NURTURING
GREEN AQUACULTURE
IN MYANMAR

MID-TERM **REVIEW**

PREPARED BY MYANMAR KOEI INTERNATIONAL LTD.
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EXECUTIVE SUMMARY

This report outlines the findings of the Mid-Term Review conducted for the Nurturing Green Aquaculture in Myanmar (NGA-Myanmar) programme, which is funded by the European Union (EU). The review's purpose is to evaluate the programme's progress in achieving its objectives and outcomes at its mid-term, examining factors such as relevance, coherence, effectiveness, impact, efficiency, and sustainability. Recommendations are provided to enhance programme delivery for the remaining duration, ensuring alignment with goals and addressing implementation challenges.

The aquaculture sector in Myanmar plays a vital role in its economy and food security, employing a significant workforce and contributing substantially to export revenues. However, despite its importance, the sector faces sustainability challenges, including pollution and inefficient practices. To address these issues, the Nurturing Green Aquaculture in Myanmar (NGA-Myanmar) programme was initiated with EU support. This programme aims to promote sustainable practices along the Yangon-Ayeyarwady aquaculture corridor to ensure long-term viability. NGA-Myanmar, implemented by Mercy Corps Netherlands (MCN) and partners, focuses on enhancing environmental stewardship and productivity. It operates through a tiered approach involving training, demonstration, and technology integration to encourage the adoption of green aquaculture practices (GrAqPs). The programme targets micro, small, and medium-sized enterprises (MSMEs) – including aquaculture farming households, engaged in aquaculture, with the goal of improving resource efficiency, reducing environmental degradation, and ensuring economic returns.

Key aspects of the programme include establishing linkages of target participants to green loans, capacity-building training, and demonstrations of GrAqPs and technologies to Champions and Early Adopters and integrating them into digital platforms for wider dissemination. The programme is currently being implemented in select townships along the Yangon-Ayeyarwady aquaculture corridor, focusing on 17 village tracts and 54 villages. Programme management involves coordination between MCN, Village Link, a technology company, and Daung Capital, a financial institution. These organizations oversee different aspects of implementation, including training, digital integration, and green loans provision. Collaboration with other private sector actors and technical experts further enhances the programme's effectiveness.

The Mid-Term Review utilized a mixed-method approach, combining quantitative analysis with qualitative insights. Despite access limitations and temporal alignment with the programme's midpoint, the review gathered valuable insights through desk studies, focus group discussions (FGDs), key informant interviews (KIIs), and expert observations. The review provides valuable insights into its progress and effectiveness, evaluating aspects such as relevance, coherence, effectiveness, impact, efficiency, and sustainability. Limitations included challenges in accessing certain areas and evaluating ongoing activities. However, the review yielded valuable insights to enhance programme effectiveness moving forward.

The review identifies both successful areas and areas requiring improvement within the programme's implementation. These findings serve as a basis for strategic adjustments to ensure the programme's continued success in promoting sustainable aquaculture practices in Myanmar.

In terms of **relevance**, the programme strategically targets the Yangon-Ayeyarwady aquaculture corridor, where aquaculture is crucial for the economy and livelihoods. By concentrating efforts in this area, the programme

maximizes its impact, addresses specific needs, and fosters a conducive environment for the adoption of sustainable practices. Additionally, the programme remains responsive to the context, with activities tailored to address identified gaps in knowledge and access to finance. The programme effectively addresses identified problems and needs within the aquaculture sector, such as a lack of technical knowledge and limited access to finance. By providing comprehensive training in green aquaculture practices and facilitating access to financial institutions, the programme supports the development of the aquaculture sector and improves the livelihoods of aquaculture producers in the target area.

The **coherence** of the NGA-Myanmar programme with relevant initiatives, policies, and strategies is evident in its alignment with the goals of the SWITCH-Asia programme, focused on promoting cleaner and more sustainable production methods among MSMEs. By targeting the Yangon-Ayeyarwady Aquaculture Corridor and introducing green aquaculture practices, NGA-Myanmar aligns directly with SWITCH-Asia's objectives and broader EU-funded policies. Additionally, the programme's efforts to enhance resource efficiency and address environmental degradation in the Ayeyarwady delta ecosystem are consistent with national aquaculture development plans. NGA-Myanmar's consistency with broader development goals is further demonstrated through its alignment with the national aquaculture development plan (NADP) 2019-2023, addressing challenges faced by small-scale aquaculture farmers. Collaborating with private sector entities, the programme directly tackles these needs, contributing to enhancing livelihoods and resilience in Myanmar's aquaculture sector. Moreover, the programme's promotion of green aquaculture practices aligns with the NADP and contributes to several Sustainable Development Goals (SDGs), emphasizing its coherence with donor policies and the broader agenda of sustainable development. Overall, NGA-Myanmar's initiatives complement existing interventions without conflicting with other programmes, ensuring effective support for Myanmar's aquaculture sector.

The **effectiveness** of the NGA-Myanmar is assessed through its progress towards achieving its intended outcomes, particularly focusing on activities delivered by the mid-term.

- Under Outcome 1, the programme aimed to channel EUR 100,000 in commercial loans to kick-start the adoption of green technology and practices by MSMEs. While collaborations with financial institutions have been established, reaching the targeted 500 participants accessing loans appears unlikely due to ongoing economic challenges in Myanmar. However, efforts to develop loan products and promote collaborations with multiple financial institutions have connected at least 124 participants to loans.
- Under Outcome 2, the programme selected and organized 314 participants into demonstration locations, surpassing the target of 250 champions. Although data at the mid-term stage are too early to assess, training sessions and demonstrations have been conducted, and bi-annual surveys are scheduled to monitor progress. It is very likely that this outcome will be achieved at the end of the programme.
- Outcome 3 aims to increase knowledge and awareness among MSMEs through field day events and the Htwet Toe app. As of the mid-term evaluation, at least 75% of the targeted 12,000 participants have been reached, with the potential to exceed these targets by the programme's conclusion.
- Outcome 4 focuses on reducing water pollution through water quality monitoring and adaptive actions by MSMEs. Although challenges exist in translating data into actionable strategies, the programme emphasizes the importance of environmental stewardship and is likely to meet its targets.
- Under Outcome 5, the programme is advancing towards developing viable business cases for green technologies. Collaborations with market actors have been forged, but it is too early to assess the likelihood of meeting the target, necessitating evaluation at the programme's conclusion.

The **efficiency** of the NGA-Myanmar programme is evaluated in terms of its utilization of resources, including financial, human, and material resources. The implementing partners operate each with assigned specific responsibilities. The programme has successfully employed both technical and non-technical staff as planned. However, feedback suggests the need for a full-

time aquaculture expert at the township level to enhance communication with the target population, thereby improving programme efficiency. The programme's budget allocation and utilization have been efficient, with approximately 40% of the budget expended by its mid-term. However, the burn rate for the local office is notably high at 93%, primarily due to internal restructuring and inflation. It's recommended to reschedule the budget for this category. Nonetheless, the remaining 60% of the budget should suffice for the remaining programme period. In summary, while the programme demonstrates efficient resource utilization, there are areas identified for improvement to enhance its effectiveness in achieving programme objectives.

While it is still premature to fully assess the **impact** of the programme, the review suggests that NGA-Myanmar has significantly contributed to raising awareness of and implementing green aquaculture practices and technologies among its intended participants. The target participants have acknowledged an increase in their technical knowledge related to aquaculture farming due to the training provided by the programme. Currently, the programme has supported participants with technical assistance through both in-person and online capacity-building support, providing access to information on green aquaculture practices. This has been complemented by improvements in the access to technologies, inputs, and financing methods. Leveraging information technology, the developed app (Htwet Toe) is perceived as beneficial not only for the target beneficiaries but also for aquaculture producers beyond the programme's target areas. The integration of Gender Equality and Social Inclusion (GESI) into the programme is also expected to have a positive impact on the community, with respondents reporting positive changes in perceptions towards LGBT individuals and increased awareness of gender dynamics.

Similarly, at the mid-term stage, it is too early to definitively assess the **sustainability** of the programme's benefits, outcomes, and impacts. However, champions' genuine interest in the promoted practices and technologies, particularly solar pump technology, suggests promising prospects for sustainability. The involvement of spouses and youth in champion activities also enhances sustainability. Additionally, plans to provide women empowerment training and promote market-oriented skill development further contribute to sustainability. Continued promotion of water quality monitoring practices is essential for long-term sustainability, with emphasis on local practices that may benefit from further training. Training should underscore the relationship between water quality measurement and feed and non-feed inputs to ensure sustainable aquaculture practices.

NGA-Myanmar has strategically integrated **Gender Equality and Social Inclusion** (GESI) considerations from the outset, guided by a thorough GESI analysis and action plan. The programme actively involves spouses and youth in its activities and trainings. However, there is a notable gender disparity in champion registration, with only 47 women recorded despite targeting both household heads and spouses, indicating a need for improvement in monitoring and evaluation (M&E) data recording practices. Feedback from female participants underscores positive impacts on aquaculture knowledge and empowerment, with GESI training fostering a deeper understanding of gender equality and challenging traditional norms. Participants reported increased confidence and improved ability to express themselves. Additionally, the **Community Accountability Reporting Mechanism** (CARM) efficiently facilitates feedback from target participants, enabling the programme to gather community inputs effectively.

To ensure the fulfilment of program objectives within the remaining program period, the following **actionable recommendations** are proposed based on the evaluation findings:

<u>Related to Outcome 1 and Outcome 5</u>

- Expand collaborations with financial institutions, including innovative banks like AYA Bank and A-Bank, to diversify funding sources and improve access to loans.
- Strengthen non-conventional financing models by exploring partnerships with commercial feed producers and local seed providers.
- Tailor loan structures to suit the specific needs of aquaculture farmers, incorporating reduced documentation requirements and affordable interest rates.

<u>Related to Outcome 2 and Outcome 3</u>

- Emphasize practical training in essential areas such as fish feed processing and water quality management to equip participants with valuable skills.
- Expand data collection to include information from both demonstration and non-demo ponds to effectively demonstrate the positive outcomes of sustainable aquaculture methods.
- Consider employing a full-time aquaculture expert at the township level to provide technical support to the target population.

Related to Outcome 4

- Reinforce water quality monitoring practices by including iron parameter monitoring in water quality assessments for specific communities.
- Involve aquaculture producers in the monitoring process to broaden the reach of water quality initiatives and advocate for sustainable practices.
- Address discrepancies in laboratory testing by considering alternative laboratories and reviewing sample collection methods.

Cross-Cutting and Others

- Extend the timeframe of NGA-Myanmar to bolster the adoption of green aquaculture practices and further develop green financing mechanisms.
- Expand GESI training sessions at the village level to deepen understanding and appreciation of GESI principles among community members.
- Tailor women's empowerment training initiatives to effectively address key areas of concern and promote meaningful empowerment.
- Update the champions list and include assessments of the Htwet Toe application in monitoring surveys to enhance the reliability of the M&E process.

