities (e.g., fishing using poisons or bombs) in the village coastal zone and included penalties for those in breach. It gave village governments enforcement power, and mandated community group monitoring. All nine villages have coastal management regulations, which are expected to help with long-term coastal conservation safeguards.

Target: Community groups functioning

Community groups were the BwN-Biorights program's engine. Mangrove greenbelts are a common property (at least theoretically); their management and protection require collective action. Community group functioning and sustainability is thus critical to safeguarding and expanding upon the gains from BwN-Biorights.

To ensure legitimacy (i.e., acknowledged by both communities and government) and promote sustainability, the BwN-Biorights contracts required community groups to be legally registered, have clear rules, meet regularly, document their meetings for transparency, and establish collective business ventures. The latter was the vehicle for livelihood improvements and collective action. By the program's end at the end of 2020, all 10 community groups in nine villages were functioning and operating group-managed income generating activities. Some struggled, while others were running reasonably well. Markets, however, were still limited at the village level.

Target: Community groups funds functioning

Another Biorights mechanism to promote group sustainability was the requirement for members to contribute IDR 5,000 every month and 10 percent of BwN-Biorights supported (individually and collectively run) income generating profits. These funds are expected to help expand post-program mangrove conservation and livelihoods activities. The total financial

savings of the 10 community groups are currently IDR 82,414,000. These funds are only used for group internal needs.

Lessons learned and recommendations: Sustainability

Changed local behavior in mangrove conservation

One of the program's major achievement, yet seemingly undocumented, was improved local awareness and changed behavior towards mangrove conservation. This is key to coastal ecosystem sustainability. However, the program indicators heavily focused on technical and "quantitative" aspects such as the restored mangrove area and increased income/ profit. While the quantitative indicators are important, the qualitative ones should not be ignored as the latter are often key to keep the mangroves standing.

Village coastal regulations

Village coastal regulations are essential to safeguarding village mangrove ecosystems and sustainability. BwN-Biorights rightly ensured that regulatory formulation/ revision was a major program activity. However, mangrove clearance threats can come from powerful interests outside the villages. Accordingly, as indicated above, awareness raising about village coastal regulations should be extended to the sub-district, district and provincial levels.

Community group collective action

Community groups led grassroots collective actions and thus, were key to successful BwN-Biorights implementation. They are also expected to lead safeguarding of post-program mangrove conservation. The 11 community groups[18] took the initiative to establish the "Bintaro Forum". It is aimed at facilitating group communication and collaboration on coastal and mangrove conservation, especially after the program has ended.

Program-supported group income generation was intended to further group cohesiveness and sustainability. This was an innovative strategy, and could be reinforced with increased business capacity building (in addition to start-up capital) in such areas as business development and marketing. However, experiences in other parts of Indonesia are that income generation can also become a source of conflict. This often happens if corruption occurs, or if group members perceive there to be unfair cost-benefit sharing.

[18] One all female group, the Kartini Bahari, was established later in project implementation.

Cost effectiveness

This section provides the framework for a cost effectiveness analysis covering the four components of the BwN-Biorights program described above.

The information presented here should be considered as preliminary and treated with caution. This section is a first step in a process towards understanding the effectiveness of the program. There are a number of reasons for this, including:

- The BwN-Biorights program began in 2015 with planning and preparedness activities (Component 1). Implementation of core and supporting initiatives included in Biorights contracts (Component 2) started in the second half of 2017 and continued for just over three years until the end of 2020. The full benefits of some interventions (e.g., those related to mangrove restoration) will only be evident in the years following completion of the program.
- Some data are currently being finalized or are incomplete (for example mangrove restoration area, profits from non-aquaculture livelihood activities).
- There are factors beyond the influence of the BwN program which had a significant impact on achievement of results. A stark example is subsidence. The subsidence resulting from unsustainable groundwater abstraction in Demak was more severe than anticipated at the start of the program. Measurements during the program also showed that the impact stretched along the entire coastline, while previously it was thought to be concentrated around Semarang. This meant that even when there was sediment trapping behind permeable structures, it was not enough to support the scope of mangrove settlement that had been expected at the start of the program. For this reason, subsidence was considered as a force majeure by the BwN program. Addressing it was beyond the scope and power of the program, yet the costs associated with permeable structures and relatively low benefits are still be reflected in the cost assessment of BwN-Biorights. In response to the impact of subsidence, the program paid more attention to alternative livelihoods, awareness raising and empowering communities to voice their needs in policy dialogues. The significant benefits of some of these interventions are not necessarily captured well in an analysis of cost and benefits, as discussed in more detail below.

Categories of costs and benefits

The general categories of costs and benefits for the BwN-Biorights program are shown in Table 8. Costs are divided into two categories:

- Costs incurred by implementing organizations.
- In-kind contributions from community groups.

Benefits are divided into three categories:

- Those which are quantifiable in monetary terms.

- Those which should be quantifiable in monetary terms but for which data is pending. This includes items for which data has yet to be collected for different reasons but for which in future there is a realistic expectation that monetary benefits can be assigned.
- Qualitative, which are non-quantifiable in monetary terms. This is a very significant category of benefits related to community resilience, and upscaling.

Table 8: General categories of costs and benefits

Cost categories[a]	Benefit categories
1. Costs incurred by implementing organizations: • Stakeholder consultations/ socialization • Feasibility assessments • Establishment and on-going meetings of community groups • Biorights support to community groups • Group engagement with village regulatory and planning processes • Coastal Field Schools • Non-coastal field school capacity building • Monitoring, learning and evaluation • Costs for aquaculture (sluice gates, dykes, etc.) • Hardware costs for permeable structures • Maintenance of permeable structures (labor, costs of materials) • Field coordination and facilitation **2. Cost incurred by community groups** • In-kind contributions to BwN-Biorights activities (time, labor and local materials)	**1. Currently quantifiable in monetary terms (to end 2020)** • Profits from mixed-mangrove aquaculture and revitalized aquaculture livelihood activities • Profits from groups' joint business ventures • Ecological services due to mangrove regeneration in areas linked to greenbelt and MMA **2. Quantifiable in monetary terms – data pending** • Non-aquaculture livelihood activities • Increased ecological services, including carbon, due to mangrove recruitment linked to sediment trapping from permeable structures[b] • Maintenance of ecological services, including carbon, of existing mangrove areas as a result of protection through village regulations and enforcement[c] **3. Qualitative (non-quantifiable in monetary terms)** • Strengthened coastal community resilience due to: - Improved community capacity to analyze local environmental situation and mainstream environmental considerations into village and district planning and implementation - Improved livelihood security due to community groups with increased skills and capacity to access external funding for environment and livelihood activities - Strengthened capacity to conduct evidence-based policy advocacy at different levels using experience from BwN-Biorights in Demak • Upscaling potential: - Potential dissemination of sustainable aquaculture practices beyond BwN-Biorights target communities through farmer-to-farmer dissemination - Potential contribution to a shift from narrow sectoral-based coastal restoration approaches to more integrated landscape approaches - Community ability to build and maintain permeable structures beyond program

a. The cost assessment is restricted to the BwN-Biorights program. Costs not directly related to the program are excluded (for e.g., costs for construction of permeable structures; costs for the contribution of international consortium members). This cost boundary was agreed in discussions with Wetlands International
b. In 2020 field measurements were hampered by the COVID-19 pandemic. Subsidence has resulted in a high level of uncertainty.
c. The area protected in each village still needs to be mapped.

Estimating costs and benefits

This section provides preliminary estimates on the costs and benefits that are currently quantifiable in monetary terms. As mentioned above and discussed in the recommendation section which follows, there are significant benefits that cannot yet be included in this analysis.

Costs

Table 9 provides an overview of the costs associated with implementation of the BwN-Biorights program in Demak. Data was provided by Wetlands International.

Table 9: Estimated costs of implementing BwN-Biorights in Demak

Description	EUR	% of total
BwN intervention: Design, monitoring, and coordination of Building with Nature interventions in Demak.	324,150	25%
Policy dialogues: Village regulations and development plans, district and province master planning	213,951	16%
Coastal Field Schools	267,046	20%
Biorights financial mechanism: Covering direct costs of mangrove restoration and sustainable development measures, incl. 15% operational costs	470,000	36%
Travel	45,000	3%
TOTAL	**1,320,147**	

In addition to the cost incurred by program implementing partners, the contracts with community groups showed in-kind contributions as shown in Table 10.

Table 10: Estimated in-kind contribution by community groups

Initiative	EUR
Permeable structures	2,190
Coastal greenbelt	17,040
Riverine greenbelt	20,890
Revitalized aquaculture	39,190
Livelihoods	8,870
TOTAL	**88,180**

Benefits

This section provides information on quantifiable benefits for which reasonable data is available. The assumptions used in calculating the benefits are explained for each category.

