YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF APPLIED ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME

A STUDY ON INSHORE FISHERIES CO-MANAGEMENT (CASE STUDY IN KYEINTALI, RAKHINE STATE)

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MPA - 9 (20th BATCH)

MARCH, 2023

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A thesis submitted in partial fulfilment of the requirements for the
Master Degree of Public Administration (MPA) Degree

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March, 2023

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This is to certify that this thesis entitled **"A Study on Inshore Fisheries Co-Management (Case Study in Kyeintali, Rakhine State)"**, submitted as a partial fulfillment towards the requirements for the degree of Master of Public Administration has been accepted by the Board of Examiners.

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ABSTRACT

This study is to examine the inshore fisheries co-management system in Rakhine State. The descriptive method is used based on primary and secondary data. Total of 100 fishermen from Kyeintali Town who participated in inshore fisheries co-management system and 100 fishermen from Gwa Township who did not participate in inshore fisheries co-management system in Rakhine State. This study found that there is still gender inequality. The result show that inshore fisheries co-management system is a successful programme in Kyeintali Town. The inshore fisheries co-management system in Kyeintali Town supports the DOF policy of ensuring food security, food safety and sustainable development of fisheries sector by conservation of fisheries resources in accordance with the fisheries laws. This study suggests that to be a better co-management system, fishers need more participation and accountability.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my heartfelt gratitude to Professor Dr. Tin Tin Htwe, Rector of the Yangon University of Economics, Professor Dr. Khin Thida Nyein, Pro-Rector, Professor Dr. Tin Tin Wai, Pro-Rector, and Professor Dr.U Kyaw Min Htun, Pro Rector (Retired) and thank to Master of Public Administration Programme Committee, Yangon University of Economics for rewarding me the opportunity to go for study this programme.

My special thanks go to Professor Dr. Su Su Myat, Director of MPA programme, Yangon University of Economics, for her enthusiasm, intensity, willingness, gorgeous and continuous encouragement. It gives me immense pleasure to acknowledge my thesis supervisor, Lecturer, Daw Khin Thu Thu Thein for her guided, supervision, advice and encouragement in preparing to completion this thesis.

I am also thankful to U Zaw Min Naing, Township Officer of Taunggup Township, Department of Fisheries for answering my key informant interview.

I have furthermore to thank Dr. Maung Maung Kyi, Chairman of Rakhine Coastal Region Conservation Association, U Aung Myo Naing, Vice Chairman and U Naing Htoo, Field Assistant, Kyeintali Town, supporting me mainly with reverent data.

And I would like to thank all of my friend at MPA 20th batch, who have supported me in writing my thesis. It would not have been possible to write this thesis without the help and support for those kind people around me. Finally, I have to thank my family for their support and encouragement to this study.

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LIST OF ABBREVIATIONS

BANCA	: Biodiversity and Nature Conservation Association
DANIDA	: Danish International Development Agency
DOF	: Department of Fisheries
EEZ	: Exclusive Economic Zone
FAO	: Food and Agriculture Organization of the United Nations
FDA	: Food and Drug Administration
FMA	: Fisheries Management Area
GoMP	: Gulf of Mottama Project
KIFCA	: Kyeintali Inshore Fisheries Co-Management Association
MALI	: Ministry of Agriculture, Livestock and Irrigation
MPA	: Myanmar Marine Protected Area
MPs	: Members of Parliament
NAG	: Network Activities Group
NGOs	: Non-Government Organizations
NOAA	: National Oceanic and Atmospheric Administration
OIKOS	: Istituto OIKOS (Italy)
OTOP	: One Town One Product
OVOP	: One Village One Product
PP	: Pyoe Pin
RCA	: Rakhine Coastal Region Conservation Association
RFP	: Rakhine Fisheries Partnership
SEAFDEC	: Southeast Asian Fisheries Development Centre
TIFCA	: Tanintharyi Inshore Fisheries Co-Management Association
UK	: United Kingdom
WCS	: Wildlife Conservation Society

CHAPTER I
INTRODUCTION

Fisheries co-management refers to the adaptive and cooperative management of aquatic resources by user groups and the government. According to the roles that the government and fishermen played, there are five basic types of co-management in the fishing industry. Fisheries co-management can be a tool for distributing authority, establishing institutions, boosting support networks and cooperation, resolving conflicts, communicating information, promoting community development, fostering possibilities for cooperation, and supporting joint action.

Fisheries co-management is important cause it gives fish resource a sense of ownership, which makes user groups more accountable for maintaining the long-term viability of the fish resource. Fisheries management areas are areas (bay, gulf, lake or others) identified as major fishing grounds based on stocks boundary/ range/ distribution, structure of fisheries and administrative subdivisions which integrate science-based, participatory and transparent governance framework and mechanism to sustainably manage fisheries in such areas to stop overfishing, fight illegal, unregulated and unreported fishing and promote food security and poverty alleviation in the Philippines. (FMA 8, 2023).

Fisheries co-management provides ensuring sustainable livelihoods, improving income for local fishing communities, reducing bycatch, and demonstrating an innovative resource governance model.

In many countries, offshore vessels encroach in inshore coastal area. So, small scale fisheries are worrying about illegal fishing and invasion of offshore fishing vessels. If inshore fisheries are not maintained, not all fishing communities may find it appropriate. Many communities may not be qualified or capable of accepting the co-management role.

Myanmar is the second largest country in Southeast Asia, and Myanmar's coast spans from the mouth of the Naf River in western Rakhine State to Kawthaung,

Tanintharyi Region, in the country's southeast. With a long coastline, Myanmar has a massive community of fishermen who rely on the sea for a living as well as to support their family.

1.1 Rationale of the Study

The management of fisheries has experienced a change in the last decades, moving toward a broader strategy that acknowledges the involvement of fishermen, local responsibility, and decentralized decision. By participating in this process, fishermen have the ability to take an active role in the management of their fisheries, harmonizing their rights and obligations, and cooperating with the government rather than opposing it. But years of uncontrolled fishing have significantly damaged the country's coastal ecosystems, causing a rapid decline in the efficiency of fisheries that provide nourishment, employment, and income; an extinction of species; and a threat of environmental destruction, particularly as water temperatures rise and become more acidic.