Implementing these recommendations will optimise the effectiveness and impact of the NGA-Myanmar program, contributing to the promotion of sustainable aquaculture practices and livelihood improvement in Myanmar.

Table of Contents

Acronyms

CARM	Community Accountability and Reporting Mechanism
CEP	Community Engagement Partners
EU	European Union
EUR	Euro
FC	Field Coordinators
FCR	Feed Conversion Ratio
FGD	Focus Group Discussion
FIs	Financial Institutions
GrAqPs	Green Aquaculture Practices
GESI	Gender, Equality and Social Inclusion
ICAFIS	International Centre for Aquaculture & Fisheries
ICR	Interest Coverage Ratio
IOT	Internet of Things
ISO	The International Organization for Standardization
KII	Key Informant Interview
LGBT	Lesbian, Gay, Bisexual, and Transgender
MC	Mercy Corps
ME&L	Monitoring, Evaluation and Learning
MFI	Microfinance Institution
MSMEs	Micro, Small, and Medium Enterprises
MTR	Mid-term review
MY	Marketing Year
NADP	National Aquaculture Development Plan
NGA	Nurturing Green Aquaculture
OECD	Organization for Economic Co-operation and Development
PAP	Powering Aquaculture Progress
SDG	Sustainable Development Goals

1 INTRODUCTION

Aquaculture contributes significantly to economic stability and food security in Myanmar. Despite its importance, the sector grapples with sustainability challenges, prompting initiatives like the Nurturing Green Aquaculture in Myanmar (NGA-Myanmar) programme, aimed at promoting sustainable practices. This programme, supported by the EU, seeks to enhance environmental stewardship and productivity along the Yangon-Ayeyarwady aquaculture corridor, representing a pivotal step towards ensuring long-term viability and resilience in Myanmar's aquaculture sector.

Aquaculture serves as a vital pillar of Myanmar's economy, contributing significantly to both its economic stability and food security. The predominant practices in Myanmar's aquaculture sector revolve around fish and shrimp farming, employing a considerable workforce totalling 59,000 individuals. Notably, aquaculture emerged as the fourth largest export sector during the marketing years of 2019/20 and retained its position in 2020/21. Over the past two decades, there has been a notable expansion in aquaculture production, with land area dedicated to this endeavour increasing from 72,588 hectares (ha) in 2000 to 200,142 ha by 2018. The geographical distribution of fishponds is concentrated primarily in regions such as Yangon, Ayeyarwady, Bago, Sagaing, and Mandalay. Among these, the Ayeyarwady region stands out as the primary hub, accounting for 50 percent of the total aquaculture fishpond area. Following closely, the Yangon region occupies 27 percent, while the Bago region holds 13 percent of the overall distribution.[1]

Although aquaculture plays a significant role in the economy and food security of the nation, its fish-farming methods remains inadequate. This deficiency in methods results in unsustainable aquaculture practices, such as the discharge of polluting effluents and the creation of eutrophication zones that harm aquatic life by reducing dissolved oxygen. Additionally, there is excessive use of fish feed and fertiliser. In 2020, the country initiated the development of its national aquaculture development plan (NADP) (2019-2023), with the aim of promoting sustainable aquaculture practices. However, the implementation status is still lacking due to a shortage of technical and financial resources, hindering efforts to enhance environmental sustainability and resource efficiency within Myanmar's aquaculture sector.

To support the sustainable development of the aquaculture sector in Myanmar, Mercy Corps Netherlands (MCN) and its partners have been implementing the Nurturing Green Aquaculture in Myanmar (NGA-Myanmar) programme along the Yangon-Ayeyarwady aquaculture corridor, where micro, small, and medium-sized enterprises (MSMEs) – predominantly aquaculture farming households are concentrated. This programme, developed under the auspices of the EU with contract number ACA/2021/428-998, commenced on January 1, 2022, and is scheduled to conclude on December 31, 2024. The programme aims to encourage the adoption of green aquaculture practices (GrAqPs) to enhance environmental stewardship, thereby reducing water pollution and carbon emissions in the Ayeyarwady delta ecosystem. Simultaneously, it seeks to increase productivity to incentivise the uptake of these sustainable practices[2].

[1] FAS Rangoon. Significant Growth in Burmese Aquaculture over Last decade but Future Uncertain. BM 2022-0010. June 07,2022.

[2] This aligns with several Sustainable Development Goals (SDGs), including Goal 5: Gender equality, Goal 8: Decent work and economic growth, Goal 12: Responsible consumption and production, Goal 13: Climate action, and Goal 14: Life below water. The programme also focuses on Circular Strategies: Resource Efficiency; Innovation: Products, Materials, and Technologies; Lifecycle Stages: Production and Distribution;

Currently, the programme is midway through its implementation. A mid-term review has been conducted to assess progress and achievements to date and to identify areas requiring improvement.

1.1 Overview of NGA-Myanmar

1.1.1 Programme Background

NGA-Myanmar is being implemented within the Yangon-Ayeyarwady aquaculture corridor and aims to enhance aquaculture productivity while mitigating its impact on the Ayeyarwady delta ecosystem. This is achieved through the introduction of cleaner production practices and green technologies, which not only boost the productivity of aquaculture farmers but also reduce waste generation, water pollution, and carbon emissions. The programme's theory of change is that **IF** aquaculture industry MSMEs' knowledge and awareness of the efficacy and feasibility of solutions for green aquaculture to support sustainable practices is improved **AND** they are supported by tailored financial products **THEN** aquaculture MSMEs will adopt profitable, sustainable business models, allowing for sustainable growth while reducing environmental degradation[3].

The main objective of the programme is to improve resource efficiency and reduce environmental degradation in Myanmar's aquaculture industry while ensuring improved economic returns in the value chain. To support the main object, the programme has set up five outcomes, they are:

- **Outcome 1**: EUR 100,000 in commercial loans is channelled to kick start adoption of green tech & GrAqPs by early adopter champion MSMEs.
- **Outcome 2**: Champion MSMEs trial & demonstrate solutions for GrAqPs across different geographic clusters.
- **Outcome 3**: 75% of other target MSMEs in the Yangon-Ayeyarwady aquaculture corridor have knowledge & awareness to adopt solutions for green aquaculture.
- **Outcome 4**: MSME take adaptive actions to reduce water pollution in response to environmental data generated by the action.
- **Outcome 5**: Viable & bankable business cases for replicating the green aquaculture model are developed and promoted.

To promote cleaner production practices and green technologies, NGA-Myanmar employs a tiered approach aimed at achieving economies of scale and reaching a tipping point to ensure the scalability and sustainability of the outcomes:

- **Tier 1 – Champions**: As a first step, a group of at least 250 MSME producers are trained as "Champions." These Champions actively engage in trying and refining the promoted GrAqPs. They undergo a series of capacity-building trainings & exposures conducted on "Demo Ponds" located within targeted aquaculture production centres in the selected townships.
- **Tier 2 - Early Adopters**: Building on the experiences of the Champions, the promoted practices & technologies are cascaded into additional 2,000 producers as "Early Adopters." These Early Adopters receive exposure to the benefits of GrAqPs & are guided on how to implement these practices by learning from the experiences of the Champions. A highlight of this phase is the "Field Day Event", where Early Adopters interact with Champions & partnered value-chain actors, gain insights into the effective implementation of GrAqPs & how to access key services & technologies.
- **Tier 3 - Scaling with Technology Integration**: To achieve broader scale, the program collaborates with key private sector partner, Village Link. This partner integrates the tested GrAqPs into their farming app called "Htwet Toe." This digital integration facilitates wider dissemination and adoption of the practices. Concurrently, efforts are directed towards green financing mechanisms and facilitating access to essential inputs and technologies. This stage targets a minimum of 12,000 producers categorized as the "Early Majority."

Enablers: Education and Behavioural Change; and Enablers: Markets.

[3] Monitoring, Evaluation and Learning Plan, April 2022.

This tiered approach facilitates a gradual and effective expansion of green aquaculture practices, creating a network of informed Champions, Early Adopters, and ultimately, broader actors in the industry. This strategy leverages knowledge exchange, digital integration, and supportive measures to ensure the lasting impact of cleaner production practices and sustainable technologies in Myanmar's aquaculture sector.

The NGA programme is being implemented along the Yangon-Ayeyarwady aquaculture corridor in the townships of Twantay, Maubin, Nyaungdon, and Pantanaw. These townships were chosen due to the clustering of micro, small, and medium enterprises (MSMEs) engaged in aquaculture. The project encompasses a total of 17 village tracts and 54 villages within these four townships.

1.1.2 Programme Management

The programme is implemented by MCN in collaboration with Village Link, a technology company, and Daung Capital, a financial institution. At the consortium level, these organisations convene regularly to strategies all aspects of implementation, manage the partnership continuously, and make any necessary adjustments to the overall strategy, work plan, and technical approaches.

The main roles and responsibilities for project implementation and management are as follows:

- **MCN**: Responsible for overall coordination and implementation of the programme, donor liaison, and coordination with partners, contractors, and relevant actors and stakeholders. The MCN team, led by its Team Leader, ensures the day-to-day programme delivery adheres to the organisation and EC policies, while ensuring the programme is implemented within budget, scope, and time. The organisation is also responsible for monitoring, evaluation, and learning, including collaborating with a consultant on the action's baseline, midterm review, and endline surveys, as well as supporting other assessments such as water quality monitoring. Given the current context's communication needs, this team handles programme communications. Additionally, the organisation ensures that Gender Equality and Social Inclusion (GESI), safety and security, as well as safeguarding and the Community Accountability Reporting Mechanism (CARM) are integral to programme delivery.
- **Village Link**: The company's scope of work involves two main tasks. Firstly, facilitating the demonstration of Green Aquaculture Practices (GrAqPs) through practical training and events at demo ponds, engaging participants such as the aforementioned Champions and Early Adopters, and linking them to Microfinance Institutions (MFIs) and other businesses. Secondly, digitising the programme outputs based on the demonstration activities into its Hwtet Toe application, thereby making all training and information accessible to other MSMEs - mostly farming households who may not have received direct training and support.
- **Daung Capital**: The financial institution supports the programme by developing and promoting green finance, providing at least EUR 100,000 in loans for early adopter MSMEs to access tested solutions.

The programme also collaborates with other private sector actors providing green technologies and solutions, as well as other financial institutions, to enhance its outcomes. Additionally, NGA-Myanmar works with the International Centre for Aquaculture & Fisheries Sustainability (ICAFIS) to provide GrAqPs experts who offer technical assistance to ensure successful programme implementation. Additionally, local experts with specialized knowledge in various areas, including water quality and gender considerations, have been contracted to further enhance the programme's effectiveness.

1.2 Objective and Scope of the Review

The objective of the mid-term review is to assess the project's progress to date in alignment with its objectives and outcomes. This involves evaluating whether programme activities are effectively contributing to the achievement of the programme's goals and if any adjustments are

necessary to enhance outcomes and performance indicators.