➢ **Profits from mixed-mangrove aquaculture and revitalized aquaculture livelihood activities**

Data sets for this section included the following information provided by Wetlands International:

- Baseline data collected for each individual in each BwN-Biorights community group.[19]
- Data on the economic activities of each group member within each group collected at the end of each of the four phases of the Biorights contracts. This included a breakdown of revenue data from mixed-mangrove aquaculture and revitalized aquaculture activities.[20]

Table 11 shows the profits from aquaculture livelihood activities conducted in mixed-mangrove aquaculture and revitalized aquaculture areas. They were calculated as follows:

- Baseline data on income (*penghasilan*) was extracted from the baseline data file. The data was rolled up to the group level.
- BwN-Biorights contracts were signed in September 2017. The period being analyzed ran until end 2020 (total of 3.25 years). It is assumed that had the BwN-Biorights activities not taken place, the yearly income from the ponds would have been the same as the baseline.
- The baseline was adjusted for the duration of the Biorights contracts (i.e., multiplied by 3.25, see column a, Table 11) so that the profits from the contract period could be compared to the baseline adjusted for the same period
- Mixed-mangrove aquaculture and revitalized aquaculture revenue data (*hasil pendapatan*, income less expenses) from each individual from each contract phase was combined and rolled up to the group level (see column b in Table 11).
- To show the additional profit resulting from the mixed-mangrove aquaculture and revitalized aquaculture livelihood activities, the adjusted baseline amount (a) was subtracted from the profit during the contract period (b).

Table 11: Profit from aquaculture livelihood activities, mixed-mangrove aquaculture and revitalized aquaculture ponds[21]

		EUR		
No	**Village**	**(a) Adjusted baseline (3.25 years)**	**(b) Profit during contract period (3.25 years)**	**Additional profit from MMA[a] and RA[b] (b-a)**
1	Bedono	6,778	10,225	3,447
2	Timbulsloko	6,709	- 190	- 6,899
3	Surodadi	13,587	20,495	6,908
4	Tugu	7,488	30,738	23,249

[19] File: Baseline data kelompok

[20] File: Data kegiatan ekonomi kelompok 2017-2020. Note that there were some inconsistencies in the data.

[21] When conditions allow, it would be valuable to compliment the quantitative data with field interviews with farmers. That would allow more complete analysis and identification of lessons.

No	Village	EUR		
		(a) Adjusted baseline (3.25 years)	(b) Profit during contract period (3.25 years)	Additional profit from MMA[a] and RA[b] (b-a)
5	Tambakbulusan	7,417	24,936	17,519
6	Morodemak	12,876	32,680	19,804
7	Purworejo	21,897	27,324	5,427
8	Betahwalang	11,983	7,937	- 4,045
9	Wedung (Onggojoyo)	7,671	13,867	6,196
10	Wedung (Seklenting)	11,385	58,461	47,076
TOTAL		**107,792**	**226,473**	**118,681**

a. MMA: Mixed-mangrove aquaculture
b. RA: Revitalized aquaculture

- **Profit from joint business ventures**

The profits from the joint business ventures of each group over the contract period are shown in Table 12. This information was collected as part of the monitoring at the end of each phase of the community groups' Biorights contracts.[22] The business ventures were new initiatives so the baseline was zero.

Table 12: Profit from group joint business ventures

No	Village	EURO
1	Bedono	1,118
2	Timbulsloko	794
3	Surodadi	2,410
4	Tugu	1,305
5	Tambakbulusan	1,417
6	Morodemak	2,123
7	Purworejo	1,218
8	Betahwalang	250
9	Wedung (Gojoyo)	887
10	Wedung (Seklenting)	1,202
TOTAL		**12,724**

- **Ecological services values due to increased mangrove areas linked to coastal and riverine greenbelt restoration activities**

The estimate of the value of ecological services from mangroves is based on the area of mangroves shown in Table 13. The figures for total area of intervention were provided by Wetlands International.[23]

[22] File: Community group saving funds
[23] The assessment team was provided with several different sources of data about the area of mangrove: i) Blue Forests final report on activities between November 2018 - September 2020, ii) March 2021 report from Deltares

Table 13: Estimated mangrove recruitment area, coastal and riverine greenbelts

Intervention	Total area of intervention (ha)	% of area dedicated to mangrove restoration	Area dedicated to mangroves (ha)	Mangrove recruitment success rate	Mangrove recruitment area (ha)
Coastal greenbelt (pond conversion)[a]	62.06	100%	62.06	63%	39.10
Riverine greenbelt (mixed-mangrove aquaculture - 10% of area for mangroves)	102.49	10%	10.25	75%	7.69
TOTAL					**46.79**

a. Mangrove recruitment in the coastal greenbelt behind the permeable structures (i.e., in non-pond areas) was low, largely due to the impacts of subsidence. As a result, no estimates are included for these areas.

The value of ecological service values shown in Table 14 was calculated based on:

- The total mangrove recruitment area from Table 13 (46.79 ha) multiplied by a per hectare estimated value of ecological services taken from the scientific literature.
- Based on a literature scan, the work of Rizal and Herawati (2018) was used to determine a basis for valuation.[24,25] A value of EUR 2,994/ ha/ year was used to calculate the ecosystem value of mangrove restoration. [26]
- The ecological services value of the BwN-Biorights greenbelt areas was calculated for 15 years, based on the length of time that group members commit to not converting the ponds (see activity 8.2). Given the potential impacts of subsidence on the long-term viability of mangrove areas, this assumption has a high level of uncertainty.

on Monitoring of Mixed Mangrove Aquaculture, iii) excel spreadsheet from Wetlands International showing information updated in 2020 after implementation and backed up by contracts (Data luas tambak GB MMA RA_09 2020, table 2). Information on the area and status of mangroves in these sources differed. Wetlands International requested that the assessment team use the data in the excel sheet to estimate benefits, together with the mangrove recruitment rate reported in the 2020 progress report to the International Climate Fund.

[24] Rizal A, Sahidin A, Herawati H (2018). *Economic Value Estimation of Mangrove Ecosystems in Indonesia*. Biodiversity Int J 2(3): 00051. DOI: 10.15406/bij.2018.02.00051

[25] Hakim (2017) conducted a relevant study focusing on the BwN program in Demak. The study assessed the long-term net present value of the economic benefit of conducting mangrove restoration and aquaculture improvement using Environment Cost-Benefit Analysis during a 25-year timeframe. The results showed that the economic value of aquatic organisms, brushwood (mangrove patches) and nursery function was 25.6 million, 2 million and 31.5 million IDR ha^{-1} $year^{-1}$ respectively. These figures were not used in the current analysis as they do not capture the full range of mangrove ecosystem services, including coastal protection and carbon storage. (Reference: Hakim, Lugas Lukmanul. 2017. Cost and benefit analysis for coastal management. A case study of Improving Aquaculture Practices and Mangrove Restoration in Tambakbulusan Village Demak Indonesia. MSc. Thesis Report. Wageningen UR)

[26] Rizal and Herawati (2018) stated that, "… the total economic value of mangrove ecosystem is ranging from US $3,624.98 to US $26,734.61 per hectare per year" (p. 3). We used the low values in the range and calculated the EUR amount based on an exchange rate of 1.21078 USD to the EURO.

Table 14: Preliminary estimate of ecosystem values of coastal and riverine greenbelt regeneration

a.	Area of mangrove regeneration (ha)	46.79
b.	Value of mangrove regeneration (per ha/ per year)	2,994
c.	Number of years	15
Total EUR value (a * b * c)		2,101,399

Summary of costs and benefits

At this stage a cost assessment should be considered as preliminary. This is in part because some data on benefits (category 2 in Table 8) are not yet available). Based on the cost and benefit figures provided in the previous section, we can make an initial rough comparison of actual costs and monetary benefits of the BwN-Biorights program as follows:

Table 15: Comparison of benefits and costs

Item	EUR	
Benefits		
Currently quantifiable in monetary terms (to end 2020)		2,232,743
Aquaculture livelihood activities, mixed-mangrove aquaculture and revitalized aquaculture ponds (Table 11)	118,680	
Profits from groups' joint business ventures (Table 12)	12,724	
Ecological services due to mangrove regeneration (coastal and riverine greenbelts) (high level of uncertainty) (Table 14)	2,101,339	
Costs		1,408,327
1. Costs incurred by implementing organizations	1,320,147	
2. In-kind contribution from community groups	88,151	
Difference, benefits over costs		**824,446**

As Table 15 shows, using purely monetary measures and currently available information, the benefits of the BwN-Biorights program appear to outweigh the costs. However, this should be treated with a significant degree of caution given the high risk that subsidence poses to mangrove ecological services which are calculated based on a 15-year timeframe. If subsidence continues at current rates, there may be a decline in benefits over time in different parts of the landscape rather than an increase, meaning that the value in Table 15 would be an over estimate.

It is worth highlighting that the costs of the BwN-Biorights program were investments in the longer term. The profits from community livelihoods, ecological services from mangrove restoration and strengthened community resilience from capacity and trust building activities will continue to generate benefits long after the program has been completed.

At the start of the BwN program a business case was prepared. One of the elements of this was a socio-economic cost benefit quick scan to demonstrate that the required investments were sound and financially sustainable. At the time, the expectation was that with the revitalization of 300 ha of aquaculture ponds, the net profit by the end of the program would be around 5,000 EUR/ha/year, resulting in an annual yield of 1.5 million EUR.