Fishing with illegal fishing gear, such as electro-fishing, dynamite fishing, and pesticide poison fishing, has been quite common and poorly regulated. Small scale fisheries are also concerning about deep-water commercial fishing attacks. Due to the wide threat that illegally fishing causes to inshore fisheries, it is essential to devise and placed into action policies that involve all co-management stakeholders in order to end illegal fishing.

To develop socioeconomically and economically, coastal communities must be encouraged and provided more responsibility. Offering coastal-communities a greater influence and a bigger involvement in responsibilities for inshore fisheries co-management may empower communities. Some economies in the world have already shown success with this method. Inshore fisheries co-management arrangements will raise community understanding of the laws, rules, and regulations that affect the use of natural resources. By understanding and supporting familiar and conventional fishing methods as well as peoples' indigenous knowledge, management approaches may be localized. Inshore fisheries co-management is regarded as one approach to the increasing concerns of resource over-exploitation. It seeks to maintain a fishery's economic worth, often by enforcing a set of rules that will not only result in an economically efficient but also socioeconomically safe catch of targeted species.

The need to improve current fisheries management systems and create new strategies is essential for managing inshore fisheries resources. This study focuses to the study on inshore fisheries co-management and how it is important for Myanmar's fishery sector.

1.2 Objective of the Study

The objective of this study is to examine the inshore fisheries co-management as a necessity to develop the whole fisheries sector of Myanmar.

1.3 Method of Study

The method used in this study is the descriptive method based on both primary and secondary data. The structured questionnaire is used to collect the primary data from selected villages: from Kyeintali town practicing inshore fisheries co-management, and Gwa township practicing traditional fisheries management. Moreover, the secondary data utilized in this study are collected from Department of Fisheries (DOF), Rakhine Coastal Region Conservation Association (RCA), Kyeintali Inshore Fisheries Co-management Association (KIFCA), library, literature books, research paper, various Fisheries co-management publications and relevant issues from websites.

1.4 Scope and Limitations of the Study

This study focuses on Kyeintali town in the Rakhine costal region. Data collection has been conducted in Kyeintali town (from Gwa township) and Thandwe township, Rakhine state. Time limitation of the secondary data is from 2017 to 2022. This study reviews fisheries co-management activities. Other fisheries co-management activities in Rakhine State are not included in this thesis.

1.5 Organization of the Study

This study is organized into five chapters. Chapter 1 is the introduction that shows the basic information of inshore fisheries co-management. Chapter 2 is literature review presents on the concept of inshore fisheries co-management. Chapter 3 is the current situation of inshore fisheries co-management in Myanmar. It provides the information about participation of the local people in inshore fisheries co-management, awareness of the environmental care, and cooperation and

collaboration of NGOs, local people, and Department of Fisheries. Chapter 4 is the case study in Kyeintali Town and Thandwe Township. Chapter 5 is finding, conclusion, and recommendation of the study.

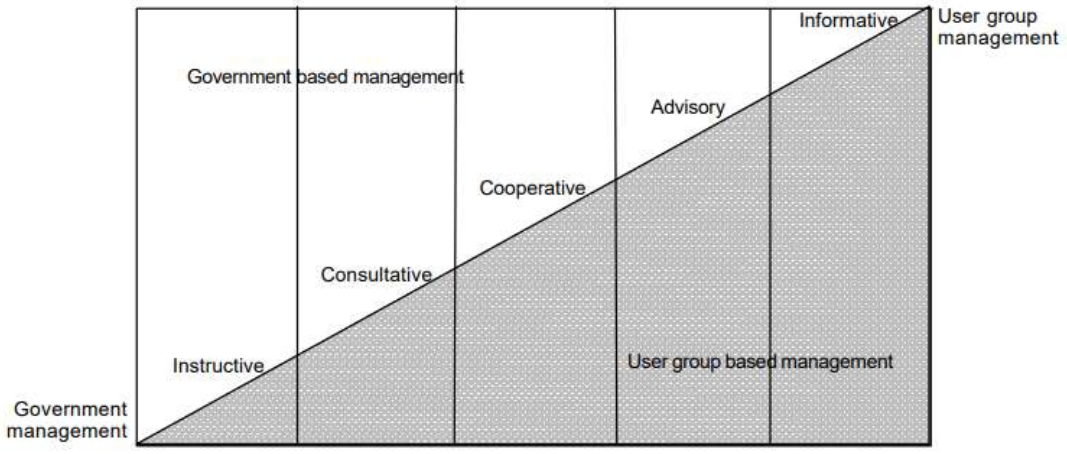
CHAPTER II
LITERATURE REVIEW

2.1 The General Definition of Co-Management

Cooperative management or co-management refers to various partnership arrangements and degrees of power sharing and integration of local (informal, traditional, customary) and centralized government management systems. Through consultations and negotiations, the partners develop a formal agreement on their respective roles, responsibilities and rights in management, referred to as 'negotiated power'. Co-management is also known as stakeholder, joint, participatory, multi-party, or cooperative leadership. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

Co-management is usually defined as the sharing of responsibilities for managing a specified natural resource between the local community and the state, as represented by a particular institution. Proceeding from this general idea, a wide variety of arrangements are feasible between the extremes of management by a centralized government on the one hand and strict local management on the other. (Pomeroy, 1996).

Figure (2.1) Hierarchy of Co-management Arrangements



Source: Sen and Nielsen, 1996

Once user groups are involved in the decision making and implementation of fisheries management, a spectrum of co-management arrangements can be identified. The figure illustrates the various types of institutional set-up for different co-management arrangements.