The scope of the mid-term review encompasses evaluating the project's implementation status through the lens of the six OECD evaluation criteria: relevance, coherence, effectiveness, impact, efficiency, and sustainability. This assessment is guided by the principles of usefulness and adaptability, determining whether the project is on course to meet its objectives. Furthermore, the MTR team is tasked with providing actionable recommendations to improve programme delivery for the remainder of the timeframe.

2 METHODOLOGY

The Mid-Term Review of the NGA Myanmar programme employed a comprehensive mixed-method approach, combining quantitative analysis with qualitative insights. Through desk studies, focus group discussions, key informant interviews, and expert observations, the review assessed the programme's progress against OECD evaluation criteria. Despite limitations in accessing certain areas and the review's alignment with the programme's midpoint, valuable insights were garnered to inform strategic improvements and enhance programme effectiveness moving forward.

2.1 Evaluation Approach

The Mid-Term Review adopted a mixed-method approach, combining both quantitative and qualitative methods. Quantitative data comprised a desk review of baseline data, bi-annual survey data such as water quality data, and monitoring and evaluation data collected by the programme.

Qualitative data encompassed information gathered from desk studies of programme documents, interviews conducted during focus group discussions (FGDs) in targeted townships, and key informant interviews (KIIs) with project stakeholders.

The data and information derived from both qualitative and quantitative studies were analysed using guiding questions developed based on the OECD's six evaluation criteria: relevance, coherence, effectiveness, impact, efficiency, and sustainability. The guiding questions aligned with the OECD evaluation criteria are outlined in .

Table 1 Guiding Questions for the Evaluation off NGA Myanmar Programme

Criteria	Questions
Relevance	• To what extent is the programme aligned with the needs and priorities of the target population and stakeholders? • Are the programme objectives and activities still relevant and responsive to the context? • To what extent does the programme address the identified problems or needs?
Coherence	• To what extent is the project is internally coherent and aligned with other relevant initiatives, policies, and strategies? • To what extent is the project consistent with broader development goals and whether it complements or conflicts with other interventions?
Effectiveness	• How is the project achieving its intended outcomes and objectives. • To what extent the programme made the progress toward the described outcomes?
Efficiency	• To what extent does the programme utilize the resources efficiency of resource in relation to the outputs and outcomes achieved in terms of financial, human, and material?
Impact	• To what extent has the project contributed on the target population and stakeholders in positively and negatively in term of social, economic, environmental and other relevant dimensions?
Sustainability	• To what extent are the project's benefits, outcomes, and impacts likely to be sustained over time?

2.2 Data Collection Approach

To fulfil the objectives of the mid-term review, the project's performance was evaluated through

the following methods: (i) Reviewing project-related documents; (ii) Conducting focus group discussions; (iii) Conducting key informant interviews; (iv) Observing demo ponds accessible at locations where focus group discussions were conducted; and (v) Utilising expert judgement from the MTR team. Questionnaire surveys with beneficiaries were not conducted since the programme had already conducted a bi-annual survey just prior to the mid-term review. Therefore, key informant interviews and focus group discussions were conducted to complement the existing programme's monitoring data.

2.2.1 Desk Study

A comprehensive review of project-related documents was conducted to gain insights into the project objectives, outputs, and implementation activities completed thus far. These documents included the project log frame, work plans, programme data, baseline assessment, training content, and monitoring and evaluation results. The specific list of documents reviewed is outlined in Annex 1.

2.2.2 Focus Group Discussion (FGD)

FGDs were conducted in person with programme champions in targeted townships. To facilitate open dialogue on programme implementation, separate FGDs were held for male and female participants. Interview locations were chosen based on accessibility and participant convenience. Guiding questions, developed after reviewing project documents, were utilised during the FGDs. In Nyaungdon, Maubin, and Twantay, separate FGDs were conducted for male and female groups, while in Pantanaw, where the number of champions was limited, only one mixed-gender FGD was conducted. A total of 64 participants took part in the FGDs, including 29 females and 35 males. The distribution of participants from each township is detailed in below.

2.2.3 Key Informant Interview

KIIs were conducted with a diverse range of stakeholders possessing firsthand knowledge about the project. This included project staff, technical experts, representatives from technology companies, microfinance institutions, Gender Equality and Social Inclusion (GESI) experts, and GESI champions, among others. KII interviews were conducted via phone or Zoom, arranged at the convenience of the interviewees. The list of KIIs is presented in Table below.

Table 2 FGD Participants' Information

Township	Discussion Type	No of Participants
Nyaungdon	Female Group	10
	Male Group	11
Maubin	Female Group	7
	Male Group	10
Twantay	Female Group	10
	Male Group	7
Pantanaw	Male and Female	9
	Total	**64**

Table 3 KII Participants' List

Organization	Respondent
Mercy Corps	Team Leader
	Program Officer
	MEL& Communication Coordinator
	Aquaculture coordinator
ICAFIS	Green Aquaculture Expert (1)
	Green Aquaculture Expert (2)
Village Link	Program Manager
	Field Coordinator (Nyaungdon & Pantanaw)
	Field Coordinator (Maubin & Twantay)
Experts	Water Quality and Hydrology Expert
	GESI Expert
	Financial Expert
Space and Universe	Manager
Vision Fund	Partnership Coordinator
GESI Champions	Maubin (Male)
	Twantay (Female)
	Twantay (Male)
	Nyaungdon (Male)
Maha Micro Finance	Chief Operating Officer

Organization	Respondent
Total	19

2.3 Limitations

Several factors contributed to limitations in the scope of the mid-term review. Firstly, security concerns posed challenges in accessing certain areas, while geographical constraints and logistical issues further complicated the team's ability to visit all villages and demo ponds within the programme's scope. As a result, the review team prioritised locations with higher accessibility and safety, conducting observations at only three demo ponds situated within these areas.

Moreover, the mid-term review coincided with the midpoint of the programme's timeframe. This temporal aspect meant that several proposed activities were either in their initial stages, partially implemented, or had not yet commenced. Consequently, the evaluation process predominantly centred on assessing the progress and effectiveness of ongoing implementation activities rather than fully evaluating the entire spectrum of planned interventions. Despite these limitations, efforts were made to glean valuable insights and recommendations from the focus group discussions and key informant interviews to inform future actions and enhance programme outcomes.

below.

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2.5 Limitations

Several factors contributed to limitations in the scope of the mid-term review. Firstly, security concerns posed challenges in accessing certain areas, while geographical constraints and logistical issues further complicated the team's ability to visit all villages and demo ponds within

the programme's scope. As a result, the review team prioritised locations with higher accessibility and safety, conducting observations at only three demo ponds situated within these areas.

Moreover, the mid-term review coincided with the midpoint of the programme's timeframe. This temporal aspect meant that several proposed activities were either in their initial stages, partially implemented, or had not yet commenced. Consequently, the evaluation process predominantly centred on assessing the progress and effectiveness of ongoing implementation activities rather than fully evaluating the entire spectrum of planned interventions. Despite these limitations, efforts were made to glean valuable insights and recommendations from the focus group discussions and key informant interviews to inform future actions and enhance programme outcomes.

3 Mid-term Review Findings

The findings from the Mid-Term Review offer valuable insights into the progress and effectiveness of NGA-Myanmar. The review examined various aspects such as relevance, coherence, effectiveness, impact, efficiency, and sustainability. Despite challenges in accessing certain areas and the review's temporal alignment, the findings highlight areas of success and areas requiring improvement within the programme's implementation. These insights serve as a foundation for strategic adjustments and enhancements to ensure the programme's continued success in promoting sustainable aquaculture practices in Myanmar.

3.1 Relevance

To what extent is the programme aligned with the needs and priorities of the target population and stakeholders? Aquaculture plays a pivotal role in bolstering the country's economy and serves as a significant source of employment and livelihood for many households. The aquaculture industry is predominantly concentrated in regions such as Yangon, Ayeyarwady, Bago, Sagaing, and Mandalay, with the Ayeyarwady region being particularly prominent. It accounts for 50 percent of the total aquaculture fishpond area, followed by the Yangon region (27 percent) and the Bago region (13 percent). NGA-Myanmar strategically focuses its activities in the Yangon-Ayeyarwady aquaculture corridor to create economies of scale for implementing green aquaculture practices. By concentrating efforts in this corridor, which harbours a significant concentration of aquaculture MSMEs, the programme maximises its impact and outreach. This targeted approach allows for efficient resource allocation, facilitates knowledge sharing among stakeholders, and fosters a conducive environment for the adoption of sustainable practices. Moreover, by addressing the specific needs and priorities of MSMEs in this corridor, NGA-Myanmar contributes to the overall economic growth and environmental sustainability of Myanmar's aquaculture sector.

The programme targets four townships within the Yangon-Ayeyarwady Corridor, where MSMEs with limited awareness of GrAqPs and green technologies are clustered. The programme not only addresses water pollution and environmental concerns by promoting green practices and technologies among MSMEs but also fosters business opportunities by linking technology providers, financial institutions, and MSMEs in the area. Consequently, the programme is well-aligned with the needs and priorities of the target population and stakeholders, particularly for households where aquaculture serves as the main source of livelihood. Additionally, it aids environmental monitoring efforts, and mitigates economic crises in the absence of adequate government support.

Are the programme objectives and activities still relevant and responsive to the context? NGA-Myanmar remains steadfast in its mission to enhance resource efficiency and combat environmental degradation in Myanmar's aquaculture sector while simultaneously improving economic returns along the value chain. The programme's approach was informed by a meticulous Baseline Study and various assessments, including the Strategic Environmental Assessment, Hydrology Assessment, Gender Equality and Social Inclusion (GESI) Analysis, and Decision-to-Pay Assessment. These evaluations revealed significant gaps, indicating a lack of exposure to green aquaculture practices, limited access to investment funds, and deficiencies in relevant skills and technologies necessary for adopting GrAqPs. These findings underscored the urgent need for targeted interventions to address these gaps and promote sustainable aquaculture practices.

In response, the programme strategically devised activities tailored to bridge these identified challenges. It involved the selection of MSME

champions for specialized training in green aquaculture practices, the establishment of demo ponds to showcase GrAqPs and green technologies, and the organization of field day events for additional MSME cohorts. Additionally, the development of the "Htet Toe" digital application facilitated widespread dissemination of GrAqPs knowledge. Notably, by its Mid-Term (June 2023), the programme successfully engaged 314 champions, representing 779 ponds covering 6,257.02 acres, with an average pond size of 8.34 acres. Moreover, the programme integrated gender equality and social inclusion training into its activities, ensuring a comprehensive approach to addressing identified challenges.

Through these concerted efforts to enhance resource efficiency and environmental sustainability, it is evident that the programme's objectives and activities remain highly relevant and responsive to the context, effectively addressing the needs of the aquaculture sector in Myanmar.

To what extent does the programme address the identified problems or needs? The inception assessments carried out by NGA-Myanmar identified a lack of technical knowledge in green aquaculture practices and limited access to finance as major challenges in the target programme area, mirroring issues observed in other aquaculture regions across Myanmar. In response to these findings, the programme has been working with aquaculture experts from the International Centre for Aquaculture and Fisheries Sustainability (ICAFIS) in Vietnam to develop a comprehensive GrAqPs training curriculum. This curriculum covers essential topics ranging from pond maintenance to disease prevention and seed quality examination, addressing critical knowledge gaps among MSMEs. Feedback from focus group discussions indicated that participants found the training provided by NGA-Myanmar highly beneficial.