Based on the data currently available, it appears that this ambition was not realized over the life of the program. Table 11 shows a profit without baseline adjustment for all aquaculture livelihood activities from the start of the Biorights contracts in the second half of 2017 until end 2020 of approximately EUR 226,473 (it is assumed the business case amount did not include a baseline adjustment). There were an estimated 378.63 ha of land in use for Biorights aquaculture activities (92.24 ha under mixed-mangrove aquaculture and 286.39 under revitalized aquaculture)[27]. Over the three and a quarter year period, this would result in an average profit of 184 EUR/ ha/ year. It should be noted that subsidence affected productivity due to harvest loss from flooding.

While the business case aspiration was not achieved, it is important to note that the profit over the three and a quarter year period was approximately double the adjusted baseline amount (columns c in Table 11). A related program indicator showed that by the end of the program, productivity from sustainable aquaculture had increased well over the 50% final target value for 300 ha (for more details see Activity 8.1, livelihoods).[28]

In the original business case, it was expected that community members would contribute 5% of their net profits from aquaculture revitalization for the maintenance of the coastal belt and to revitalize additional aquaculture ponds across Demak district. The expectation was for 40 additional aquaculture ponds per year to be revitalized through this mechanism. By the end of the BwN-Biorights program, the total value of savings from the ten community groups was approximately EUR4,579. These savings came from group joint business ventures rather than individual contributions. No savings over the life of the program were used for replication as envisioned in the business case. The savings are currently targeted for internal group use use to support and continue the implementation of the group's activities after the program's completion. When field conditions allow, it would very useful to conduct interviews with group members to explore (among other things): i) their opinion of the 5% contribution approach and whether it is an effective mechanism for replication over the long run, ii) alternate ideas they might have about how to support sustainability and replication.

The original methodology for this assessment envisioned a comparison between the BwN-Biorights mechanism and the benchmark of standard government-sponsored mangrove restoration programs in terms of elements such as planning/ budgeting, training, implementation, outcomes, and the sustainability of interventions. Information from

[27] Based on file: Data luas tambak GB MMA RA_09 2020, Table 2. Assuming that 90% of mixed-mangrove aquaculture is used for aquaculture and 10% for mangroves.
[28] 2020 report to the International Climate Initiative (IKI).

government sources indicates that government programs restore one hectare of mangrove area for between Rp 25,000,000 and Rp 50,000,000 (at current exchange rates, EUR 1.452 – EUR 2,904). The government approach relies fully on re-planting by contractors, and there is rarely follow-up to assess success. With no indication of success rates, it is impossible to make a comparison.

The integrated BwN-Biorights approach focused not only on mangrove restoration but also deep community engagement, aquaculture revitalization, alternative livelihoods, and very importantly, strengthened community resilience to contribute to sustainability. A more meaningful comparison/ benchmark might be with similar programs implemented by Wetlands International or other organizations which combine livelihood activities and mangrove restoration.

Recommendations

As discussed in more detail below in the sections on innovation and recommendations for up-scaling, the BwN-Biorights mechanism shows value as an approach aimed at taking a landscape perspective towards integrating environmental restoration, improving community livelihoods and strengthening coastal community resilience. To better understand both the monetary and non-monetary benefits of the approach, the following actions are recommended:

1. Where possible, fill the gaps in information under Table 8 category 2 (quantifiable in monetary terms – data pending).
2. Conduct a rigorous assessment of the socio-economic and ecological impacts of the BwN-Biorights initiatives on area and quality of mangrove restoration. This would fill the data gap related to mangrove recruitment linked to sediment trapping from permeable structures while at the same time enhancing data on coastal and riverine greenbelt areas.
3. Monitoring of the economic activities of groups resulted in quite a detailed data set. If this data is going to be used for further analysis, the data should be reviewed and data set cleaned.
4. Explore how best to include the benefits of strengthened community resilience and the potential influences on upscaling into a cost assessment (Table 8 category 3). It is expected that these benefits will be significant.
5. Consider estimating the benefits that mangrove restoration generates in terms of protecting homes, livelihoods and infrastructure. This could increase government interest in mangrove restoration and seeking donor funds for adaptation measures. Again, subsidence would need to be taken into consideration.
6. Consider calculating the carbon sequestration capacity of the newly restored areas. Such an analysis would also need to take into consideration the possible impact of subsidence on the permanence of carbon stores in different parts of the landscape.
7. Explore what other programs of Wetlands International or other organizations might offer an appropriate comparison to the BwN-Biorights approach and try to obtain cost and benefit information from those programs.

It is also recommended that government, communities and program implementors continue to monitor the benefits flowing from the BwN-Biorights program in Demak over time. As mentioned earlier, some benefits will accrue over time (for example, mangrove areas and associated ecosystem services). This will contribute to a better estimation of the benefits and value of the program.

Innovative aspects

People-centered conservation, which focuses on both the environment and on livelihoods, has gained momentum since the 1990s. Some well-known approaches include community-based natural resource management (CBNRM), collaborative management (co-management), alternative sustainable livelihoods (ASL) and payment for ecosystem services (PES).

Biorights is another form of people-centered conservation. It provides microcredit to improve farmers' livelihoods in return to their active participation in achieving conservation goals. Microcredit is converted into cash payments upon successful delivery of the conservation services.

While the concept of integrating conservation and livelihoods objectives has been around for the last three decades, Biorights can be considered innovative for the following reasons:

- Biorights has been proven to be a feasible and flexible approach to deliver innovative mangrove restoration techniques such as building with nature (BwN), mixed-mangrove aquaculture and LEISA.

- Biorights offers direct cash (not in-kind) incentives and thus, is more attractive to the targeted beneficiaries. In this respect, Biorights is similar to PES, while different from CBNRM, co-management and ALS.

- Biorights unifies development and conservation objectives into a workable framework. The Biorights financial package is delivered as a contractually binding conditional loan with phased disbursements. Loans must be used for (environmentally friendly) livelihoods improvements. Local communities repay the loans in the form of contributions to achieving conservation objectives. Thus, each loan disbursement must meet certain mutually agreed upon conservation criteria and indicators. This contractual obligation has more weight than voluntary participation, and thus increases the likelihood of success. Since the loan disbursement criteria and indicators are negotiated in advance, resistance and conflicts are minimal.

  It should be noted, however, that the ability of group members to fulfill their contractual obligations depends as much on their active participation as on their conservation technical capacity. Accordingly, local conservation capacity building must always be an integral part of Biorights.

  In the BwN-Biorights program, loan conditions also included activities and indicators not directly linked to conservation, such as group communication and policy advocacy. This was an important step for promoting group cohesion as well as incorporating policy advocacy sustainability measures.

- Although loans are received by individual farmers, the Biorights contract is between the program and the farmer group, not the individual. Group contracts create peer pressure to comply with the loan conditions, since one group member's performance affects the entire group. In addition, since contract signing is public and witnessed by village authorities, peer pressure also come from the broader community. Group contracts are also easier to manage than individual contracts.

- Equally important, working with groups permits a landscape level approach, rather than just individual plots. This provides the opportunity to build farmer awareness on, and take responsibility for, the area's wider ecological challenges.

- If a group fails to meet its contractual obligations, the financial package (i.e., loan) is transferred to another group. This creates a sense of competition among groups, which acts as an incentive to fulfill the loan conditions. Group failure may also create shame among the group members, especially in a society where traditional collective norms are still strong.

Recommendations for scaling-up

Scaling-up in this report refers to a situation in which the process and/ or results are replicated and expanded, partially or entirely, beyond the program's immediate sites. It is divided into horizontal and vertical scaling-up.

Horizontal scaling-up is when replication takes place organically, as more and more people adopt the program without requiring additional institutional, bureaucratic and financial support. For example, some villagers who were not involved in the program may adopt mixed-mangrove aquaculture or LEISA methods after seeing their neighbors increased production and income. Or, other villages may formulate coastal village regulations after seeing decreasing mangrove clearance in the program's target villages.

Vertical scaling-up is when the process and/ or results are replicated, partially or entirely, at a higher administrative and/ or political jurisdiction (e.g., at district, provincial, national or international levels). For this to happen, new administrative, institutional and financial mechanisms are needed. For example, the provincial government (i.e., Central Java) could allocate budget and create administrative and technical procedures in order to offer loans to farmers in other coastal villages. These loans would be conditional on the construction and maintenance of permeable structures and/ or adopting mixed-mangrove aquaculture and/ or LEISA methods.

To reach as many people as possible, vertical and horizontal scaling-up should go hand in hand.[29]

1. Horizontal scaling-up

Horizontal scaling-up is not the expansion of a program *per se*. Rather, it is the spontaneous replication of program results, which is often the ultimate goal of any development project. Farmers are usually more ready to adopt a new practice (e.g., mixed-mangrove aquaculture, LEISA) when they see other farmers showing good results (e.g., more pond production). However, good production alone may not be sufficient to make farmers transform their conventional aquaculture into new practices such as mixed-mangrove aquaculture and LEISA. Transaction costs for adopting new practices can be high, especially at the beginning and without external assistance (e.g., government, donor).

However, market incentives can be a powerful driver for behavioral change. A future Biorights program should consider addressing market incentives to enable horizontal scaling-up/ spontaneous replication. For example, as indicated earlier, mixed-mangrove aquaculture and LEISA products could be marketed with an "environmentally friendly" unique selling point.