- **Instructive**: There is only minimal exchange of information between government and users. This type of co-management regime is only different from centralized management in the sense that the mechanisms exist for dialogue with users, but the process itself tends to be government informing users on the decisions they plan to make.
- **Consultative**: Mechanisms exists for governments to consult with users but all decisions are taken by government.
- **Cooperative**: This type of co-management is where government and users cooperate together as equal partners in decision-making. For some authors, this is the definition of co-management.
- **Advisory**: Users advise government of decisions to be taken and government endorses these decisions.
- **Informative**: Government has delegated authority to make decisions to user groups who are responsible for informing government of these decisions. (Sen and Nielsen 1996, p. 407)

2.2 Fisheries Co-management

Co-management developed due to an attempt to improve the success of fisheries management as many of the aquatic resources risked being or were already depleted. The aim was to involve the community in the decision-making process so that there may be an increased adherence to the regulations set by the government. (Sen and Nielsen, 1996)

The effectiveness of existing fisheries management regimes in maintaining or achieving sustainable resource utilization is constantly debated and questioned as fisheries in many parts of the world continue to be under pressure or in crisis. In recent years there has been growing recognition that user groups have to become more actively involved in fisheries management if the regime is to be both effective and legitimate. In this analysis, fisheries co-management is defined as an arrangement where responsibility for resource management is shared between the government and

user groups. It is considered to be one solution to the growing problems of resource over-exploitation. (S Jentoft, 1989).

The role user groups play in the decision-making process depends on who and how they are represented. (S Jentoft and B J McCay, 1995). They describe two types of representation for users: functional; which is based on gear types, and territorial, which is based on geography. However, in many developing countries and some developed countries, there may be other types of user group representation based on socio-cultural variables such as ethnicity, gender or religion. The role of user groups in the decision-making process will depend on their relative negotiating capabilities, knowledge and strengths vis-h-vis each other and with government. Some groups may feel alienated or poorly represented and decide to boycott the decision-making process. There may also be other stakeholders who have a legitimate right to be represented in the co-management process such as scientists, social scientists and those representing the public interest such as environmentalists. The type of representation is often determined by the political culture of the country and whether participatory or representative democracy is encouraged or discouraged. (Sen and Nielsen, 1996).

2.2.1 Importance of Fisheries Co-management

Co-management is not only suitable for small-scale fisheries, it is actually pointed as the only realistic solution for the majority of the world's fisheries. (Gutierrez, N. et al, 2011). However, it is here argued that co-management has an especially relevant role to play in to address to - day's small-scale fisheries challenges and that there is an urgent need for progressive implantation of co-management arrangements to enable small-scale fisheries to survive and thrive. (Cavallé, M., Said, A., ORiordan, B., 2020).

Small-scale fisheries require specific management strategies as they are heterogeneous, seasonally diverse, polyvalent, operating in different socio-political structures, and targeting a variety of demersal and pelagic fisheries, while exhibiting multi-tasking roles as they engage in pre-harvest, harvest and post-harvest activities (Chuenpagdee et al., 2017). They also play a key role in providing food security and livelihoods to coastal communities, contributing to the socio-economic fabric both through the local economy and cultural heritage (van de Walle, Gomes da Silva, O'Hara, & Soto, 2015). They also engage in low-impact fishing activities, compared

to industrial forms of fisheries, and thus have the potential to be stewards of the environment (Nayak & Berkes, 2011).

It is therefore necessary to move away from one-size-fits-all policies to ensure that policies match the needs of all fishing sectors through appropriate governance systems. Although often considered as a fishery dependent problem, fisheries sustainability is much more than that, as it is impacted and influenced by various factors including wider environmental changes, culture, community, the markets, the political economy, power relations and so on. For this reason, a bottom up, nuanced co-management approach– in contrast to the one-size-fits-all technical fix top-down approach convention - ally used in fisheries management – is necessary to attain not only sustainability of fisheries but also the socioeconomic viability of fishing communities (Said & Chuenpag - dee, 2019).

2.2.2 Benefits of Fisheries Co-management

Although co-management has been picked up to some or other extent in most APFIC countries, there has been very little advocacy for introduction of the approach as a national initiative. Community empowerment has been demonstrated time and time again (e.g. Pomeroy et al., 1997) to be a very positive social change and in some cases has resulted in improved natural resource management. The rapid changes in the fisheries in Asia-Pacific over the last 20 years certainly suggest that as we "fish down the food chain" there are fewer links in the chain that would provide direct human food. The social implications of this type of decline are enormous. They will probably be forced to move to urban areas, aggravating the already large problems in the region's mega-cities. As a poverty reduction strategy, fisheries co-management has enormous potential and there is a clear need for greater advocacy of the approach. (Brown et al., 2005).

One of the apparent perceptions that needs to be overcome is that co-management is a challenge to government authority and that this ought to be resisted. Experience to date, however, has shown that when governments do devolve authority, they benefit by achieving better results in terms of ecological, social and economic outcomes. Under co-management, resource users will get the benefit of participating in management decisions that affect their welfare and governments will benefit by being more effective and efficient, and potentially damaging conflicts, poverty and resource degradation can be avoided, or at least mitigated. (Brown et al., 2005).

Co-management may provide a number of benefits, including;

(1) A more transparent, accountable and autonomous management system.

(2) A more democratic and participatory system.

(3) More economical than centralized management systems; requiring less to be spent on management administration and enforcement, in the long run.

(4) Through involvement in management, fishers take responsibility for a number of managerial functions.

(5) Makes maximum use of indigenous knowledge and expertise to provide information on the resource base and to complement scientific information for management.

(6) Improved stewardship of aquatic and coastal resources and management.

(7) Management is accountable to local areas. Fishing communities are able to devise and administer management plans and regulatory measures that are more appropriate to local conditions. (Localized solutions to local problems.)

(8) By giving the fishers a sense of ownership over the resource, co-management provides a powerful incentive for them to view the resource as a long-term asset rather than to discount its future returns.

(9) Various interests and stakeholders are brought together to provide a more comprehensive understanding of the resource.

(10) Since the community is involved in the formulation and implementation of co-management measures, a higher degree of acceptability, legitimacy and compliance to plans and regulations can be expected.

(11) Community members can enforce standards of behavior more effectively than bureaucracies can.

(12) Increased communication and understanding among all concerned can minimize social conflict and maintain or improve social cohesion in the community. (R.S. Pomeroy and P. Pivera-Guieb, 2006).

2.2.3 Limitations of Co-management

Co-management is known to be time consuming, as one must spend time collecting surveys and gaining trust within the community. (Trimble M., Berkes F., 2013). Strong lines of communication between the government and the community is essential. Educating the community is often necessary so that more informed decisions can be made. (Rodwell LD., Lowther J., Hunter C., Mangi SC., 2014).