Access to financial resources is a critical factor for the success and sustainability of aquaculture ventures. However, many aquaculture farmers in Myanmar face challenges in accessing loans and financial support due to various barriers such as lack of collateral, limited financial literacy, and inadequate infrastructure. By facilitating access to financial institutions, the NGA programme helps aquaculture farmers overcome these barriers and obtain the necessary funds to invest in green aquaculture practices and technologies. In the context of Myanmar, where access to loans for the aquaculture sector is limited, the NGA programme's efforts to facilitate access to finance and promote sustainable practices are particularly significant.

By addressing identified critical needs and challenges faced by aquaculture MSME/farmers, the programme demonstrates its relevance and effectiveness in supporting the development of the aquaculture sector and improving the livelihoods of aquaculture producers in the target area.

3.2 Coherence

To what extent to which the project is internally coherent and aligned with other relevant initiatives, policies, and strategies? NGA-Myanmar's initiatives are coherent with the goals of the SWITCH-Asia program, aimed at assisting MSMEs in adopting cleaner and more sustainable production methods. Focused on the Yangon-Ayeyarwady Aquaculture Corridor, where MSMEs are prevalent, and introducing green aquaculture practices and technologies, the program aligns directly with SWITCH-Asia's objectives. Furthermore, NGA-Myanmar's efforts to enhance resource efficiency and address environmental degradation in the Ayeyarwady delta ecosystem are in line with broader EU-funded policies.

Regarding other interventions, while the International Development Organization supported Myanmar's aquaculture development with approximately ten projects between 2016 and 2020[4], there has been a decline in such support since. However, the Powering Aquaculture Progress (PAP) project[5], implemented by De Heus – a feed company, remains active. As a public-private partnership focused on modernizing aquaculture supply chains, PAP's activities do not conflict with those of the NGA program. Thus, NGA continues to

[4] International Bank for Reconstruction and Development/ The World Bank. Myanmar Country Environmental Analysis, Sustainability, Peace, and Prosperity: Forests, Fisheries and Environmental Management, Fisheries Sector Report. 2019.

[5] https://freshstudio.vn/introduction-to-the-powering-aquaculture-progress-partnership-in-myanmar/

address the needs of Myanmar's aquaculture sector without conflicting with other interventions, as confirmed during focus group discussions revealing no recent projects in the area.

To what extent is the project consistent with broader development goals and whether it complements or conflicts with other interventions? NGA-Myanmar's consistency with broader development goals is evident through its alignment with the national aquaculture development plan (NADP) 2019-2023. The NADP identifies challenges faced by small-scale aquaculture farmers, including land acquisition difficulties, limited financing options, and inadequate access to supplies and equipment. By collaborating with various private sector entities, NGA-Myanmar directly addresses these needs, contributing to the broader objective of enhancing the livelihoods and resilience of aquaculture producers in Myanmar. Through partnerships with technology firms, financial institutions, and other stakeholders, NGA-Myanmar facilitates access to essential resources and expertise for aquaculture MSMEs, promoting economic growth and sustainability while bolstering community resilience against environmental and socio-economic challenges.

Furthermore, the programme's promotion of green aquaculture practices and technology adoption aligns with the NADP and contributes to several Sustainable Development Goals (SDGs), including Gender Equality, Decent Work and Economic Growth, Responsible Consumption and Production, Climate Action, and Life Below Water. This comprehensive approach underscores the programme's coherence with donor policies, the national aquaculture development plan, and the broader agenda of sustainable development.

3.3 Effectiveness

How is the project achieving its intended outcomes and objectives? To what extent the programme made the progress toward the described outcomes? To assess this criteria, it involves reviewing project documentation to understand initial intentions and comparing actual achievements at its mid-term. It is crucial to acknowledge that many aspects of the program implementation are still ongoing during this period, thereby this review emphasizes progress against the intended outcomes rather than final results.

Table 4 Summary of Outome 1

Outcome	EUR 100,000 in commercial loans is channelled to kick start adoption of green tech & GrAqPs by early adopter champion MSMEs.
Indicator (target)	No. of target MSMEs accessing newly developed customized loans (500 participants)
Summary	Collaborations have been established with various financial institutions, including Daung Capital, Vision Fund, and LOCL Myanmar, as well as with other market actors like AgroSolar Myanmar, to develop and promote customized loan products for program participants. To date, at least 124 participants have been connected to access loans from these providers. However, it is unlikely that the targeted 500 participants will be achieved by the end of the program's timeframe due to the ongoing negative economic outlook in Myanmar.

Under **Outcome 1**, at the programme's mid-term, the implementation of the activities mostly involved the development of loan products and initial promotion. Given the ongoing economic challenges in Myanmar, NGA-Myanmar anticipated difficulties in achieving the targeted 500 participants accessing loans. For this reason, the programme expanded its collaborations beyond Daung Capital – the lead financial institution partnered from the programme's start. Collaboration with Vision Fund commenced in early 2023, leading to the development and launch of a green loan product specifically for women engaged in aquaculture. However, Vision Fund encountered an objection from the Financial Regulatory Department regarding this collaboration over a concern by the authority of working with a programme implemented by a non-profit organisations. Nevertheless, Vision Fund has continued to market their loan product in Maubin within its current scope of work. Furthermore, through the Htwet Toe app, the programme partnered with another financial

institution, LOCL Microfinance, which also developed and marketed a green loan for aquaculture operators. NGA-Myanmar's progress indicates that more than 124 participants have been connected with partnered financial institutions across target areas.

Additionally, the programme collaborated with two technology companies: Agrosolar Myanmar, a solar pump technology company, and Space and Universe, a supplier of small-scale feed machines. These companies were supported in promoting their technologies in demo ponds to NGA-Myanmar participants. Agrosolar developed an innovative financing mechanism allowing MSMEs to purchase pumps through a pay-after-harvest arrangement. However, Space and Universe showed less interest in providing their products on credit due to perceived high risk associated with Myanmar's economic outlook.

Key informant interviews with financial institution practitioners and experts indicate that the financial sector in Myanmar is grappling with challenges stemming from the overall economic outlook, potentially leading to a decreased interest in providing loans, particularly to new customers. Additionally, focus group discussions with participants highlighted interest in accessing loans, but concerns persist regarding the requirements, interest rates, and repayment terms, exacerbated by the uncertainty in the economic landscape. Given the prevailing political situation, achieving the target indicator for this outcome within the NGA implementation timeframe appears overly ambitious. Therefore, it is advisable to adjust this target to a more realistic number. Moreover, while the program continues its efforts to foster collaborations with other financial institutions, exploring opportunities to connect with commercial banks is also recommended.

Table 5 Summary of Outome 2

Outcome	Champion MSMEs trial & demonstrate solutions for GrAqPs across different geographic clusters.
Indicator (target)	• % of champion enterprises demonstrating satisfactory knowledge of GrAqPs (75%) • No. of unique business cases for adopting green tech at the pond-level (10 cases)
Summary	At present, 314 participants have been selected and organized into 13 demonstration locations, where Green Aquaculture Practices (GrAqPs) trainings and demonstrations have been conducted. To monitor progress, the program has devised four bi-annual surveys, scheduled for Years 2 and 3, to assess knowledge and practice related to GrAqPs, although data at this mid-term stage is too early to gauge achievement percentages. The program has also advocated for various solutions to support GrAqPs adoption, including water quality test kits, solar pumps, the Internet of Things (IoT), and feed-making machines. Moving forward, documenting unique business cases at the farm level regarding the benefits of these technologies will be essential to measure the related outcome indicator. It is very likely that this outcome will be achieved at the end of the programme. However, the programme could benefit from an extension to establish a solid foundation for GrAqPs adoption and scaling up.

Under **Outcome 2**, to achieve its first indicator, two green aquaculture experts from the International Centre for Aquaculture and Fisheries Sustainability (ICAFIS) in Vietnam were tasked with developing the GrAqPs training curriculum. These experts conducted a high-level needs assessment by observing existing aquaculture practices in the target area and engaging with aquaculture farmers to understand their knowledge levels for curriculum development. Simultaneously, they shared good aquaculture practices from Vietnam with the target population through two training sessions. Subsequently, aquaculture experts from the Village Link and Mercy Corps delivered follow-up training for the target beneficiaries. By the mid-term review, at least four training sessions had been provided to the target champions, covering topics such as pond preparation, disease management, seed selection and stock density, and feed processing for both fish and shrimp. Demonstrations on how to carry out water quality

monitoring were also conducted, with champions equipped with water-testing kits including thermometers, pH and ammonia measurement test kits.

NGA-Myanmar has identified and registered 314 participants as champions, surpassing the target of 250 champions. The programme's monitoring and evaluation systems have systematically recorded the champion lists, identifying 16 champions from three target townships – Pantanaw, Nayungdon, and Twantay – who did not participate in any NGA programme training sessions. The programme should consider removing these 16 champions from the list.

Additionally, to assess knowledge and practices among programme participants, bi-annual monitoring surveys are conducted in Year 2 and Year 3, aiming to include as many champions as possible as survey participants. One survey was conducted prior to this review (in April), but the data would be too early to assess the participants knowledge and practice as training activities for this year will be going on until the end of the year. Therefore, the programme should continue with the planned bi-annual monitoring survey in December and conduct analysis accordingly. It is noteworthy that in the first bi-annual survey data, 10 respondents were family members of the champions who never participated in any training sessions. Responses from family members who did not attend any training on behalf of champions should not be included, as they could affect the assessment results of programme activities, providing a lesson for the next survey.

The effectiveness of the programme became evident during the focus group discussions. Almost all male and female participants expressed appreciation for the training content, highlighting improvements they experienced and shared with the mid-term review team. Participants revealed that prior to the training, they lacked knowledge on visually assessing pond water quality or checking the quality of shrimp seed. However, after participating in the training, they acquired skills in pond water quality assessment through visual inspection and seed quality assessment, resulting in the purchase of only good-quality seed. This practice not only reduces shrimp fatality rates but also increases income.

During focus group discussions, it became evident that the prevailing traditional practice among most participants is to not measure water quality, indicating a deeply ingrained behaviour that will be challenging to change. This underscores the necessity for the programme to consistently reinforce the promoted practices throughout its duration. Conducting a planned Barrier Analysis study can help identify barriers for adoption and develop targeted actions accordingly. Despite participants receiving water quality test kits from the programme during training, they are still in the learning stage, which explains why the initial bi-annual survey results on the application of green aquaculture critical practices still showed a higher number of respondents who did not measure water quality.

Below are some quotes from champions sharing the effectiveness of the training during the focus group discussion:

"Before I joined the training, I did not know that oxygen deficiency can occur in the pond at night, but now I know about it because of the training."