[29] The terms "horizontal" and "vertical" scaling-up were adopted from Hartmann, A., & Linn, J. (2008). Scaling-up: A Framework and Lessons for Development Effectiveness from Literature and Practice. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1301625

This may create market demand, especially among the more health-conscious urban middle class. If the price (and other factors such as taste, freshness, etc.) of mixed-mangrove aquaculture and LEISA products is the same (or better) as conventional products, consumers may choose the former. Financial returns are also a strong incentive for private (and public) sector investment.

Scaling-up considerations

Market incentives. Activities that address market incentives for horizontal scaling-up could be embedded in the program design. These include value chain and bottleneck (of main commodities) analyses, as well as marketing strategies (e.g., market research, product development, marketing techniques). Providing farmers with digital marketing training using social media (e.g., WhatsApp, Facebook) can be a useful capacity building initiative. Private sector collaboration that brings market perspectives could be invaluable to this process.

If LEISA products can demonstrate good profit margins, other farmers may be interested in converting to LEISA. It would be useful to explore if there are any micro-credit institutions that can cover the initial high conversion costs. Future Biorights programs could explore lending/ micro-credit institutions that target small producers, especially for environmentally-friendly products. Alternatively, it may be useful to approach large businesses (including banks) with strong environmental reputations. In Indonesia, large businesses (including state and private banks) are required to allocate 2.5 percent of their profits to corporate social responsibility (CSR) initiatives; these funds are typically spent at the local community level.

However, market incentives may not work in areas where mangroves are common property. In such areas, external entities (e.g., government, donor) are likely still needed for mangrove restoration. Willingness to safeguard mangroves can also be a result of increased environmental awareness and enforced regulations and/ or customary rules.

***Networking*.** A common strategy for horizontal scaling up is to forge collaboration and networking with other communities. This can stimulate farmer to farmer learning, which is a precondition for innovation adoption. The Bintoro Forum could be a strategic avenue to disseminate BwN-Biorights results/ information to other communities (and governments). This newly established grassroot association, however, first needs capacity building (e.g., organizational management, networking, advocacy, lobbying) to be able to operate effectively.

The Bintaro Forum is still very new; its effectiveness, in terms of influencing other farmers, is unknown. The program has established other communication and information dissemination channels, such as bulletins, a WhatsApp group, posters in village centres, the Surodadi visitor centre, village exchanges. etc.. The impacts of these communication methods is not yet known. A future program should consider incorporating an explicit program indicator to measure program reach and impact beyond the target beneficiaries.

Financial mechanism. There has been some internal discussion in Wetlands International about implementing the Biorights mechanism through banks or micro-credit agencies. While

the idea is intriguing, it may not work because the very reason banks and micro-credit agencies exists is to issue loans that are paid back, with interest. It is difficult to see how the Biorights mechanism, which is all about ultimately transforming loans into grants could fit with this business model.

It is possible that banks and micro-credit agencies could act as managing intermediaries, but there are several concerns with this idea. Firstly, it can be expected that banks and micro-credit agencies will have high transaction costs which will be reflected in the fees that would need to be paid for their services. Secondly, these organizations do not have the technical skills and knowledge to manage Biorights contracts so would need to hire expert support, again likely increasing the costs. Thirdly, one of the strengths of the Biorights mechanism is its flexibility. Given the way that banks operate and the importance of rules, regulations and conformity, it might be difficult to maintain that flexibility while working with a bank or micro-credit agency.[30]

Early indications of horizontal scaling-up

Interviews with group members, village government representative and the project team provide early indications that horizontal scaling-up is taking place. For example, there is anecdotal information about other farmers who have started to adopt the LEISA approach at their own initiative. Other information includes the formation of new groups focusing on mangrove conservation and livelihood activities. Additionally, it was mentioned that other villages are developing coastal conservation regulations.

All of this information still needs to be confirmed. It is therefore recommended that Wetlands International conduct a well-planned field survey (including interviews) to explore and confirm these and other developments in more detail. This would include the economic multiplier effects resulting from the project such as, for example, the establishment of small businesses to capitalize on mangrove eco-tourism.

With scaling-up in mind, the survey should be designed to identify the reasons why people are replicating the results from the BwN-Biorights program. Findings from the survey could then be used to ensure that scaling-up considerations are embedded in the design of any future programs.

2. Vertical scaling-up

Vertical scaling-up occurs when successful programs are sustained, adapted and expanded at a larger geographical scale, thereby achieving greater impacts. The BwN-Biorights program consisted of three interrelated interventions:

[30] To fully explore this idea, it is recommended that when the conditions allow, Wetlands International arrange face-to-face with representatives from banks and micro-credit agencies to discuss what might be possible.

1. The BwN ecosystem (mangrove) restoration (e.g., permeable structures, pond conversion into mangroves, mixed-mangrove aquaculture) and aquaculture revitalisation.
2. Biorights, which provided livelihoods-based conditional payments in return for community participation in mangrove restoration.
3. Community capacity building in mangrove conservation, livelihoods and collective action.

For this report, BwN-Biorights vertical scaling-up refers to the (potential) expansion of all three interventions. However, it is also possible that Biorights financing could be used to implement and expand other types of community-based conservation (e.g., watershed forest restoration).

The most important aspect to any scaling-up process is collaboration with a partner that has the capacity to do so – this is usually the government. Scaling-up efforts must assess the enabling conditions that will allow the interventions to grow. At a minimum, the technical, financial and institutional/ organizational capacity must be in place. Decisions also have to be made with regards to the geographical and administrative scale at which the expansion is targeted, e.g., district, provincial, coastal regions (which could cross district or provincial jurisdictions), national.

Funding for scaling-up could be from donor(s), government, private sector, or a combination thereof. If the scaling-up is expected to be done by the Indonesian government (GoI), the enabling conditions should be assessed against the GoI's existing technical, financial and institutional/ organizational capacity for similar initiatives (Table 16.).

Table 16: Enabling conditions for scaling-up

Enabling conditions	BwN-Biorights program	Government program
Technical	*Mangrove restoration* • Permeable structures • Pond conversion to mangrove areas • Mixed-mangrove aquaculture *Livelihoods* • Sustainable livelihoods (e.g., revitalized aquaculture) • Extensive local capacity building in mangrove conservation, livelihoods (e.g., revitalized aquaculture), collective action, policy advocacy • Alternative livelihoods • Joint ventures Note: mangrove restoration and livelihoods are integrated initiatives.	*Mangrove restoration* • Mangrove planting • Sylvo-fishery *Livelihoods* • Intermittent assistance for aquaculture inputs (e.g., milkfish seed, shrimp seed). • Intermittent local capacity building (e.g., training) for different aquaculture topics (e.g., shrimp culture, fish feed production, pest management). Note: mangrove restoration and livelihoods are stand-alone initiatives.
Financial	• Five-year cycle	• One-year cycle

Enabling conditions	BwN-Biorights program	Government program
	• Large amount (compared to government budget), continuing over the program's lifetime	• Limited amount, and not available every year
Institutional/ organizational/ personnel capacity	• Flexible organization/ institutional arrangement; personnel with technical expertise in mangrove conservation and sustainable aquaculture • Program personnel (field facilitators) • Mangrove conservation and livelihoods initiatives are managed by the same organizations (i.e., consortium), allowing the two initiatives to be integrated into one cohesive program	• Rigid bureaucracy; extension officers have aquaculture expertise, but not in mangrove conservation. • Mangrove conservation and coastal livelihoods are managed by different government departments that rarely work together. The former is by the Ministry of Environment and Forestry (MoEF) and the latter by the Ministry of Marine Affairs and Fisheries (MMAF).
Program management	• Adaptive	• Rigid, prescribed

As shown in Table 16, there is little likelihood that the GoI will adopt the entire BwN-Biorights approach (i.e., integrating mangrove conservation and conditional loan-based livelihoods improvements) into its routine development plan and budgeting. Mangrove conservation and coastal livelihoods are under two different departments (MoEF and MMAF) that often have different program priorities and that rarely work together. Designing, implementing, and monitoring BwN-Biorights requires extensive expertise, financial resources and a long-term (at least five years) program cycle, which the government often does not have.

The GoI has a five-year development plan which broadly outlines each sector's development target. This broad target is elaborated into yearly plans. For example, if the GoI has a five-year target to restore x ha of mangroves, it may do it in a separate location every year. Thus, mangrove restoration or aquaculture support in a specific area is based on the available budget in a particular fiscal year. Both national and provincial governments may (or may not) allocate budget for mangrove conservation and/ or aquaculture development in a particular year, and they do not necessarily coordinate.

The (national and/ or provincial level) GoI's mangrove conservation and/ or aquaculture support is usually publicly tendered and implemented by a winning contractor. Mangrove planting is a preferred method for coastal restoration, with the winning contractor supplying the mangrove seedlings and hiring laborers for planting. Local people are usually involved in providing the seedlings and as laborers. The district fishery office (or village government) could request the contractor to hire the formally registered local community groups. Government technical officials sometimes visit the designated planting areas to make sure the location is not in high tide areas, not on emergent land (i.e., *tanah timbul*), and is free from land tenure issues.