Many of the more isolated communities have a different language and communication can be slow and lack vital information. (Armitage D., Berkes F., Dale A., Kocho-schellenberg E., Patton E., 2011). Existing laws and policies may need to be altered, or new ones created so as to allow for the structure of co-management. (Pomeroy RS., Berkes F., 1997). Conflicting views and economic versus conservation issues appear to be some of the main limitations to a successful co-management process. Lack of funding, data and resources are also main contributing factors to un-successful co-management. (Rodwell LD., Lowther J., Hunter C., Mangi SC., 2014). Co-management requires constant communication and effort, and therefore long-term sustainability can be difficult. (Pomeroy RS., Berkes F., 1997). Third party involvement such as non-governmental organizations (NGO's), or student groups, often forms an essential part of a successful co-management. (Trimble M., Berkes F., 2013).

2.2.4 The Role of Fisheries in Poverty Alleviation

In the Southeast Asian region, the fisheries sector plays a vital role in ensuring food security of its peoples. In 2006, the total fish production in Southeast Asia was 23,948,854 mt accounting for about 15% of the world's total fisheries production of the same year. The number of fishers comprising more than 2% of the region's total population does not include those engaged in fish culture as well as in ancillary fisheries activities such as selling, marketing, processing, etc. Of the total number of fishers, more than 80% are engaged in small-scale fisheries. Considering that the peoples in the Southeast Asian region are fish eaters with an average annual per capita consumption of about 26.8 kg compared to the world's average of only 16.4 kg, the small-scale fishers have been the main suppliers of fish for the people. (Virgilia T. Sulit, 2008).

Sustainable development of small-scale fisheries could therefore lead to poverty alleviation and economic development. However, there are many concerns that impede the sustainability of the region's small-scale fisheries which include the large number of fishers, poverty in the fishing communities, and the weak law enforcement system common in many countries in this region. The many fishers competing with each other, and racing over the decreasing fisheries resources has led to the problem of overcapacity. Being conducted under the open-access regime, the small-scale fisheries sub-sector is difficult to regulate while the establishment of an

appropriate fisheries management system could not also be easily put in place. (Virgilia T. Sulit, 2008).

2.2.5 Types of Fishery

a) Inshore Fishery

Inshore Fishery means fishery carried out in the inshore area along the Myanmar coast as determined by the Director General as inshore fishery area. (Myanma Marine Fisheries Law, 1990, p.3).

According to DOF, inshore fishery areas are those less than 10 nautical miles from the shore.

b) Offshore Fishery

Offshore Fishery means fishery carried out in the Myanma Marine Fisheries Waters as determined by the Director General as offshore fishery area. (Myanma Marine Fisheries Law, 1990, p.3).

According to DOF, offshore fishery areas are those beyond 10 nautical miles from the shore.

c) Small Scale Fisheries

According to FAO, artisanal fisheries are traditional fisheries involving fishing households (as opposed to commercial companies), using relatively small amount of capital and energy, relatively small fishing vessels (if any), making short fishing trips, close to shore, mainly for local consumption. In practice, definition varies between countries, e.g. from gleaning or a one-man canoe in poor developing countries, to more than 20-m. trawlers, seiners, or long-liners in developed ones. Artisanal fisheries can be subsistence or commercial fisheries, providing for local consumption or export. They are sometimes referred to as small-scale fisheries. (FAO, 2015).

2.2.6 Stakeholders in Fisheries Co-Management

Fisheries co-management is defined as a partnership arrangement in which the community of local resource users (fishers) and government, with support and assistance as needed from other stakeholders (boat owners, fish traders, fish processors, boat builders, business people, etc.), and external agents (non-

governmental organizations, academic and research institutions), share the responsibility and authority for the management of the fishery. (Berkes et al., 2001).

a) Resource Users (Fishers)

The local community is made up of individuals with differing interests in marine and coastal resource co-management. At the community-level, co-management projects usually have as their primary target fishers, that is, individuals who make their livelihood harvesting and using marine and coastal resources. The fishers are the individuals who, through their use of the resource, directly impact upon it and who are in turn directly impacted by management measures. Fishers are considered by many to be the real day-today managers of the resource, and as such, should be active participants in management. Fishers are usually the target of organizing and capacity-building activities. Fishers' family and household are also stakeholders in co-management. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

b) Government

Both the national and local government units (i.e. province/state, city, town, municipality, district, village) have jurisdiction over fisheries and coastal resources. Each government level has different mandates, authority and responsibility. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

Others in the local area are both direct and indirect stakeholders in co-management. Based on part of their business interests in the fishers and the resource, these stakeholders will have multiple interests in being involved in co-management. Fishers must be given access to government and government officials to express their concerns and ideas. Fishers should feel that government officials will listen and take action as necessary. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

One fundamental debate in co-management is the perception that fishers cannot always be entrusted to manage resources on their own. Unless government and officials who implement government, policies can be convinced of the desire and the ability of fishers to manage themselves, not much progress can be made in co-management. The acknowledgement and acceptance of local-level management is partly the task of fishers to take on the new responsibilities, to organize themselves and, on the ability of the local community, to control the resources in question. On the

other hand, communities and change agents often point out that government resource managers are reluctant to share authority. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

c) Other members of the local community

A number of other members of the local community are directly and indirectly stakeholders in community-based co-management. These stakeholders will have varying interests in engaging in co-management, depending in part on their economic interests in the fishers and the resource. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

d) Change Agents

Change agents include non-governmental organizations, academic institutions, research institutions, development agencies and similar organizations who act in a catalytic and facilitation role for community-based co-management. The change agent is considered to be a catalyst of change and to act as an intermediary between communities and external institutions, such as government, the general public and businesses. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

Most change agents have a conservation and/or social development focus. They may be registered with the government and be officially recognized as a legal entity. The change agent should maintain relative objectivity and provide technical and analytical skills. The change agent provides a variety of services such as information and independent advice, ideas and expertise, education and training, community organizing, social development, research, advocacy, and finance and resource mobilization. Many change agents have staff, such as community organizers, who live and work in the community. A community presence can increase the level of trust between communities and the change agent and increase total participation. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

Change agents may choose to establish alliance with other change agents who have complementary skills, allowing them to implement more complex projects than they could by working alone. Alliances or networking increase the ability of change agents to learn from each other. It also allows the change agents to engage in advocacy to influence public policy. Development agencies, as change agents, can provide funding and technical guidance for community-based co-management. (R.S. Pomeroy & R. Rivera-Guieb, 2005).