"Prior to attending the water quality management training by the NGA programme, I made the mistake of losing all the fish in my pond due to a lack of knowledge about water quality management. After receiving the training, I have been able to avoid such mistakes."

"In the last two years, I dug a new fishpond and filled it with water without adding lime. Initially, I believed that adding lime to the pond for fish farming was unnecessary. While visually inspecting my fishpond, the water quality appeared to be good, but in reality, the lower layer of water in my pond was deteriorating. As a result, the fish were dying, and I also noticed some spots on my fish that I suspected to be parasites. Consequently, in the following year, after harvesting, I added as much lime to my pond preparation as I could to rectify the situation. Though I could not afford to put lime in the same amount as what I had learned in training, I noticed that the water quality had improved."

Some participants from the focus group discussions and interviews provided the following few suggestions related to the training:

"I would like the NGA-Myanmar project to come to our area and engage in aquaculture farming in their own ponds using their practices and techniques. Then, I could compare the improvements and benefits of their ponds with

ours. This way, we would have the opportunity to learn about the differences in practices and techniques between their ponds and ours. For instance, we could gain insights into different costs, feeding methods, productivity, and more, which could help us improve our farming practices, productivity, and income."

"If it is possible for the aquaculture expert of the project to visit our villages regularly, it would be highly beneficial for us. This way, we can communicate our requirements in person and make the necessary adjustments to enhance our fish farming practices."

"In terms of training, it's advisable to place a primary focus on practical aspects to generate greater interest. Each practice becomes more engaging and effective when accompanied by hands-on experiences."

"Though demo ponds have been demonstrating green aquaculture practices, However, there is no way to show how demo ponds are more effective than conventional practice. Without showing the comparison between the demo pond and non-demo pond, the aquaculture could not clearly see the benefit of green aquaculture practices."

"The training should be conducted more frequently, for example, once every two months rather than every three or four months. It would be beneficial to maintain regular contact with the farmers."

In relation to the second indicator under this outcome, the programme selected water quality test kits, solar pumps, the Internet of Things (IoT), and feed-making machines for scaling green technologies based on the baseline study. These technologies have been successfully demonstrated at 13 demo ponds established during Year 1, exceeding the programme's target of 12. The programme also provided essential resources for demonstrating good practices at these ponds, including responsibly produced seeds, quality lime, and sand filters, tailored to each demo pond's specific requirements. While participants expressed satisfaction with the performance of solar pumps, interest in feed-making machines was comparatively lower due to rising feed material prices, prompting the programme to explore potential alternative feed materials to address the concern.

Additionally, although participants have access to water quality test kits, awareness around water quality measurements remains low. To address this, the programme has utilized various channels, including trainings and Htwet Toe outreach (explained under Outcome 3). Moreover, it has engaged youth, primarily members of NGA-Myanmar GESI champions, to conduct water quality monitoring in support of activities under Outcome 4 while promoting these practices. Given the importance of water quality monitoring in GrAqPs, the programme is recommended to continue emphasizing the significance of water quality practices through existing and potential channels.

Overall, while the NGA programme has successfully increased awareness among aquaculture farmers in the Yangon-Ayeyarwady corridor, challenges such as rising feed and non-feed input prices need addressing for full adoption of GrAqPs practices. Extending the programme duration by one year or more may be necessary to establish a solid foundation for GrAqPs adoption at the pond level. Additionally, a more focused training approach with increased engagement between aquaculture experts and champions, encouraging GrAqPs demonstrations at the pond level, is recommended for the remaining programme period.

Table 6 Summary of Outome 3

Outcome	75% of other target MSMEs in the Yangon-Ayeyarwady aquaculture corridor have knowledge & awareness to adopt solutions for green aquaculture.
Indicator (target)	• % of cohort of 2,000 target MSMEs increased knowledge and awareness to adopt green tech & GrAqPs. (80%) • % of cohort of target 12,000 MSMEs increased knowledge and awareness to adopt green tech & GrAqPs. (80%)
Summary	To expand the program's reach by an additional 2,000 direct participants, field day events will be conducted starting in the second semester of Year 2 and continuing until the end of the program. This will be achieved by harnessing the support of

	existing champions and established demo farms. To effectively promote GrAqPs and engage 12,000 target participants, the partnered technology company, Village Link, has integrated GrAqPs into the Htwet Toe app and its social media outreach. As of the midterm evaluation, at least 75% of the targeted 12,000 participants have been reached. It is highly probable that the program will exceed these outcome targets by the program's conclusion.

To achieve **Outcome 3**, the program has implemented two distinct strategies. Firstly, it aims to enhance the understanding and adoption of green technology and green aquaculture practices among 2,000 MSMEs through field day events at demonstration ponds, scheduled from the second semester of Year 2 until the program's conclusion. Considering the available number of champions and demo farms, it is anticipated that NGA-Myanmar will successfully reach these additional participants. However, it is advisable for the program to incorporate pre- and post-tests to gauge participants' knowledge levels, enabling a more comprehensive reporting of this outcome.

The second approach concentrates on ensuring that a total of 12,000 participants are engaged through the Htwet Toe application to increase their awareness and knowledge of green technology and green aquaculture practices. As of June 2023, the program has reached 72% of the targeted participants, with 44 green aquaculture-related articles already uploaded.

During focus group discussions, champions shared their perspectives on the Htwet Toe application's utility. Many mentioned primarily using it to check market prices, while some sought specific technical assistance, with only a few expressing interests in participating in quizzes designed to assess their knowledge of promoted GrAqPs. To complement data gathering and measure the effectiveness of information shared through Htwet Toe, the program is advised to include relevant questions in bi-annual surveys and other field monitoring activities.

It's worth noting that some champions, particularly those over 50, mentioned facing challenges using the application, as they typically use their phones solely for communication purposes. Despite that, it is argued that the Htwet Toe application has significant long-term and scalable potential for reaching more aquaculture operators even beyond NGA-Myanmar's target locations. Farmers can utilize it to address their concerns and expand their knowledge even after the project concludes, indicating its enduring value to the aquaculture community.

Table 7 Summary of Outome 4

Outcome	MSME take adaptive actions to reduce water pollution in response to environmental data generated by the action.
Indicator (target)	No. of MSMEs that take adaptive actions to reduce water pollution. (75%)
Summary	The program promotes water quality monitoring as a key aspect of GrAqPs, encouraging participants to monitor water quality of ponds, rivers, lakes, and other ambient environments. Participants use the data to implement adaptive measures for reducing water pollution. Youth champions are trained to conduct monthly measurements of eight parameters at various sites, but challenges remain in translating data into actionable strategies. Despite this, the program's emphasis on water quality monitoring reflects its commitment to environmental stewardship and is likely to meet its targets.

Under **Outcome 4**, the program aims to encourage participants to monitor water quality both in ponds and ambient environments such as rivers and lakes. They are then expected to use the gathered data to implement adaptive measures aimed at reducing water pollution. This initiative is of paramount importance due to the significant role rivers, reservoirs, and other water bodies play in community well-being.

The baseline assessment study conducted in August 2022 revealed that only 27% of respondents had satisfactory knowledge of green aquaculture concepts and practices. While 47%

claimed to conduct regular water quality monitoring, only 10% did so systematically, using parameters like pH, ammonia, and dissolved oxygen levels. Others relied on visual cues such as fish feeding behavior or the color and odor of pond water. Additionally, only about 5% of respondents practiced wastewater treatment, and there were no observed settlements or reservoir ponds addressing siltation.

Recognizing the critical role of water quality in aquaculture, the NGA program incorporated water quality testing methods into its activities. Programme participants, including youth champions, received training from water quality experts. These youth champions were then tasked with monthly measurements of eight parameters (phosphate, nitrate, nitrite, alkalinity, pH, dissolved oxygen, temperature, and BOD) at both ponds and their upstream and downstream sources. The collected data was sent to the program for database analysis.

Furthermore, water quality experts conducted on-site measurements as well as sample collection for laboratory analysis in Yangon. Discrepancies were noted among the measured data resulting from the on-site measurements conducted by experts and youth champions, compared to the laboratory analysis. This can be attributed to various factors, including differences in testing methods and detection limits, as well as the likelihood of sample degradation or contamination during transportation from the field to the lab. Notably, results from the laboratory consistently showed higher values compared to other measurements (including results that, if accurate, could have led to the demise of fish in the assessed ponds), indicating potential inaccuracies that necessitate consideration of improvement in sample handling or alternative laboratories for future analysis.

During focus group discussions with trained youth champions during site visits, it was observed that while they could conduct measurements, they expressed difficulty in translating the data into actionable strategies for effectively utilizing the results. Although the training was effective in obtaining data and equipping champions with measurement skills, there is room for improvement in training approaches to enhance effectiveness in utilizing the collected data.

This review underscores the program's significant emphasis on the importance of water quality monitoring in aquaculture. The program aims to enhance participant knowledge and implementation of effective monitoring practices for better environmental stewardship, particularly in the absence of effective monitoring by the authorities. It is likely that the program has reached its relevant targets under this outcome.

Table 8 Summary of Outome 5

Outcome	Viable & bankable business cases for replicating the green aquaculture model are developed and promoted.
Indicator (target)	No. of sector-wide bankable business cases of green aquaculture developed & promoted. (3)
Summary	The program has been identifying green technologies for promotion among participants in the demo ponds. Collaborations with various market actors have been forged by the mid-term and can be further strengthened throughout the program's remaining timeframe. It is too early to assess the likelihood of meeting the program's target at this stage, and therefore, evaluation will be necessary at the final assessment.

Under **Outcome 5**, the programme has been advancing towards developing viable and bankable business cases for various green technologies, including solar pumps, through collaborations with technology providers and financial institutions. Given the current economic challenges in Myanmar, there may be a need for the programme to prioritize working with technology providers to establish value chain financing, as demonstrated with AgroSolar. Plans are underway to bolster follow-up activities for this outcome in the final year of the programme (2024). Therefore, it is too early to gauge the likelihood of meeting the programme's target at this stage, necessitating evaluation at the programme's conclusion. However, it is argued that extending the programme could provide valuable additional time for further development of alternative financing mechanisms, enhancing MSMEs' access to green technologies.

3.4 Efficiency

To what extent does the programme utilize the resources efficiency of resource in relation to the outputs and outcomes achieved in terms of financial, human, and material? The programme implementation was carried out through partnerships among Mercy Corps, Village Link, and the Daung Capital. Among them, Mercy Corps is responsible for ensuring action implementation according to donor policies. Village Link, a digital service registered company in Myanmar, takes on the responsibility of connecting rural entrepreneurs, green technical professionals, suppliers and buyers, and other agri-related businesses on a single online platform via the Htwet Toe mobile app. Village Link also takes on the responsibilities of leading field activities, including the action's promotion of smart green tech, including developing and showcasing Myanmar-adapted IoT mobile-based solutions. Daung Capital, a Myanmar fingreen tech company and lender, has the responsibility to develop green financial products for sustainable aquaculture production. Daung Capital will develop loan products tailored to the needs of target MSMEs and collaborate with MC to develop a marketing campaign to promote the new products. Daung Capital will allocate EUR 100,000 in loans for early-adopter MSMEs to access the tested solutions.[6]

Regarding human resources, the program has successfully employed both technical and non-technical staff as initially planned. However, based on feedback from focus groups and key informant interviews, the review team suggests that employing a full-time aquaculture expert at the township level could enhance program efficiency by facilitating closer communication with the target population.