Under the traditional GoI development planning and budget cycle, it may be unlikely that the GoI will replicate and scale-up all of the BwN-Biorights program. A more realistic approach, as

described below, is probably a multi-stakeholder collaboration between the GoI and donor(s), as well as possibly the private sector.

Scaling-up Considerations

The GoI could adopt the BwN-Biorights elements that serve its development targets and fits into its planning and budgeting processes. This was done, to a limited extent, during BwN-Biorights implementation when community groups lobbied the village and district governments to fund a portion of BwN-Biorights activities (e.g., construction of eco-tourism mangrove tracks).

For scaling-up purposes, future BwN-Biorights programs should consider further provincial level policy support, especially in coastal land use planning and enforcement. Capacity building for government in this area is critical for the future of Indonesia's coastal areas. Collaboration with provincial governments should be done systematically from program start. A formal agreement between the donor(s) and government could be forged, outlining a clear roadmap for who does what in implementing the program. This could also include a government budget commitment. The GoI could also seek additional grants from such institutions as the Green Climate Fund (GCF) or Global Environment Facility (GEF).

Another scaling-up pathway is to work with national government institution(s). Potential partners are the MoEF, MMAF, and the Peatland and Mangrove Restoration Agency (*Badan Restorasi Gambut dan Mangrove*/ BRGM). BRGM may be the most relevant institution, as its main mandate – in addition to peatlands – is mangrove restoration. However, it should be noted that government institutions do not have equal power, especially in influencing provincial governments. BRGM is a coordination body that may not have strong influence on such provincial government bodies as district fishery and environment-forestry offices. The latter may be more compliant with their respective line ministries priorities.

Early indications of vertical scaling-up

There is evidence that the government is capable of replicating a portion of the BwN-Biorights activities, as demonstration by the government-funded construction of 4.4 km of additional permeable structures. In terms of future scaling-up, it is important to examine what kinds of program activities fit with government development targets, capacity and bureaucratic systems (e.g., planning and budget cycles).

3. Success factors

In thinking about how to scale-up the BwN-Biorights program, it is important to consider elements that have been success factors, including the following:

- Comprehensive preparation and planning
- Trust building through intense and extended involvement of field facilitators
- Strong local ownership

- Fair and clear Biorights contracts developed and implemented in a transparent manner
- Contract requirement for groups to engage in policy advocacy (e.g., village development planning and coastal regulations)
- Engagement with village government and broader community
- Strong capacity building program focusing both on technical skills and knowledge, and critical thinking and creativity
- Participatory monitoring using clear and jointly developed indicators
- Flexibility to adjust field activities
- On-going technical field support for farmers
- Adequate funding and time

A combination of the above factors contributed to the BwN-Biorights program's achievements on increased mangrove areas and improved livelihoods. Future Biorights programs, however, **should broaden their achievement indicators** to explicitly incorporate and measure changes in local community conservation and income generating **capacity**, **confidence**, and **collective action**, both at the **individual** and **institutional** levels. These qualitative indicators are highly valued by the beneficiaries (e.g., local communities and village governments), critical to ensure the sustainability of program results and better reflect community resilience. They also set the groundwork for horizontal scaling-up. Assessment of the BwN-Biorights program would provide a more comprehensive picture if both quantitative and qualitative indicators were incorporated.

Annex 1: Main categories of documents reviewed

Field notes
- Community consultations/ minutes of meetings
- Field activity reports

Biorights contract related
- Package deals
- Biorights contracts
- Grant letters

Biorights implementation and monitoring
- Community progress reports
- Community monitoring reports
- Community workplans
- Monitoring and evaluation reports
- Baseline information for groups
- Detailed dataset tracking economic activities of individuals

Information on Coastal Field Schools

Village policy and planning
- Village regulations
- Strategic plans for management of village coastal areas

Technical
- Feasibility assessment
- Technical guidelines
- Reports

Annex 2: List of interviews

Aquaculture farmers

1. Mat Sairi, Barokah
2. H. Masrur, Sami Jaya Al Baroqah
3. Noviatur Rohmah, Jaya Bahakti
4. Hasan Ashuri, Mia Sido Mumbul
5. Mafthukin, Purwo Bumilar
6. Indah Purwanti, Kartini Bahari
7. Ahman Busro, Sido Makmur
8. Musthofa, Rejo Mulyo
9. Maskur, nggojoyo Jaya

Village organizers

1. Nur Comaidi, Surodadi Village
2. Abdul Ghofur, Tambakbulusan Village
3. Muhajir, Wedung Village

Government representatives

1. Soimah, Extension Worker, Marine and Fisheries Agency, Demak District
2. Danar, Extension Worker, Marine and Fisheries Agency, Demak District
3. Ahmad Nur Aziz, M.ST,MM, Head of Regional Economy and Infrastructure, Development Planning Agency, Research and Development, Demak District
4. Lilik Hamadi, Head of Marine, Coastal and Small Islands, Fisheries Agency, Central Java Province
5. Muhammad Sulchan, Head of Capture and Marine Fisheries, Marine and Fisheries Agency, Demak District
6. Fegi Nurhabni, Coordinator of Disaster Mitigation and Climate Change Adaptation, Di5. Utilization of Coastal and Smaill Islands, Directorate General of Marine Spatial Management, Ministry of Marine Affairs and Fisheries
7. Resky Sulistyo Soedibyo, Disaster Management Agency, Demak District

Village government:

1. H. Jamaludin Malik, Village Head, Wedung Village
2. Agus Salim, Village Head, Bedono Village
3. Majahidin, Village Head, Morodemak Village
4. Khoirul Umam, Village Head, Betah Walang Village
5. Ahmad Saifullah, Village Head, Al Asadul Usud

University

1. Rudhi Pribadi, Diponegoro University

Annex 3: Example of BwN-Biorights contract

Notes on translation:

- This a rapid informal translation intended only to provide an understanding of the elements of the contracts signed as part of the BwN-Biorights program.
- Financial information and information identifying the community group and its location have been removed.

Wetlands International Indonesia

Building with Nature

COOPERATION CONTRACT

Between

Wetlands International Indonesia, Jl. Bango 11 Bogor 16161, as **the First Party**

and

<Name removed>, <location removed>, Demak Regency, as **the Second Party**

in the implementation of the *Building with Nature* (BwN) Project funded by the *Sustainable Water Fund* (SWF) from the Government of the Kingdom of the Netherlands and in Indonesia managed by Wetlands International Indonesia.

We, both parties:

1. <Name removed>, who in this case acts for and on behalf of Wetlands International-Indonesia domiciled at Jl. Bango No. 11, Bogor, in this case acts as the **first party**;
2. <Name removed>, on behalf of the <group name removed> is located in <address removed> District Demak, in this case acts as a **Second Party.**

Agree to cooperate in the implementation of activities as part of the *Building with Nature Indonesia* Project – *Securing Eroding Delta Coastlines* financed by the Sustainable Water Fund (SWF) from the Government of the Kingdom of the Netherlands, with the following conditions:

CONSIDERATIONS

Both parties are concerned about coastal erosion and degradation of aquaculture in Demak Regency;

Both sides realize the need for a mangrove greenbelt to: (a) improving safety (reducing disasters) and the resilience of coastal communities, and (b) increasing productivity and the local economy;

Both parties agree that the width of the coastal greenbelt is 200 meters inland and is determined from the shoreline at the lowest tide. While the riverine greenbelt is 50 meters inland and is determined from the river bank at the lowest tide;

Both parties agreed to share knowledge and experience with each other in order to strengthen the community in continuing their activities after the project period ends;

The shared vision of both parties is for green and healthy coastal conditions that will support the sustainable livelihoods of coastal communities.

CHAPTER I

SCOPE OF JOB

Article 1

1. To achieve the common vision, **both parties** will provide support, either in the form of financial, human resources and/ or other resources to revitalize the community's economic activities and at the same time restore mangroves, through a mechanism called *Bio-Rights.*
2. The scope of work includes:
   a. Making/ converting several aquaculture ponds to be part of the greenbelt, then rehabilitating the ponds that are part of the green line with mangroves;
   b. Implementation of a system integrated mangrove aquaculture (*sylvo-fishery*);
   c. Revitalization or rehabilitation and improvement of aquaculture activities;
   d. Development of alternative livelihoods;
   e. Policy, advocacy and communication;
   f. Community group management.
3. The location for the implementation of the activities as stated in points a- c of Article 1 Paragraph 2 above is marked in the sketch of the location in Appendix 1.

CHAPTER II

EXECUTION TIME

Section 2

1. The contract implementation period starts from the date the contract is signed until June 30 2020.

CHAPTER III

COMMITMENT OF BOTH PARTIES

Article 3

Restoration of Greenbelt through Conversion of Ponds

1. Both parties agreed to rehabilitate at least 3.89 hectares of aquaculture in the greenbelt.
2. Activities agreed to be carried out include:
   a. Convert pond (belonging to the **Second Party**) within the greenbelt area as habitat for mangrove reforestation;
   b. Restoring land conditions required for mangroves to recover (sufficient sediment, adequate salinity, presence of propagules, etc.);
   c. Helping the process of regeneration of natural mangroves as required (eg. enrichment planting) only on approval of Field Facilitators;
   d. Compensation for pond owners who lose their livelihoods when their ponds are converted as part of the greenbelt, for example by renting ponds in other locations or starting alternative livelihoods activities.
3. For the needs mentioned above, **the First Party** will provide funds of a maximum of Rp <amount removed> for the needs of **the Second Party**, accompanied by technical guidance and support.
4. In support of the above, **the Second Party** will contribute by providing working time, labor, materials, land/ ponds with a value equivalent to Rp <amount removed>. The contribution of Rp <amount removed> cannot be taken from or be part of the funds provided by **the First Party** as mentioned in Paragraph 3 above.