2.3 Policy and Plans Implemented by Department of Fisheries

Department of Fisheries is under the Ministry of Agriculture, Livestock and Irrigation, and is organized with the objectives of the conservation of fisheries resources, food security of sustainable fish consumption and contribution of aquaculture technology for the people.

Policy

Ensuring food security, food safety and sustainable development of fisheries sector by conservation of fisheries resources in accordance with the fisheries laws.

Plans

There are twenty-six plans which are set up by Department of Fisheries. Some of these are:

- For fisheries development, collaboration with local, international organizations and development partners to implement plans and projects formulated in accordance with the policies.
- The establishment of accurate operational frame work for systematic improvement and implementation of fisheries co-management and ecosystem approach to fisheries management.
- Implementation of the fisheries co-management and ecosystem approach to fisheries management, by promoting community fisheries organizations and their fisheries co-management committees, capacity building, gender promotion (women empowerment) and provision of technical assistance to fisheries sector.
- Promotion of community fisheries organizations for improved fisheries resource management and rural development.
- Cooperation with public, private and local/ international organizations for the promotion of sustainable fresh water and marine aquaculture industries.

2.4 Review on Previous Studies

Svein Jentoft, Bonnie J. McCay, Douglas C. Wilson (1998) studied on social theory and fisheries co-management. It was found that co-management as an institution, is not only about rules. It is also about creating opportunities. It is a process of social creation through which knowledge is gained, values articulated, culture re-expressed and community created. Without this broad perspective on co-

management, the problems of fisheries may have a paralyzing effect on fisheries managers: There is nothing one can do, world's fisheries are doomed and there is no way they can escape their dismal destiny.

Maria Hauck, Merle Sowman (2001) studied on Coastal and fisheries co-management in South Africa. Their finding includes that the initial conditions required to facilitate successful implementation of co-management in the South African context are (i) allocation and security of access rights, (ii) long-term government support and commitment to co-management efforts, (iii) allocation of adequate time and resources to initiate and facilitate such partnership arrangements and (iv) adopting holistic and integrated approaches to coastal resource management that includes an assessment of alternative economic opportunities, especially in situations where resources are overexploited or degraded.

Tin Aung Thi (2005) studied on fisheries sector development in Myanmar. His finding includes that effects of management measures need to be monitored, both on the fish stock and on the local communities whose livelihood and/ or food security depend on the resources. Such monitoring requires both biological and socio-economic research. The capacity of line agency staff to investigate and understand the livelihoods of poor people who manage aquatic resources, and their capacity to use this knowledge in the development of policies, legislation and support services need to be strengtherned.

K. Viner, M. Ahmed, T. Bjorndal, K. Lorenzen (2006) studied on development of fisheries co-management in Cambodia: a case study and its implications. It was found that although there is the potential for successful co-management in Cambodian small-scale fisheries, it is currently limited by some important constraints. These include the lack of clearly defined enabling legislation, of property rights, of resource boundaries and of access control. Unless alternative livelihood options become available and more attractive than fishing to resource users, fishing pressure is likely to remain high, with resultant low catch per unit effort and low individual catches.

Louisa Evans, Nia Cherrett, Diemuth Pemsl (2011) studied on assessing the impact of fisheries co-management interventions in developing countries. Their finding includes that assessments of natural resource management interventions are notoriously difficult as reflected by the scarcity of impact assessment data on fisheries co-management in developing countries. For Small Scale Fisheries in developing

country contexts this is problematic in that the economic value of these fisheries is often unknown and other benefits are intangible. The financial investment in fisheries co-management as the primary management approach in Small Scale Fisheries continues to be substantial, thereby justifying a greater investment in comprehensive and independent impact assessment.

Khin Lay Kyaw (2011) studied on the development of Myanmar fishery sector. Her finding includes that effective and efficient management and conservation of natural resources are needed for sustainable development of fishery. It is important to make the public awareness that food security depends on the development of fishery sector to considerable extent. However, for sustainable development for long run and for conservation of fishery resources, the government has already drawn up a long-term plan to protect fishery resource.

Min Thuya (2011) studied on the performance of Myanmar fishery sector. His finding includes that overfishing can also cause a decline in fish catches especially fishing effort can be largely uncontrolled in open fisheries where anyone can fish though some fish catch areas are allowed only under a license. Another factor is that it is not possible to determine and set sustainable limits on the amount of fish to be caught over a specified period of time. It is needed to ensure proper management, especially by local authorities together with local fishing communities. Local fishing communities are keys to the survival of the fisheries. And he also recommended that a further research can also be done for other fisheries and also on the policies laid down and on implementation for the fisheries sector management in Myanmar.

Hla Aung (2011) studied on development of livestock and fisheries sector in Myanmar. He recommended that to be sustainable development of fisheries resources, effective and efficient management and conservation of fisheries resources are needed.

CHAPTER III
THE CURRENT SITUATION OF FISHERIES CO-MANAGEMENT IN MYANMAR

3.1 Fisheries in Myanmar

Myanmar is geographically located in Southeast Asia with a total area of 676,552.7 km^2 (Myanmar Statistical Yearbook, 2021). It stretches 936 km from east to west and 2,051 km from North to South. The country's fishing waters including Exclusive Economic Zone (EEZ) is about 486,000 km^2 and the continental shelf area is 228,781 km^2 (SEAFDEC, 2017). The length of its continental coastline is 2,832 km divided into three coastal regions, the Rakhine Coastal region, the Ayeyarwaddy and Gulf of Mottama (Mataban) region (the Delta Zone), and Tanintharyi region. Myanmar has extensive inland water bodies of 8.1 million ha which include natural lakes, reservoirs, river systems, and ponds. Its river system consists of the 2,000 km Ayeyarwaddy (Irrawaddy), Sittaung and Thanlwin (Salween) rivers, and 2,600 km of tributaries and smaller rivers combined (SEAFDEC, 2017).