Regarding the budget, the program's allocation and utilization have been efficient, with approximately 40% of the budget expended. However, the burn rate of the local office is notably high at 93%, primarily due to internal restructuring of Mercy Corps operations in Myanmar, compounded by inflation, leading to unexpected expense increases. It is recommended to reschedule the budget for this category. Nonetheless, the remaining 60% of the budget should suffice for the remaining program period.

Overall, the mid-term review team acknowledges the program's efficient operation. However, to elevate champions to a more advanced level of Green Aquaculture Practices (GrAqPs) and green technology from their current awareness level, the program should consider an extension. This would allow for increased focus on closer engagement with beneficiaries at the pond level, implementation of pond diaries for recording feed and non-feed inputs, and enhancement of water quality monitoring practices among champions.

Table 9 Programme Financial Information (as of July 2023)

Budget Heading	Budget Amount (Euro)	Total Expense (Euro)	Total Remaining (Euro)	Burn Rate %
Human Resources	1,151,055.64	509,602.00	641,453.64	44%
Travel	46,000.00	*12,168.33*	*33,831.67*	*26%*
Equipment and Supplies	87,600.00	25,987.40	61,612.60	30%
Local Office	46,630.96	43,258.02	3,372.94	93%
Other Costs and Services	327,461.84	103,766.24	223,695.60	32%
Other (Program)	164,000.20	27,682.89	136,317.31	17%
Total Direct Costs	**1,822,748.64**	**722,464.88**	**1,100,283.76**	**40%**
ICR (7%)	127,592.40	50,572.54	77,019.86	40%
Total	**1,950,341.04**	**773,037.42**	**1,177,303.62**	**40%**

3.5 Impact

To what extent has the project contributed to the target population and stakeholders in positively and negatively in term of social, economic, environmental and other relevant dimensions? While it is still premature to fully assess the impact of the programme, the review contends that NGA-Myanmar has significantly contributed to raising awareness of and applying green aquaculture practices and technologies among its intended participants. The target population has acknowledged an increase in their

[6] Annex 6: Communications and Visibility Plan, Mercy Corps.

technical knowledge related to aquaculture farming due to the training provided by the programme.

Currently, the programme has already reached and benefited 298 champions (excluding 16 non-training participants). Additionally, alongside training, the programme developed the Htwet Toe online application, integrating green aquaculture techniques, technologies, and financial methods, accessible to a wider network of aquaculture producers across Myanmar. 8,640 participants (72% of the targeted 12,000 MSMEs) have been onboarded to the app and have access to knowledge and skills on GrAqPs as well as information about supporting businesses to adopt the promoted technologies and access to financing. This application is perceived as beneficial not only for the target beneficiaries but also for aquaculture producers beyond the programme's target townships, representing a positive outcome.

The integration of Gender Equality and Social Inclusion (GESI) into the programme (explained below) is expected to have a positive impact on the community in the target area. Notably, all four GESI key informant interview respondents reported positive feedback: their perception of LGBT individuals positively changed, becoming more aware of the influence of masculinity on patriarchal society and the opportunities for women.

3.6 Sustainability

To what extent are the project's benefits, outcomes, and impacts likely to be sustained over time? Similarly, it is too early to determine the sustainability of the programme's impact at this stage. Indicators of sustainability could be assessed at the final evaluation by examining the extent to which champions have adopted green practices and technologies. However, at this midterm, champions' interest in the promoted practices and technologies seems genuine, especially as these innovations contribute to enhancing productivity and reducing production costs. Solar pump technology stands out as a favourite, likely due to its potential to reduce fuel costs amidst rapid inflation.

The inclusion of spouses and youth in the champions' activities is likely to strengthen the sustainability of the programme's outcomes. The programme plans to provide women empowerment training to women in the target area, enabling them to create alternative income sources by connecting with the market. Before conducting the training, it is recommended that the programme should ensure it is market-oriented skill development.

Water quality monitoring practices are essential for sustainability, and therefore, the programme is advised to continue promoting them. The programme team has identified local practices that could benefit from training and should be further promoted. For instance, the practice of adding an increased amount of lime to the pond to enhance the production of natural feed (i.e., planktons) without measuring the pH level may pose problems for aquaculture farming. Training highlights should include awareness of the relationships between water quality measurement and feed and non-feed inputs to the pond.

3.7 Cross-cutting

3.7.1 Gender Equality and Social Inclusion (GESI)

The programme strategically conducted GESI analysis and action planning at the outset, providing guidance on integrating GESI into activities. This included involving spouses and youth in trainings and demonstrations, as mentioned previously. Therefore, it is recommended that the programme register both male and female members of targeted aquaculture households in the champion database. During the review, only 47 women were recorded in the champion database, despite the programme targeting and engaging both heads of households and their spouses in activities.

In the focus group discussion, a total of 29 participants were involved, and all female participants confirmed that they did not encounter any barriers or discrimination in joining the training. These women also noted that their aquaculture knowledge had improved due to the training provided by NGA-Myanmar. One female participant from the focus group discussion explained the benefits of the NGA training as follows:

"I started shrimp seedlings in March and purchased about 40,000 shrimp seeds, but I only obtained around 20,000 shrimp in return. The success rate depends on the quality of the seeds I purchased. During the training, the trainers taught us not to buy seed bags containing shrimp seeds that are dying, typically about 10 or 15 shrimp seeds per bag. The trainer also taught how to identify healthy shrimp seeds. If the unhealthy shrimp seeds were bought, the return profits would be lower. Now, I know how to select the shrimp seeds due to the training. The profit will become better."

The inclusion of GESI trainings in the NGA programme brought the concept of gender equality to the community. All the KII participants in GESI provided positive feedback that the training provided a better understanding of gender equality. One of the male participants in GESI training provided his understanding of GESI training as follows:

"After the GESI training, I gained a deeper understanding of the rights and freedoms of women and girls. Often, our traditional culture has restricted their freedom. For instance, they are typically not allowed to socialize with their friends at night. Women and girls are human beings too and desire to enjoy time with their friends just as men do. Traditionally, in our society, when women and girls encounter problems or conflicts while being out at night, they are often blamed without the root problems being addressed. People attribute such issues to their being outside at night, essentially engaging in victim-blaming. In my opinion, both women and men are human beings, and it's essential to address the actual problems to determine who is at fault. My perspective on the rights of women and girls shifted after participating in the training. I now recognize that women and girls could pursue leadership roles in business if they choose to do so."

Furthermore, a female participant in the interview stated:

"Because of this NGA programme there has been a significant improvement in my ability to express myself. For instance, I have overcome my fear of speaking up after joining training. As a result, I have become more confident in sharing my ideas and opinions, leading to a more inclusive and collaborative environment".

It is recognized that GESI trainings provide a greater understanding of gender equality and are likely to enhance the leadership roles of women and youth. The project has positively impacted the participants by increasing their understanding of gender issues and fostering changes in gender norms and attitudes.

It is acknowledged that GESI trainings offer a deeper understanding of gender equality and are likely to empower women and youth in leadership roles. The project has had a positive impact on participants by enhancing their comprehension of gender issues and promoting changes in gender norms and attitudes.

3.7.2 Community Accountability Reporting Mechanism (CARM)

Under the programme, the Community Accountability Reporting Mechanism (CARM) system was established to facilitate feedback from the target participants and communities regarding the implementation of NGA-Myanmar. During the focus group discussion, nearly all participants confirmed that they had received information about CARM and understood how to reach out with any complaints or inquiries. Bi-annual survey results regarding CARM showed that no individuals expressed dissatisfaction with the system, a sentiment echoed in the feedback from the focus group discussions. This indicates that the target participants have been effectively informed about the CARM system and its channels, proving to be efficient for the programme as it enables the target population to provide feedback, suggestions, or raise any issues easily.

4 Conclusion and Recommendations

The midpoint of the NGA-Myanmar programme represents a crucial stage in the collective effort. While it may be early to conduct a comprehensive evaluation of the programme's performance against established criteria, this Mid-Term Review holds significant importance for reflection and strategic adjustment. It provides an opportunity to assess the progress made thus far, identify areas of strength, acknowledge challenges encountered, and chart a course for enhancing the programme's effectiveness moving forward.

4.1 Conclusion

The mid-term review has indicated that the NGA programme is yielding positive benefits for the target participants, although a more comprehensive assessment of its impacts and sustainability is required at a later stage. Currently, like much of Myanmar's population, the targeted participants are grappling with exacerbated economic challenges due to ongoing crises. Aquaculture producers face numerous obstacles, including rising feed and non-feed prices. Against the backdrop of political upheaval and economic turmoil, the imperative to green the aquaculture sector in Myanmar becomes even more pronounced. In this context, extending NGA-Myanmar's timeframe is believed to provide an opportunity to establish a more solid foundation for greening the aquaculture sector, thereby contributing to the country's long-term prosperity and resilience amidst adversity.

Currently, the NGA-Myanmar programme is well-aligned with the needs of aquaculture MSMEs, including aquaculture farming households, in the Yangon-Ayeyarwady aquaculture corridor. The programme's overall design, which prioritizes collaboration with private sector actors providing technologies and financing, supports the achievement of its goals, especially in the absence of effective and responsive public sector service delivery. The programme also emphasizes support for women – the neglected actors in the aquaculture sector in Myanmar, thereby enhancing its relevance. Specifically, the programme's strategy to engage lead firms specializing in information technology (such as Village Link) and green finance (like Daung Capital) reflects a pragmatic approach to scaling the programme's outcomes.

The coherence of the programme is evident in its alignment with both the national aquaculture development plan (2019-2023) and the Sustainable Development Goals (SDGs), including Gender Equality (Goal 5), Decent Work and Economic Growth (Goal 8), Responsible Consumption and Production (Goal 12), Climate Action (Goal 13), and Life Below Water (Goal 14). Additionally, the focus on MSMEs, including a large percentage of aquaculture farming households, in the Yangon-Ayeyarwady Aquaculture Corridor promotes a green, low-carbon, and resource-efficient economy in line with the SWITCH-Asia approach. Recognizing the need for a comprehensive understanding of gender issues within aquaculture further underscores the project's coherent approach to addressing social dynamics and environmental concerns.

The effectiveness of the programme is evident, with nearly all target populations providing positive feedback on the enhancement of knowledge in aquaculture production and environmental stewardship. The programme's demonstration of green practices and technologies at demo ponds, along with Gender Equality and Social Inclusion (GESI) training, not only fosters community interest in adopting green technology but also facilitates gender equality in the sector. The established CARM system further enhances the programme's effectiveness by enabling direct feedback from the target population. To enhance its effectiveness further, the Mid-Term Review recommends that the programme reinforce the provision of trainings, particularly focusing on key

aquaculture practices such as water quality measurement, to address entrenched traditional practices more effectively.