Article 4

Mangrove Integrated Aquaculture System

1. Both sides agreed to implement an aquaculture system integrated with mangroves (*sylvo-fishery*) in ponds covering an area of at least 29.19 hectares, in line with the vision to restore the greenbelt of mangrove riverbanks up to a width of 50 meters.
2. Activities agreed to be implemented include:
   a. Reposition pond embankments to allow mangrove regrowth;
   b. All activities listed in Article 5 can be applied to areas that have been converted into mangroves;
   c. Repair damaged pond doors (using bamboo);
   d. Purchase of nets;
   e. Pond drying using a pump;
   f. Provision of compost and probiotics (MOL);
   g. Preparation of samponin;
   h. Provision of fish/ shrimp seeds;

i. Provision of environmentally friendly feed, according to need;
j. Harvesting;
k. Implementation of an innovative aquaculture system (eg different species or more than one species) as introduced in the *innovation platform*, with prior approval and guidance from the Field Facilitator.

3. For the needs mentioned above, **the First Party** will provide funds of a maximum of Rp <amount removed> for the needs of **the Second Party**, accompanied by technical guidance and support.

4. In support of the above, **the Second Party** will contribute by providing working time, labor, materials, land/ ponds with a value is equivalent to Rp <amount removed>. >. The contribution of Rp <amount removed> cannot be taken from or be part of the funds provided by **the First Party** as mentioned in Paragraph 3 above.

Article 5

Revitalization of Aquaculture

1. Both sides agreed to revitalize the productivity of aquaculture in ponds with a total area of 36.17 hectares through the application of the LEISA system (*low external input sustainable aquaculture*) and/ or through the introduction of a system of innovative aquaculture.
2. Agreed activities include:
   a. Observing and recording routine activities in the ponds;
   b. Repairing broken pond doors (using bamboo);
   c. Raising the embankment of the ponds;
   d. Drying ponds using pump;
   e. Procurement of compost and probiotics (MOL);
   f. Procurement of samponin;
   g. Procurement of fish/ shrimp seeds;
   h. Provision of environmentally friend feed, according to need;
   i. Harvesting;
   j. Implementation of an innovative aquaculture system (eg. different species) as introduced in the *innovation platform*, with prior approval and guidance from the Field Facilitator.

3. For the needs mentioned above, **the First Party** will provide funds of a maximum of Rp <amount removed> for the needs of **the Second Party**, accompanied by technical guidance and support.

4. In support of the above, **the Second Party** will contribute by providing working time, labor, materials, land/ ponds with a value equivalent to Rp <amount removed>. The contribution of Rp <amount removed> cannot be taken from or be part of the funds provided by **the First Party** as mentioned in Paragraph 3 above.

Article 6

Alternative livelihoods, Joint Ventures and *Innovation Platform*

1. Both parties agreed to implement environmentally friendly alternative livelihoods as individual activities of group members and/ or as a joint group effort, in order to diversify sources of income and increase resilience.
2. The activities to be implemented and the cost will be discussed during the work program, and will be based on the options that were introduced in the training and/ or *innovation platform* and described in detail in the work plan. Examples that can be implemented include non-timber forest protects, raising catfish, among others.
3. Innovative aquaculture activities (*innovation platform*) will be implemented after obtaining approval from **the Second Party** for the proposed types of activities that arise from the research results of BwN partners. **The First Party** will disburse the allocation of funds for this activity only if **the Second Party** will implement it, and if not, then the allocation will be transferred to the group's joint business activities.
4. For the needs mentioned above, **the First Party** will provide funds of a maximum of IDR <amount removed> for the needs of **the Second Party,** along with technical guidance and support, when the alternative livelihood options will be implemented.
5. In support of the above, **the Second Party** will contribute by providing working time, labor, materials, land/ ponds with a value equivalent to Rp <amount removed>. The contribution of Rp <amount removed> cannot be taken from or be part of the funds provided by **the First Party** as mentioned in Paragraph 4 above.

Article 7

Policy, Advocacy and Communication

1. Both parties agreed to encourage the protection of mangroves that are still in good condition or that have been restored, as well as the social and environmental sustainability of economic activities through policies, advocacy and communication.
2. Agreed activities include:
   a. Participate in meetings and activities of rural development plans, and at times also attended meetings at the district and provincial levels;
   b. Active involvement in the development, dissemination and implementation of village regulations;
   c. Making information/ announcement boards;
   d. Sharing experiences and encouraging the implementation of activities in other villages;
   e. Participate in Community Monitoring Group (Pokmaswas), if needed.
3. For the needs mentioned above, **the First Party** will provide technical and material guidance and support.

4. For the needs mentioned above, **the Second Party** will contribute in the provision of working time, person time, and materials.

Article 8

Manage Community group

1. Both parties agreed to support the management of community groups in a fair, transparent, accountable and effective manner.
2. Agreed activities include:
   a. Preparation of documents required for the establishment of community groups;
   b. Implementation of regular monthly meetings;
   c. Development of the group's annual work plan;
   d. Participating in field school activities, *innovation platforms* as well as training and other meetings to support the development of local economic improvement within the framework of BwN, as presented in the work plan;
   e. Participate in monitoring activities together with the with the field facilitator and community group.
3. For the needs mentioned above, **the First Party** will provide and manage funds of a maximum of IDR <amount removed> for the needs of **the Second Party**, accompanied by technical guidance and support.
4. For the needs mentioned above, **the Second Party** will contribute in the provision of working time, person time, and materials.

CHAPTER IV

FINANCIAL MANAGEMENT

1. The funds to be provided by the **First Party** will be disbursed as a conditional loan that must be returned to Wetlands International Indonesia no later than the date of 30 June 2020, unless the criteria for loan repayment in Chapter VI have been met. The amount of conditional loan that will be received by **the Second Party** is a maximum of IDR <amount removed>.
2. The conditional loan will be delivered by **the First Party** to **the Second Party** through a special account of **the Second Party**, which will only be used for the purposes of implementing this cooperation.
3. **The Second Party** will distribute the conditional loan funds to group members in accordance with the approved activity plan and stated in the group workplan.
4. Withdrawal of funds by **the Second Party** shall in consultation with **the First Party,** represented by the Field Facilitator.
5. Both parties agree that the use of the funds stated in this contract is ONLY for the implementation of this cooperation.

6. The conditional loan can only be used for the implementation of the program *Building with Nature* as agreed in Chapters I and III, and in line with the work plan of the group. The general allocation of funds is described in Appendix 2.

CHAPTER V

Disbursals

1. The conditional loan provided by **the First Party** to **the Second Party** will be disbursed through 4 (four) stages as follows:

   a. First stage: 50% of the total Rp <amount removed> (or Rp <amount removed>).

      The first stage payment will be provided by the **First Party** to the **Second Party** no later than at the end of the month of October 2017, provided the **Second Party** has met the following requirements:
      - Has fulfilled various requirements for the formation of community groups;
      - All members of the community group have "proof of ownership" and / or "proof of use" of land;
      - The contract has been signed by both parties and witnesses and has been received by **the First Party**;
      - **The Second Party** has submitted a group plan that contains a plan showing the activities to support implementation of the BWN project, including: aquaculture plans, mangrove restoration plans (including maintenance), implementation/ support for policy and advocacy work and submission of the group reporting schedules to the Field Facilitators.

   b. Second stage: 25% of the total Rp <amount removed> (or Rp<amount removed>).

      The second phase payment will be provided by the **First Party** to the **Second Party** at the latest at the end of the month of March 2018, provided the **Second** Party has fulfilled the following requirements:
      - Has officially succeeded in forming a community group, as evidenced by a certificate from the Ministry of Law and Human Rights of the Republic of Indonesia;
      - Created group rules to actively support the implementation of this contract;
      - All members of the community group have "proof of ownership" and/ or "proof of use" of land;
      - Implemented a system of aquaculture and/ or aquaculture integrated with mangrove, as learned in the field school and/ or *innovation platform* (minimum 80% of the area of aquaculture ponds is owned by members of the group);
      - Carried out mangrove restoration activities (including maintenance of sediment trapping structures) along the coast and river greenbelts (minimum 80% of the agreed area);
      - Submitted the minutes of the group's monthly meetings;
      - Submitted a report based on participation in the village planning process (*Musrenbangdes*);

- Draft village regulations related to sustainable village coastal management and greenbelt protection;
- Report on activities and use of funds.

c. Third stage: 20 % of the total Rp <amount removed> (or Rp <amount removed>).