Fisheries plays a vital role in the culture and economy of Myanmar. Fish serves as major source of animal protein of its people who largely consume rice and fish in their daily meals. With population of 54.2 million in 2022 (Myanmar Statistical Yearbook, 2022), the country's average fish consumption was 30 kg/person/year (FAO, 2022). Most of people in delta and hill regions prefer to consume freshwater fish and coastal people prefer the marine fishes.

Fisheries in Myanmar can be categorized into three sectors associated with three different fishery laws; Freshwater Fisheries (inland fishery), Marine Fishery (offshore and inshore fishery), and Aquaculture. The fisheries sector is one of the major components of the country's economy supporting thousands of households who are dependent on fisheries for their livelihoods. A total of 3,220,000 of the county's population are employed as full time and part time fishers, where 57% are engaged in freshwater fisheries and 43% in marine fisheries.

The Department of Fisheries under the Ministry of Agriculture, Livestock and Irrigation is the responsible agency for ensuring food security, food safety, and sustainable development of the fisheries sector by conservation of fisheries resources in accordance with the fisheries laws.

The fisheries sector of Myanmar is divided into marine and freshwater fisheries sub-sectors. While marine fisheries sub-sector includes inshore and offshore, the freshwater fisheries sub-sector includes aquaculture, as well as leasable and open fisheries sub-sectors. Marine fisheries include inshore and offshore, and freshwater fisheries include aquaculture, leasable, and open fisheries.

In Myanmar, fisheries are managed by Department of Fisheries under the Ministry of Agriculture, Livestock and Irrigation. Regulation of the offshore fleet includes an offshore closure that is consulted and agreed upon annually, although an exception is commonly granted to a portion of the licensed offshore fleet. Recent closures have covered June-July-August, a period during the monsoon season which generally urns from May to October. There is also a maximum trip limit that has expanded from 25 to 40 to 90 days currently that allows fishing boats to venture farther from port. State sand regional licenses are also required to fish in waters adjacent to states and regions. New licenses are rarely granted and there are no harvest limits.

Inshore fishing was decentralized by a constitutional amendment in 2015. States and regions are now struggling to develop new legislation for inshore fisheries management that remains in line with Union fisheries law. Minimum legal mesh sizes are routinely ignored, and data collection on harvests, let alone stocks, is poor. Fishing is severely curtailed in the monsoon season (from May to October, but especially from June to August) by weather. For the inshore fleet, many either stop fishing during this time or switch gears to either fish closer to the shore or to target shrimp with illegal baby trawl gear.

3.1.1 History of Myanmar Fisheries Sector

Fishing pressured off the coast of Myanmar has grown over time. Myanmar's marine fisheries were considered to be lightly exploited until the late 1960s. This is because there was generally a preference for freshwater fish, and there were no major investments in seagoing vessels, ports, and other infrastructure within the country where most fisheries were confined to the inshore areas.

In 1962, the People's Pearl and Fisheries Board was established (Soe, 2008), and marine fisheries began to develop, with increasing use of motorized fishing vessels, including bottom trawlers. In the 1970s, international agencies like the FAO also contributed to capacity enhancements by providing funds for fisheries development and for cold storage capacity. Additionally, from winter of 1981 through summer of 1983, FAO conducted a series of surveys to help determine the extent of Myanmar's fisheries resources and opportunities for expansion and development.

The Myanmar government has remained focused on the further development of its fisheries and aquaculture sectors since the 1980s when it experienced an economic downturn. (Soe, 2008). This downturn spurred the government to invite significant foreign investments and led to the firm establishment of policies that encouraged fisheries and aquaculture development as a way to improve the nutritional and livelihood demands of its population. Myanmar's fishery exports also increased from the 1980s as a means to earn foreign exchange. (Booth and Pauly, 2011).

Myanmar's fisheries are divided into inshore and offshore sectors. Inshore fisheries operate within 10 nautical miles of the shoreline with vessels up to 9m in length and engines under 25 HP. (Department of Fisheries, 2018). Coastal waters may have been only lightly fished prior to the onset of industrial trawling in the Bay of Bengal during the 1950s, and throughout the 1960s. The use of trawls likely contributed to the depletion of sharks and rays due to lack of selectivity. During the 1980s local fishing effort intensified, and in 1989, foreign countries began to lease fishing rights from the Myanmar government to fish in offshore waters deeper than 15 m, under the Law Relating to the Fishing Right of Foreign Vessels.

Offshore waters are divided into 30 by 30 nautical mile blocks, creating 144 fishing zones. (Pe, 2004). The influx of foreign vessels greatly increased fishing mortality and stock depletion during the 1990s. Foreign vessels were expected to remain within the offshore fishing zones, but they often entered inshore waters, causing conflict with artisanal fishers operating there. The 1990 Marine Fisheries Law gave artisanal fishers the right and the priority to fish in all zones (Pe, 2004), which further exacerbated conflict with the foreign industrial fleets.

Additionally, despite the fact that trawling was banned within 8 km of the Rakhine and Tanintharyi coastal zones and within 10 km of the Delta region, local large-scale industrial vessels are allowed to operate within territorial waters, further exacerbating the tensions with small-scale artisanal fishers and rendering the ban

ineffectual (Pe, 2004). Since the 1980s, there have been some improvements in the regulation of fishing activities such as gear restrictions, but these have been relatively minor, and DOF acknowledged that illegal, unreported, and unregulated (IUU) fishing was and is rampant (Aung and Oo, 1999).

3.1.2 Social Dimension

The participation of stakeholders to management regulations is important for good performance and resilience in any fishery. Due to the limited capacity for enforcement in Myanmar's fisheries, and lack of a clear path to increase this capacity, stakeholder participation is even more critical. Deterrence of illegal fishing behavior through enforcement is not the only way to improve compliance with fishery regulations; indeed, building regulations such that fishermen comply because they believe that is the right thing to do or that compliance will benefit them may often be superior to an approach based solely on deterrence.