The programme demonstrates efficiency through its adaptive approach to managing delays in its startup activities caused by external factors such as the unconducive political and security situation, which create operational challenges. While it is acknowledged that the programme aims to institutionalize the provision of GrAqPs through private sector actors and by leveraging information technology in the absence of an effective public extension system, it is suggested to employ full-time aquaculture experts at the township level, especially as a temporary measure while the private extension model is being matured. This would accelerate the adoption of green aquaculture practices and technologies, thereby further enhancing the programme's efficiency in achieving its impact and sustainability.

While it is too early to fully assess sustainability, participants show genuine interest in promoted practices and technologies, particularly solar pump technology. Inclusion of spouses and youth strengthen sustainability, with plans for women empowerment training to create alternative income sources. Continued promotion of water quality monitoring practices is commended, along with addressing local practices that may pose challenges for aquaculture farming.

The NGA-Myanmar programme has strategically conducted Gender Equality and Social Inclusion (GESI) analysis and action planning. The programme involves spouses and youth in trainings, demonstrations, and other activities. Female participants have reported improved aquaculture knowledge due to the programme's trainings, and GESI awareness sessions have positively impacted participants by increasing their understanding of gender issues and fostering changes in gender norms and attitudes, empowering women and youth in leadership roles. However, it is important to note that the superiority of masculinity over femininity practices remains entrenched and likely continues to persist in the target aquaculture communities. Therefore, targeted capacity-building trainings and mentorship initiatives for women entrepreneurship in aquaculture (e.g., value-added processing) need to be strengthened. This should be complemented with ongoing awareness-raising efforts addressing women's time poverty and engaging women in decision-making processes at home. Additionally, ensuring equal access to resources such as credit and inputs for aquaculture activities is essential for promoting gender equality in the sector.

4.2 Recommendations

While more generic recommendations have been diligently integrated into the analysis corresponding to each evaluation criterion, further executable actions are imperative to align with the findings and ensure the fulfillment of program objectives within the remaining program period. The following action-oriented recommendations are therefore proposed to optimize program efficacy:

Related to Outcome 1 and Outcome 5

- Acknowledging the challenges faced by financial institutions and participants amidst uncertainty, the programme has taken proactive steps to expand its collaborations with as many financial entities as possible. To further strengthen its network, it is recommended that the programme continues to explore partnerships with other financial institutions, including innovative banks such as AYA Bank, A-Bank, and SME BD Bank, renowned for their progressive approaches in the banking sector. Additionally, exploring a partnership with Maha, a microfinance organization expressing interest, offers an opportunity to diversify funding sources for participants and enhance the sustainability of the programme. This strategic expansion not only improves access to loans with favourable interest rates but also mitigates risks associated with reliance on microfinance institutions.
- The programme's ongoing efforts to develop non-conventional, alternative value-chain financing models are commendable. To strengthen this approach further, exploring additional green technologies, tools, and inputs that enhance productivity while reducing negative environmental impacts from aquaculture is crucial. For example, forging partnerships with commercial feed

producers such as De Heus or local providers of responsible seeds can yield significant benefits by fostering synergy among various market actors along the aquaculture value chains. Additionally, prioritizing the establishment of direct connections with primary distributor green tech companies can optimize efficiency, reducing dependence on intermediaries. These initiatives have the potential to surmount barriers and unlock market opportunities effectively.

- In any case, whether working with conventional financiers like banks or with alternative financiers, such as value chain actors, the loan structure should be tailored to suit the specific needs of aquaculture farmers. This entails incorporating elements such as reduced documentation requirements, appropriate payment schedules, and affordable interest rates. The programme can continue its proactive approach to raise interest among these new actors. One effective strategy is to compile an initial list of interested aquaculture farmers seeking loans, technologies, or inputs, and present it to these financiers or value chain actors. This proactive approach enhances effectiveness and ensures alignment with the farmers' requirements when negotiating loan terms with financiers.

Related to Outcome 2 and Outcome 3

- In the remaining phase of programme implementation, emphasis should be placed on reinforcing practical training in essential areas such as systematic fish feed processing, proper feeding techniques, water quality management, and accurate record-keeping. In follow-up training sessions, the programme could also include guidance on preventing or addressing the occurrence of Cyclops for nursery farms. This approach aims to reduce the need for pesticides, promoting sustainable farming methods and environmental conservation. These hands-on sessions will equip participants with valuable skills to improve their farming practices.
- The programme has strategically implemented a data-driven approach, incorporating the collection, analysis, and utilization of data to showcase the tangible benefits of adopting green aquaculture practices. This includes improvements in feed conversion ratios (FCR), water parameters, and overall productivity. To enhance this approach further, given the participants' demonstrated increased knowledge and adoption of promoted practices, the programme could expand its scope to encompass data from both demonstration ponds and non-demo ponds. This comprehensive data collection would include information on both feed and non-feed inputs. Through systematic analysis of this data, the programme can effectively demonstrate the positive outcomes of sustainable aquaculture methods.
- Given the absence of effective and responsive government extension services and the challenges posed by safety and security concerns, it is recommended that the programme consider employing a full-time aquaculture expert based at the township level. This strategic move would enable the expert to provide timely and effective technical support to the target population, fostering better engagement and understanding of aquaculture practices. In instances where hiring a full-time aquaculture expert proves difficult or impossible, the programme could explore alternative solutions. One option is to assign aquaculture experts from organizations like Mercy Corps and Village Link to fulfill this role on a temporary basis. This collaborative approach ensures that technical support is still provided to the target population, albeit through external partners.

Related to Outcome 4

- Water quality monitoring is critical in green aquaculture, yet it is not a practice commonly carried out among aquaculture operators across Myanmar. The programme has intelligently prioritized this aspect. To further enhance support in this area, the programme can reinforce the connection between water quality results and effective aquaculture practices. For instance, practical demonstrations could illustrate how adding lime impacts pH levels, thus highlighting the

importance of this practice. Additionally, in certain communities, reports indicate that high iron content in groundwater used for shrimp ponds has adversely affected shrimp growth. Therefore, it is essential for the programme to include iron parameter monitoring in water quality assessments for these specific communities. This proactive measure can help address potential challenges and optimize aquaculture practices to ensure the health and productivity of aquatic organisms.

- The programme has in place a water quality expert who has been working with youth champions to regularly collect and analyse water quality data from ponds and ambient waters. This initiative has been instrumental in ensuring that water quality is regularly assessed and shared among participants. By highlighting the significance of water quality measurements, the programme aims to foster positive behavioural changes not only for environmental preservation but also for enhancing pond productivity and sustainability. To further strengthen its efforts, it is recommended that the programme expands its engagement by involving selected aquaculture producers, especially those regarded as informal leaders within their communities. These individuals should be equipped with relevant training, equipment, and support to actively participate in the monitoring process. Concurrently, activities should be implemented to disseminate monitoring results back to participants, enabling them to make informed, data-driven adaptations to their operations. This inclusive approach not only broadens the reach of water quality monitoring initiatives but also empowers influential community members to advocate for sustainable aquaculture practices.
- The programme's effort to triangulate water data analysis with laboratory testing is noteworthy. However, discrepancies have been noted, particularly with ISO laboratory test results indicating higher values compared to those from another measurement method, raising concerns about data accuracy. These discrepancies may stem from differences in measurement techniques or potential errors in the laboratory. To address this issue, it is advisable to consider utilizing a different laboratory for future testing. Additionally, a review of sample collection, preservation, and transport methods is recommended to identify any factors contributing to variations in water quality results. This comprehensive approach will help pinpoint the root causes of discrepancies and ensure the generation of more accurate and reliable data in future assessments.

Cross-Cutting and Others

- If feasible within the budgetary constraints, extending the timeframe of NGA-Myanmar is highly recommended. This decision is prompted by the complex operational landscape in Myanmar, which poses challenges for Mercy Corps and its partners in implementing programme activities effectively. By extending the timeframe, there is an opportunity to bolster the adoption of green aquaculture practices in the target areas, thereby benefiting a larger number of producers. Moreover, this extension can facilitate the further development of green financing mechanisms, which are pivotal for scaling up green practices and technologies within the aquaculture sector.
- The integration of GESI into programme activities has received positive feedback from participants. To further enhance GESI awareness within the target area, the programme is recommended to expand GESI training sessions at the village level, facilitated by designated GESI champions. These sessions will play a pivotal role in deepening the understanding and appreciation of GESI principles among community members, thereby fostering a more inclusive and equitable environment. Additionally, the development of trainings focused on women's empowerment should be approached with careful consideration. It is essential to conduct thorough assessments to discern the specific interests and needs of women within the community. By gaining insights into their priorities and aspirations, the programme can tailor training initiatives to effectively address key

areas of concern and promote meaningful empowerment. This approach ensures that training efforts are relevant, impactful, and responsive to the unique circumstances and aspirations of women in the target area.

- In terms of M&E, it is advisable for the programme to update the champions list by removing registered participants who did not attend training sessions. This adjustment is crucial to prevent any misinterpretation of programme monitoring and evaluation data. Moreover, in the forthcoming monitoring surveys of champions, it would be beneficial for the programme to include an assessment of the effectiveness, usefulness, and any issues related to the Htwet Toe application. Furthermore, to gain a comprehensive understanding of the adoption of green aquaculture practices, it is recommended to complement survey findings with data from pond diaries. Relying solely on survey data may not accurately reflect the actual status. By integrating pond diary data with survey results, the programme can ensure a more accurate assessment of the adoption status of green aquaculture practices among target beneficiaries. This integrated approach enhances the reliability and validity of the M&E process.