The third stage will be provided by the **First Party** to the **Second Party** at the latest at the end of the month of March 2019, providing the **Second Party** has fulfilled the following requirements**:**

- Has made technical and financial reports in accordance with the agreement;
- All members of the community group have "proof of ownership" and/ or "proof of use" of land;
- Integration of aquaculture practices as a result of learning obtained at field schools and/ or *innovation platform* training;
- Restoration of coastal and/ or river mangrove greenbelts;
- Submission of the minutes of the group's monthly meetings;
- Village regulations related to coastal management and greenbelt protection have been signed by the Village Head.

d. Fourth stage: 5% of the total Rp <amount removed> (or Rp <amount removed>).

Phase four will be provided by the **First Party** to the **Second Party** at the latest in March 2020 with a maximum extension until May 2020, providing the Second Party has fulfilled the following requirements:

- Has made a final report of activities, including financial reports as requested;
- All members of the community group have "proof of ownership" and/ or "proof of use" of land;
- The success rate of the activity reaches a score of more than 80;
- Village regulations related to coastal management and greenbelt protection have been disseminated and socialized.

CHAPTER VI

LOAN BACK PAYMENT

1. The conditional loan must be repaid to Wetlands International-Indonesia on 30 June, 2020, depending on the level of success of the implementation of activities in line with Chapter III:
   a. If the activity success rate scores more than 80, the loan will be converted into a **GRANT,** and the **Second Party** has no obligation to repay the loan;
   b. If the activity success rate scores between 61 - 80, then the loan that must be returned by the **Second Party** is 20% of the total contract value, or Rp <amount removed>;
   c. If the activity success rate scores between 41 - 60, then the loan that must be returned by the **Second Party** is 40% of the total contract value, or Rp <amount removed>;

d. If the activity success rate scores between 21 - 40, then the loan that must be returned by the **Second Party** is 60% of the total contract value, which is Rp <amount removed>;
e. If the activity success score is equal to or less than 20, then the loan must be returned by the **second party** is equal to 80% of the total contract value, or amounting to Rp <amount removed>.

CHAPTER V II

LEVEL OF SUCCESS

1. Both parties have jointly defined the indicators used to determine the level of success and developed a system to assess the level of progress of activities, as shown in Annex 3.
2. The success rate will be determined annually, before the next phase of disbursement.
3. The success rate should increase every year. If not, then corrective or adjustment steps must be taken to increase success.

CHAPTER V III

GROUP SAVINGSs FUND

1. **Both parties** agreed to create a group savings fund, with the aim to encourage the replication of the *Building with Nature* approach for environmental restoration and revitalization of economic activities.
2. **Both parties** will record gains from the various activities carried out in accordance with this contract, and will set aside 10% of the profits to be stored in the group savings fund.
3. **Both parties** will conduct a search of other funds, such as from the government, so they can be used to add to the group savings fund to implement replication activities.
4. To achieve the goal of replication, new members are welcome to join the group and enjoy usage of the group savings funds.
5. The group will make more detailed rules for the group saving fund.

CHAPTER IX

CONDITIONS FOR TERMINATION OF CONTRACT

1. If during this contract period there is a termination of support from the Dutch government, then this agreement will be automatically terminated. This termination shall be made by the **First Party** in writing and shall enter into force on the date of notification. In such a condition the **Second Party** will not demand any payment from the **First Party.**
2. If either party violates this agreement, a written warning will be issued stating the need for settlement within 30 days of receipt of the warning letter. If the warned party cannot complete

it within that time, the contract may be declared terminated. Termination of the contract will be carried out in writing and will take effect immediately on the date the termination letter is issued.

CHAPTER X

CONFLICT

1. The **First Party** will not be liable in the event of a conflict in a contract or other agreement between the **Second Party** and a **Third Party** (including the members of the group, community members, governments, and others).
2. If there is a conflict related to this agreement, then both parties agree to resolve it amicably. If the matter cannot be resolved amicably, then both parties agree to appoint the Demak District Court for settlement.

CHAPTER XI

ACTIVITY MANAGEMENT

1. The **First Party** has appointed a Field Facilitator as a representative in carrying out the tasks of coordination, guidance and monitoring of activities in this joint project.
2. The **second party** must hold a coordination meeting with the Field Facilitator at least once a month or more frequently, depending on the needs on the ground. If needed, the **Second Party** may invite a **Third Party** to attend the meeting. The meeting must be documented in the form of minutes of the meeting signed by both parties, so that various decisions and follow-ups are agreed upon by both parties.

CHAPTER XII

DUTIES AND RESPONSIBILITIES

1. The duties and responsibilities of the **First Party** are:
   a. Review and approve or reject (if not in line with contract) monthly plans proposed by the **Second Party**, taking into account input from the Field Facilitator;
   b. Provide technical support, both oral and written, related to the activities carried out by the **Second Party**;
   c. Provide funds for implementing activities in accordance with the budget proposal submitted by **the Second Party**; funds will be transferred to a special account of the **Second Party**;
   d. Together with the Field Facilitator or other officially appointed parties, carry out monitoring and evaluation activities on activities carried out by the **Second Party.** Monitoring and evaluation activities will be carried out every three months, starting from the implementation of activities in the field;

e. Follow all applicable laws and regulations in the jurisdiction of the Republic of Indonesia.

2. Duties and responsibilities of the **Second Party** are:
   a. Ensuring that all activities in this agreement have full support from community groups, and that activity planning has been carried out through an open and participatory process at the village level, where men and women have the same rights to voice their aspirations;
   b. Carry out all activities as well as possible, including activities as listed in Appendix 2. All activities must comply with the applicable rules and regulations in the territory of the Republic of Indonesia;
   c. Consult closely with the Field Facilitator and local government in carrying out the activities covered by this agreement;
   d. With the support of a Field Facilitator, making technical reports, financial and other agreed reports. The financial statements must follow the procedures specified by the **First Party**. All original proof of expenditures must be kept up to five years after the completion of this contract for auditing purposes;
   e. Facilitate visits to be carried out by the **First Party** to carry out monitoring and evaluation activities, including assisting in providing accommodation, transportation and communication processes and gathering information from relevant parties as needed. The costs for these activities are borne by the **First Party**;
   f. Accompanying the visit of staff, guests or other parties who are partners of the **First Party** with the approval of the **First Party** and first communicated with the **Second Party**;
   g. Maintain the confidentiality of data and information related to this agreement. Data and information can only be used for the purposes stated in this contract, and are not allowed to be handed over to other parties without the written consent of the **First Party.**

CHAPTER XI II

Other

1. Both sides agreed that changes to this agreement can only be made in writing and involving both sides, which then will be included in amendments/ additions;
2. In the case of *force majeure* (such as a major natural disaster), all conditions written in Chapter III will be reviewed again.

CHAPTER X IV

CLOSING

1. This agreement has 5 (five) pages of attachment which are an integral part of the agreement , made and signed in Demak on the date below with 2 (two) copies of which have been stamped and have the same legal force.

<Removed: signing information>

Appendix 1. Location of Greenbelt Restoration Activities Through Conversion of Ponds, Aquaculture Integrated with Mangroves, and Revitalization of Aquaculture in < location removed>**.**

<Map removed>

Appendix 2. Mechanism for Bio-rights Loan Distribution and Conditions <location removed>

Loan Fund Distribution				
Payment Stage	**Conditions**	**Funding Needs**	**Output**	**Required reports**
Phase I amounting to Rp <amount removed> will be paid no later than the month of October 2017	• The contract has been signed by both parties and witnesses and has been accepted by the **First Party** • Has fulfilled various requirements for the formation of community groups • All members submit "proof of ownership" and and/or "proof of use" of land • The **Second Party** has submitted a plan group that contains the activity plan for support of the BwN project, including: aquaculture plans, mangrove restoration plans (including maintenance), implement/ support the policy and advocacy work and the group's reporting schedule to the Field Facilitator	• The process of forming a group decree for the Ministry of Law and Human Rights • Facilitator preparation of the group's working rules • List all land ownership of group members • Implementing fish farming and/ or integrated with mangrove • Carry out mangrove restoration activities (including maintenance of sediment trapping structures) along coastal and river greenbelts • Conduct regular group meetings • Participate in village planning process (*musrenbangdes*) • Follow the process of drafting village regulations related to sustainable coastal management and greenbelt protection • Make reports on activities and use of funds	Submitted no later than March 31, 2018 technical report including the following information: - group formation process - conduct restoration, aquaculture and alternate livelihood activities - document the entire process: village planning (*musrenbangdes*), preparation of village regulation A financial report containing: - Record of financial transactions corresponding to funding allocation - Plan for the use of phase II funds - Appendix with photocopies of all receipts	Technical and financial reports. Technical report submitted to the Field Facilitator and also to the Wetlands International Indonesia (WII) management in Bogor. Financial reports are sent to the Finance Department of WII in Bogor.
Phase II amounting to Rp <amount removed> no later than March 2018	• Has officially succeeded in forming a community group, as evidenced by a certificate from the Ministry of Law and Human Rights • Create group rules to actively support the implementation of this contract • All group members have provided "proof of ownership" and/or "proof of use" of land • Implement aquaculture systems and/or integrated mangroves with aquaculture as studied in field schools and/or *innovation platforms* (minimum 80% of the pond area of community group members)	• Improvement of aquaculture as a result of implementing field schools and/or *innovation platform* training • Restoration of river and coastal mangrove greenbelts • Attend monthly group meetings • Ratification of village regulations related to coastal management and protection of greenbelts by the Village Head	Submitted no later than March 31, 2019 technical report including the following information: - implementation of restoration activities, aquaculture and alternative livelihoods - document the entire process: village planning (*musrenbangdes*), preparation of village regulation A financial report containing:	Technical reports and financial reports. The technical report should be submitted to the Field Facilitator and also sent to the WII Management in Bogor. Financial reports are sent to the Finance Department of WII in Bogor.