Myanmar's inshore fishing communities are often long-standing fishing towns that pass fishing traditions down within families, thus developing a sense of stewardship among the community. They often express a desire to manage their fisheries themselves and conserve the stocks that they rely on for nutrition and livelihoods, and that can support their children when they are old enough to go fishing. This mindset can also lead to a displacement of blame for dwindling catches, with legal fishers often claiming it is illegal fishers from outside the community that cause stock decline by using illegal gear. However, often when pressed these communities will acknowledge that legal mesh sizes are too small to actually protect juvenile fish, and that they would like to abide by or even extend closed seasons.

3.1.3 Inshore and Offshore Fisheries

In inshore fisheries, fishing boats can operate in waters 10 nautical miles from the shoreline. Inshore fishing boats are not more than 30 feet long, powered by less than 25 HP engine, and use driftnet, gillnet, and long line. On the other hand, offshore fishing vessels operate beyond the inshore fishing zone to the EEZ, are more than 30 feet long powered by more than 25 HP engine and use trawl net, purse seine, and long line.

The Department of Marine Administration (under the Ministry of Transport and Communications) is responsible for the registration of fishing boats and fish

carrier vessels carrying the flag of Myanmar, while the Department of Fisheries (DOF) carry out the granting, suspending, and withdrawing of fishing licenses from fishing boats or carrier vessels. Also, the DOF is authorized to implement, control, and enforce laws, regulations, and conservation and management measures which must be complied with by the fishing vessels.

Incursion of offshore vessels into inshore fishing grounds is said to occur particularly in areas where deep water is found within 10 nautical miles of the shore, such as the Mawtin Coast region of Rakhine (WCS Myanmar 2018).

However, the scale and complexity of the governance challenge appears to make the DOF reticent to put a lot of effort into it solving it. Control of illegal fishing offshore is the responsibility of the Myanmar Navy, Army, and Combined Security Team and does not include any DOF personnel or any knowledge of fisheries law. This lack of focus and expertise on fisheries reduces management effectiveness.

3.1.4 Securing Marine Fisheries, Livelihood & Biodiversity in Myanmar

Myanmar's marine resources have long provided sustenance to its coastal people. Over 25,000 small-scale fishing vessels are registered to fish its coastline and nearly half of the country's population lives in coastal states and regions. Despite fisheries' importance, Myanmar has limited capacity for sustainable management.

This overexploitation has resulted in drastic declines of stocks; a 2014 marine survey carried out by Norway showed that pelagic stocks are currently only 10% of their 1979 biomass, with similar estimates for inshore fisheries. Inshore fisheries are of particular concern as the decline directly influences local livelihoods and food security. The impacts of fishing practices on protected marine species, such as dugong, turtles, sharks and rays, are also evident.

Fortunately, the newly elected government of Myanmar was in the process of decentralizing authority of the inshore fisheries sector to its states and regions, a development that provided the platform for empowering local people and enabling fisheries co-management.

3.1.5 Myanmar Marine Fisheries Law

Myanmar Marine Fisheries Law was enacted on 25th April 1990 by the State Law and Order Restoration Council, under the State Law and Order Restoration Council Law No. 9/ 90.

In this law, it is stated in chapter (7) that “The Director General may, for the purpose of carrying out the fishery systematically, and for the conservation and protection of the fish, issue conditions, prohibitions, orders, and directives relating to fishery”. (Myanmar Marine Fisheries Law, 1990).

According to this, the Director General confirmed to the request of inshore fisheries co-management system by the local communities and other coastal conservation associations.

3.2 Fisheries Co-Management in Myanmar

There are generally two types of fisheries co-management system in Myanmar. One is that the government instructs the local people to manage the fisheries areas cooperatively; also known as “Locally Manage Area”. And another type is that the conservation associations request to the government to maintain and manage the fisheries areas cooperatively.

According to FAO, it can be divided into three coastal regions: the Rakhine Coastal Region (from the mouth of the Naaf River to Mawtin Point, about 740 km in length), the Ayeyarwaddy Delta and the Gulf of Moattama (Martaban) Coastal Region (from the Mawtin Point to the Gulf of Moattama, about 460 km in length) and the Thanintharyi Coastal Region (from the Gulf of Moattama to the mouth of the Pakchan River, about 1 200 km in length) in the Bay of Bengal and in the Andaman Sea.

In the Rakhine Coastal Region, Kyeintali Inshore Fisheries Co-management Area (280 mi^2) (known as KIFCA) is in Kyeintali Town, Gwa Township.

In the Ayeyarwaddy Delta, there are five fisheries co-management sites located in Labutta, Pyapon, Maubin, Hinthada, and Thabaung Townships. All sites have at least one village that is implementing a rudimentary form of fisheries co-management. Two of the sites (Labutta and Pyapon) are in coastal saline areas, two are in freshwater areas (Hinthada and Thabaung) while the fifth site (Maubin) is in an area inland that alternates between freshwater and brackish conditions.

In the Gulf of Moattama, the first fishery co-management zone including 500 acres of crab conservation area in Mon State was declared by Mon State Government in the village of Aung Kan Thar in Thaton Township, in late 2017. This was a result of collaboration between GOMP, village fishers, Thaton FDA, DOF (state and district), and Myanmar Fisheries Federation. The primary focus will be tackling the problem of illegal fishing in the area. Currently, fisheries co-management plans for

this area and for two other Mon State townships are being drafted with the support of NAG as part of GOMP.

In the Thanintharyi Coastal Region, Thayetchaung inshore fisheries co-management area (130 km2) (known as TIFCA) is in Thayetchaung Town, Dawei Township.

Despite fisheries' importance, Myanmar has limited capacity for sustainable management. A recent University of Washington global analysis of fisheries governance systems labeled Myanmar the least effective. Overexploitation, encouraged by poor regulations, weak rule of law and enforcement and unsustainable fishing techniques, has resulted in drastic declines of stocks. Norway's 2014 marine survey showed that pelagic stocks are currently 10% of their 1979 biomass, with similar estimates for inshore fisheries. Inshore fisheries are of particular concern, currently over capacity and non-compliant with closed seasons (DOF).