5 References

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Annex 1 List of Reviewed Documents

Sr.	Name of Documents
1	First Interim Narrative Report, January – December 2022
2	Annex 1_Baseline Assessment. August 2022. Prepared by Myanseed Agribusiness Consultancy
3	Annex 2_Strategic Environmental Assessment. August 2022. Prepared by Myanmar Koei International Ltd.
4	Annex 3_Hydrology Assessment. August 2022. Prepared by Dr. Aung Myo Hsan
5	Annex 4_Gender Equality and Social Inclusion Analysis. August 2022. Prepared by Khin Lay New Tun
6	Annex 5_Decision to Payment Assessment, Solar Pump and Feed Making Machine. December 2022.
7	Annex 6_Visibility and Communication Plan. April 2022.
8	Annex 7_ Monitoring, Evaluation and Learning Plan. April 2022.
9	Annex 8_Community Mobilization Plan. April 2022.
10	Annex 9_Community Accountability and Reporting Mechanism Plan. April 2022.
11	Annex 10_GESI Champion Plan
12	Annex 11_ Updated Log frame and Activity Matrix (31 December 2022)
13	Annex 11_ Updated Workplan
14	Regular Water Quality Monitoring for Freshwater Aquaculture. July 2023. Prepared by Dr. Aung Myo Hsan
15	Bi-annual Survey Result (Excel and Power BI)
16	Programme database (Excel and Power BI)
17	Demo Ponds' Information (Excel)
18	Training Manual of Fish and Shrimp Farming
19	Training Manual of GESI
20	Financial Information of NGA Programme (Excel)

Annex 2 Lists of Demo Ponds

Sr.	Name	Township	Village Track	Village	Number of ponds	Pond area (Acre)	Demo Pond Type	Solar	FFMM	Seed	Limestone	IOT	Sand Filter	Filter Bag	Water Quality Test Kits
1	U Nay Lin Tun	Maubin	Aung Heik	Inn Ma	2	2	Nursery	Yes		Yes	Yes			Yes	pH, Thermometer, Ammonia
2	U Zin Min Oo	Maubin	Ma Let To	Pay Pin	4	1	Fish		Plan to provide	Yes	Yes			Yes	pH, Thermometer, Ammonia
3	U Win Khin	Maubin	Hta Nee	Shwe Ta Chaung	5	1	Shrimp	Yes		Use own seed	Yes		Plan to provide	Yes	pH, Thermometer, Ammonia
4	U Tin Myint Soe	Maubin	Let Kyar Gyi	Boe Kan Pay	3	2	Nursery	Yes		Yes	Yes		Plan to provide	Yes	pH, Thermometer, Ammonia
5	Daw Than Beo Sint	Twantay	Ta Ka Hleit	Shan Ta Lin	5	2	Fish		Plan to provide	Yes	Yes			Yes	pH, Thermometer, Ammonia
6	U Saw Kyaw Khin	Twantay	Kyi Tan	Kyi Tan	5	3	Fish		Yes	Yes	Yes			Yes	pH, Thermometer, Ammonia
7	Daw Hla Helot Htay	Twantay	Ta Ka Hleit	Shan Ta Lin	2	1	Fish		Plan to provide	No	Yes			Yes	pH, Thermometer, Ammonia
8	U Aung Mya Than	Nyaungdon	Ta Zin Yae Kyaw	Ah Thin Su	2	1	Shrimp	Yes		Yes	Yes		Yes	Yes	pH, Thermometer, Ammonia
9	U Hla Sein	Nyaungdon	Ta Zin Yae Kyaw	Yae Kyaw	4	15	Fish			Yes	Yes	Yes		Yes	pH, Thermometer, Ammonia
10	U Hote Sein	Nyaungdon	Sett Kawt Taung	Sett Kawt	1	10	Fish		Plan to provide	Yes	Yes			Yes	pH, Thermometer, Ammonia
11	U Tin Hla	Nyaungdon	Sin Tone	Kyaine Pin Sal	3	8.5	Fish		Yes	Yes	Yes			Yes	pH, Thermometer, Ammonia
12	U Thaung Htike	Nyaungdon	Par Hleit	Par Hleit	4	0.4	Nursery	Yes		Yes	Yes		Plan to provide	Yes	pH, Thermometer, Ammonia
13	U Chit Ko Kaine	Pan Ta Naw	Kyone Tine Gyi	Kyone Tine Gyi	3	50	Fish			No	No	Yes		Yes	pH, Thermometer, Ammonia

Annex 3 Guiding Questions of Fous Group Discussion and Key Informant Interview

Focus Group Discussion Guiding Question

Target Population: Smallholder commercial fish farmers

Dear Respondent,

We are conducting a mid-term review (MTR) for NGA-Myanmar project to understand the project has made and make recommendations for the remaining periods as well as the design of the future projects. To help us gain this understanding, I am going to ask you questions about how well the activities of enhancing your knowledge related to green aquaculture practices. All the information you responded with here will be kept as confidential.

PART A: Introduction	
Facilitator Information	Date:
Facilitator: Note taker:	Start time: End time:

Participants	Name	Village Name
Participant-1		
Participant-2		
Participant-3		
Participant-4		
Participant-5		
Participant-6		
Participant-7		
Participant-8		
Participant-9		
Participant-10		
Participant-11		
Participant-12		

	Part B: Discussion Questions
1	Could you please describe the type of business you are engaged in?
2	If there any challenges that your business face, please explain it.
3	Please share with us what you know about the NGA-Myanmar project in your area? How did you hear about it?
4	Is there any other program similar to the NGA program currently being implemented in your area within these three years?
5	What services have you received from NGA-Myanmar project so far? Please explain?

	Part B: Discussion Questions
	***Probe**: Ask about training, field days, demo ponds, small-scale feeding machines, solar pump, "Htwet Toe" application, etc. Probe for pond management, fish health, better management practices, GESI, what topics were covered? How long was the training? how many times have you received them?*
6	How has been the participation of women and youth in these trainings? Are there any gender differences in access to and participation in NGA program activities and services? Have specific genders experienced greater or lesser benefits from the program, and if so, why? ***Probe:** Is the participation adequate? What are some of the barriers to women and youth participating in training? What can be done different to encourage more women and youth participation?*
7	Are there opportunities for women and marginalized genders to take on leadership roles within the program?
8	Do you think the trainings you received from NGA-Myanmar project are useful for your aquaculture business? Please discuss in detail. From the training you have received, what actions related to your fish farming have you taken at an individual level?
9	To what extent does the NGA programme contribute to the resource's efficiency in your farm operation? (For example: reduce the feed input or reduce FCR, reduce fuel consumption, etc.) Does the NGA project address specific environmental and aquaculture challenges in the region?
10	Do you know about the "Htwet Toe" application? How often do you use it, and is it easy and convenient to use? What specific information do you look for when using this application?
11	Do you expect that your level of fish production and income change by applying the knowledge and the services you have received from NGA-Myanmar project? How?
12	Do you have any channel to provide suggestions or complaints to NGA programme? Have you provided suggestions or complaints related to NGA programme?
13	Do you have any plans to utilize equipment such as a solar pump or small-scale feeding machine, etc., in your operations?
14	Please share recommendations and anything else you would want us to know about activities of the NGA-Myanmar project?

Key Informant Interview Guiding Question for Project Teams, Micro Finance and Technology Company

Dear Respondent,

We are conducting a mid-term evaluation of the Nurturing Green Aquaculture (NGA) project in Myanmar to assess the project's progress, make recommendations for the remaining period, and inform the design of future projects. You have been selected to provide valuable insights and feedback based on your experiences and perspectives related to the NGA-Myanmar Project through an interview. Your input is vital in helping us evaluate the project's progress and impact. The interview will be conducted in a one-on-one format and is expected to last approximately 30-45minutes. All the information obtained from the interview will be confidential.

Background Information	
	Date of Interview…… Name of Interviewer…… Start time…… End time…… Full name of the respondent…… Male/Female…… Prefer not to say…… Organization…… Position……

Questions to Technology Companies (Agrosolar Myanmarl/ Space & Universe/VNNM)	
1	Could you elaborate on the technologies that have been identified for the NGA-Myanmar project? How well suited is your technology to the NGA project? How does your company's technology contribute sustainably to the environment and resource efficiency? When did you start? Up to when?
2	How many numbers of machines has been provided to the NGA programme? Does your company provide any kind of warranty for your technology? What are the pros and cons of your technology?
3	Do you offer any training or training materials on how to use the technology? Please explain the offer method.
4	Do you provide your technology for other programme in Myanmar or other nations in addition to the NGA programme?
5	Have you gathered any user feedback for the NGA programme? What kind of feedback did you receive?
6	Please describe if you have any recommendations about how to enhance the technical support for implementing the NGA programme?
Questions to Financial Institutions	
1	What kind of financial support is offering from your organization to NGA Programme?
2	What are the primary criteria that your organization considers when evaluating applicants for loans to ensure they meet the requirements and standards set by your organization?
3	What were the main goals and anticipated results when you decided to support this project?
4	Can you provide insights into the types and number of loans that have already been extended to farmers under the project?
5	What is the credit rate of your loan? How did you decide the credit is workable for the farmers?
6	Have there been any challenges in financial provision to farmers in NGA programme?
7	What indicators does your organization use to measure the impact of your funding on the NGA Project?
8	Is there a plan for your organization to continue offering loans to farmers beyond the conclusion of the NGA-Myanmar project?
9	Do you have any recommendations or constructive feedback regarding the current process of providing loans that could lead to improvements or enhancements?

Key Informant Interview Guiding Question for GESI Expert and GESI Champion

Background Information	
	Date of Interview…… Name of Interviewer…… Full name of the respondent…… male/female…… Prefer not say…… Organization…… Position……

	Questions to GESI Champions
1	Could you please describe the type of business you are engaged in?
2	Please share with us what you know about the NGA-Myanmar project in your area?
3	In which role, do you participate in NGA-Myanmar program? Can you share your experiences and motivations for participating in the NGA Project as a local fish farmer? Could you describe the key responsibilities and activities associated with the role of a GESI champion within the project?
4	Are there any barriers or challenges that specific genders face in accessing or participating in the program?
5	Have specific genders experienced greater or lesser benefits from the program, and if so, why?
6	What kind of knowledge did you gain from the Gender Equality and Social Inclusion training?
7	Has the program played a role in challenging or changing gender norms and attitudes?
8	After being GESI Champion, has your opinion on the involvement of women in aquaculture and their leadership role changed? Are there opportunities for women and marginalized genders to take on leadership roles within the programme and aquaculture sector? Please discuss it.
9	Has the program contributed to an increase in gender-based violence or discrimination?
10	Are there any instances of gender backlash that have been exacerbated by the program?
11	Do you know about the "Htwet Toe" application? How often do you use it, and is it easy and convenient to use? What specific information do you look for when using this application?
12	Do you have any channel to provide suggestions or complaints to NGA programme? Have you provided suggestions or complaints related to NGA programme?
13	Have you received financial assistance in the form of loans from the project or any other financial institutions?
14	Have the GESI knowledge and practices acquired through the NGA-Myanmar Project contributed to the growth of your aquaculture business and/or increased your income?
15	Based on the findings related to gender, what recommendations can be made to improve the program's gender responsiveness and address any gender disparities or challenges?
	GESI Experts and Specialist
1	When did you join to NGA-Myanmar programme? What is your assigned period?
2	Have program staff and partners received gender sensitivity training and capacity-building support in addition to GESI champions? How many GESI champions have been trained?
3	How many times of GESI trainings have been provided? How many times of training are to be provided?
4	What kind of challenge do you encounter when you implemented GESI champion?
5	How has GESI training in NGA impacted the implementation of gender-responsive activities?
6	To what extent has the program was designed to contribute to the economic empowerment of women and marginalized genders?
7	Has the programme supported any changes in income or economic opportunities for specific genders?
8	Do you see any attitude or behaviour change in GESI champions after receiving training? How do you measure these changes?
9	Based on the findings related to gender, what recommendations can be made to improve the program's gender responsiveness and address any gender disparities or challenges?

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About Mercy Corps

Mercy Corps is a leading global organization powered by the belief that a better world is possible. In disaster, in hardship, in more than 40 countries around the world, we partner to put bold solutions into action — helping people triumph over adversity and build stronger communities from within. Now, and for the future.

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