Loan Fund Distribution				
Payment Stage	**Conditions**	**Funding Needs**	**Output**	**Required reports**
	• Carry out mangrove restoration activities (including maintenance of sediment trapping structures) along the coast and river greenbelts (minimum 80 % of the agreed area) • Submitting the report of the group's monthly meetings • Submit a report on participation in village planning process (*musrenbangdes*) • Draft village regulations related to sustainable coastal management and greenbelt protection • Make reports on activities and use of funds		- Record of financial transactions corresponding to funding allocation - Plan for the use of phase III funds \ - Appendix with photocopies of all receipts	
Phase III of Rp <amount removed> no later than March 2019	• Have made technical and financial reports in accordance with the agreement • Improvement of aquaculture practices as a result of implementing field schools and/or *innovation platform* training • Restoration of coastal and/or river greenbelt with mangroves • Submitting reports of the group's monthly meetings • Village regulations related to coastal management and greenbelt protection have been signed by the Village Head	• Continuing aquaculture as a result of implementing field schools and/or *innovation platform* training • Restoration of coastal and/or river mangrove greenbelts • Attend monthly group meetings • Ratification of village regulations related to coastal management and greenbelt protection by the Village Head	Submitted no later than March 31, 2020 technical report including the following information: - implementation of restoration, aquaculture and alternative livelihood activities - document the entire process: village planning (*musrenbangdes*), preparation of village regulation A financial report containing: - Record of financial transactions corresponding to funding allocation - Plan for the use of phase IV funds \ - Appendix with photocopies of all receipts from phase III	Technical reports and financial reports. The technical report submitted to the Field Facilitator and also sent to WII Management in Bogor. Financial reports are sent to the Finance Department of WII in Bogor.
Phase IV of Rp <amount removed> no later than March 2020	• Have made a final report of activities including financial reports as requested • The activity success rate reaches more than 80% • Village regulations related to coastal management and green line protection have been disseminated	• Complete activities until the success rate reaches a score of more than 80	Submitted no later than 30 June 2020 technical report including the following information: - implementation of all mangrove greenbelt restoration, aquaculture and alternative livelihood activities restoration activities, aquaculture and other economic alternatives - document the entire process: village planning	Technical reports and financial reports. The technical report submitted to the Field Facilitator and also sent to WII Management in Bogor. Financial reports are sent to the Finance Department of WII in Bogor.

Loan Fund Distribution				
Payment Stage	**Conditions**	**Funding Needs**	**Output**	**Required reports**
			(*musrenbangdes*), preparation of village regulation A financial report containing: - Record of financial transactions corresponding to funding allocation - Attachment of photocopies of all stage IV receipts	

Appendix 3. Indicators of Activity Success in <location removed>
(as a Loan Repayment Guide to CHAPTER VI)

Activities	Parameter	Weight Activities	Weight Parameter
1. Aquaculture ponds using LEISA (l*ow external input and sustainable aquaculture*)	Use of compost as needed	20	25
	Use of MOL		25
	Does not use chemicals		25
	Recording of pond activities (*log book*)		25
2. Pond aquaculture integrated with mangroves with the application of LEISA	Making pond construction integrated with mangrove	20	20
	Use of compost as needed		20
	Use of MOL		20
	Does not use chemicals		20
	Recording of pond activities (*log book*)		20
3. Mangrove greenbelt	Preparing the land for mangrove greenbelt	15	40
	No opening of ponds in greenbelt area		20
	Not cutting down mangroves in the greenbelt area		20
	Rehabilitating mangroves naturally		20
4. Group/member alternative livelihood activities	There is a productive alternative economic business managed by the group	5	50
	Alternative economic businesses are managed in an environmentally friendly manner		50
5. Legal recognition from the Ministry of Law and Human Rights	There is a group structure, statutes and rules	5	100
6. Regular group meeting	Attended by all group members	10	50
	Meetings are held at least once a month		50
7. Annual group work plan	Known by the Village Head	5	100
8. Participate in village development planning meetings (m*usrenbangdes*)	Actively involved in the village planning process	10	25
	There must be a minimum of two group members (male and female)		25
	Raising proposals for group activities in village planning process		25
	Proposed group activities are contained in the village medium term plan document		25
	There is representation of members in the village drafting team	10	50

9. Active in the process of making and socializing village regulation	Putting forward suggestions from the group		25
	Proposals for group activities are contained in the village draft regulation		25
	TOTAL	100	

The formula for calculating the success rate score:

$$Score\ success\ level = \sum_{n} \left\{ X * \frac{(\sum Y)}{100} \right\}$$

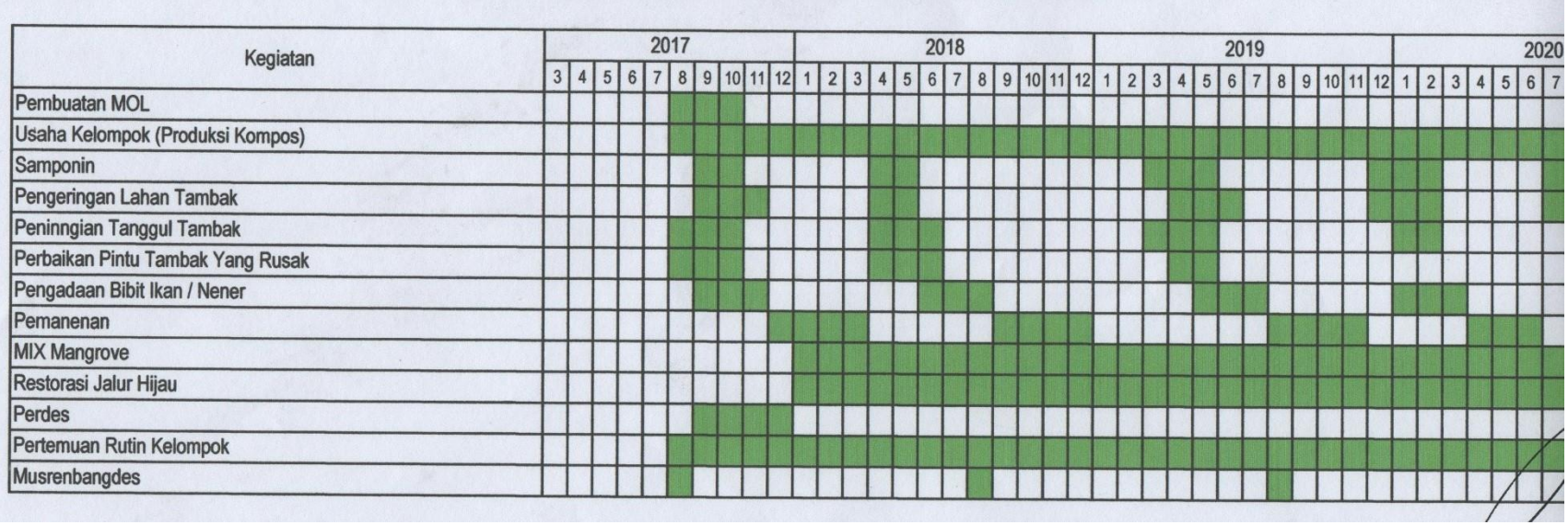
Description: X = activity weight; Y = parameter weight; n = number of activities
The success rate score is obtained from the sum of each activity weight value (X) multiplied by the percent total weight parameter (Y) per activity (n) carried out in the village.

Table of Scores of Success Rates in <location removed>.

No	Score Score	Success Category	Note
1	> 80	Very good	All loans will be converted into GRANT
2	61 – 80	Satisfactory	20% of the total contract value or Rp <amount removed> must be returned to the First Party
3	41 – 60	Weak	40% of the total contract value or Rp <amount removed> must be returned to the First Party
4	21 – 40	Very weak	60% of the total contract value or Rp <amount removed> must be returned to the First Party
5	20	Poor	80% of the total contract value or Rp <amount removed> must be returned to the First Party

Appendix 4. Workplan

<Identifying information removed>



Kegiatan	2017										2018												2019												2020						
	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Pembuatan MOL																																									
Usaha Kelompok (Produksi Kompos)																																									
Samponin																																									
Pengeringan Lahan Tambak																																									
Peninngian Tanggul Tambak																																									
Perbaikan Pintu Tambak Yang Rusak																																									
Pengadaan Bibit Ikan / Nener																																									
Pemanenan																																									
MIX Mangrove																																									
Restorasi Jalur Hijau																																									
Perdes																																									
Pertemuan Rutin Kelompok																																									
Musrenbangdes																																									

Appendix 5. Second Party bank account.

<Bank account information removed>