Along Thandwe District's coastline, Rakhine State, over 80% of people are directly or indirectly involved in small-scale fisheries for livelihoods and subsistence, but are rarely involved in decision-making or planning processes. There is also evidence of inshore fisheries bycatch, including a range of globally threatened species like dugongs, turtles, sharks and rays, though information is guarded and poorly documented. Compounding these problems, Rakhine is ranked second in Myanmar's States and Regions in terms of poverty, with 78% of the population poor and concentrated along the coast (WCS). Not least, there are emergent threats, and opportunities, created by the ongoing political transformations and the development of the offshore oil and gas sector.

3.3 Inshore Fisheries Co-Management in Kyeintali Town

This cooperating management system mainly aims to conserve the marine resources. Local people cooperatively conserved and their objective is to develop fish resources for the purposes:

- To develop the Myanmar coastal fishery sector's in the long-run,
- To conserve the rare types of resources in Myanmar marine areas,
- To safe the fish resources which are people always used, and
- To secure the rare fish resources.

RCA involved and helped to implement for the purposes of raising the socio-economic status of fissures and fishers who mainly exploited and consumed, and to get the long-term development of fish resources. Another purpose is to maintain the fisheries by fishers themselves.

Dealing with the conservation of marine resources, inshore fisheries co-management was implemented in 10 villages from Kyeintali Region; whereas people from those area make their livings with inshore fisheries. Fish resources are declining all over the world (RCA, 2020). Research papers, international researchers and international organizations pointed out that, local people and fishers should cooperate together to increase the quantity of fish resources. According to their observations, stakeholders in Rakhine fishery sector knew that it would success if they use that co-management system. So, inshore fisheries cooperating management system was firstly implemented in those 10 villages in Kyeintali Town.

In Kyeintali Town, there is only 10 villages whose main livelihoods are fisheries and this was the reason for choosing 10 villages for co-management. There was some business who were illegally fisheries and offshore vessels were invading into inshore areas. Another objective was to protect and solve these problems. So, stakeholders discussed these points with villages and most of the fishers understood. Then, they accepted and agreed to implement this management system cooperatively.

All village group committee identified to draw up the protected inshore water area, and stated rules and regulations to take action for breaking rules themselves. All these steps were done with the help of RCA. DOF always cooperates and gives advices in such an important case. So, all rules and regulations were under the existing laws and instructions of DOF.

In addition, participating communities also proposed a potential marine protected area (18 mi^2) outside of the co-management area due to its perceived biodiversity values. Once zones were proposed, and management plan drafted, awareness-raising meetings were held in each of the 10 communities to discuss and revise the proposed Kyeintali Inshore Fisheries Co-management Area, draft Management Plan, and vote on committee members. A total of 533 community members participated in these initial discussions, and by December 2017, a total of 1,435 community members formally acknowledged their support for the co-management initiative by signing a joint letter of support.

Following a three months period of review and internal government consultations at the national, subnational, and local levels, the Kyeintali Inshore Fisheries Co-Management Area was formally declared by the Director General of the Department of Fisheries on August 8, 2018. The designated area now covers 280 mi^2 of coastal waters in the vicinity of the ten participating communities and incorporates a number of management zones. These zones include: no-take zones (8 mi^2), seasonally closed areas (9 mi^2), gear-restricted areas (57 mi^2), and sea turtle nesting beaches (1 mi^2) and are intended to protect important habitats and reduce potential interactions of threatened species with fishing activity.

According to the Notice of Order No. 1/ 2018 by the Department of Fisheries under the Ministry of Agriculture, Livestock and Irrigation, the following area from Kyeintali Town, Gwa Township, Thandwe District was defined as Inshore Fisheries Co-Management Area. Its total area is 179,200 acres (280 mi2). (KIFCA, 2022)

Area Specification

- 10 nautical miles from Taing Gyo stream mouth to the sea
- 10 nautical miles from Maung Htauk headland to the sea
- 10 nautical miles from Mee Chaung Ye stream mouth to the sea

Villagers (fishers, and local people who depend on fishery sector) identified those co-management areas with two main reasons. One was that areas must be near with 10 villages, and second reason was the villagers depended areas. Experienced traditional fishers and villagers consulted together when will they conserve those areas. With their consultation, the following management areas were identified to support the local management of marine resources:

a) No Take Zones

A no-take zone is an area set aside by the government where no extractive activity is allowed. Extractive activity is any action that removes, or extracts, any resource. Extractive activities include fishing, hunting, logging, mining, and drilling. Shell collecting and archaeological digging are also extractive.

No-take zones offer a greater amount of protection to the ecosystems, habitats, and species within the boundaries of those larger, and less restrictive, protected areas. No-take zones are a specific type of marine protected area (MPA). According to the National Oceanic and Atmospheric Administration (NOAA), no-take MPAs totally

prohibit the extraction or significant destruction of natural or cultural resources. (National Geographic News, 2022).

b) Seasonally Closed Areas

Seasonally closed areas may be defined as prohibition of fishing during a particular period of time mainly during spawning of brood fishes in the specified area so as to allow spawning and also the growth of the fry. It is a valid means of reducing effort directed at the spawning stock (recruitment overfishing) that may reduce the spawning stock to non-sustainable levels.

This is particularly important for lithophilous and phytophilous fish, since spawning may be disrupted and eggs and fry destroyed if fishing is allowed at the wrong time. (Nikolskii, 1969).

c) Gear Restricted Zones

Gear restricted zones are areas within which individuals are prohibited from fishing for, or possessing, non-exempt species when fishing with certain types of gear. Gears mean 1/2" square, 1" square, 1.25" square, 2" square … If small square (fishing net) is not used in these zones, immature fish will not be caught.

d) Protected Turtle Nesting Beaches

An increasing threat to the survival of turtle hatchlings comes from artificial lighting from coastal development. On the land, sea turtle (female) always lay eggs mostly in autumn season and spring season. Villages in Kyeintali which have sandy beaches like this conserve sea turtle by identifying protected turtle nesting beaches.

3.3.1 Projects of Inshore Fisheries Co-Management

A number of community co-management projects managed by such organizations as DANIDA, Pyoe Pin, WCS, and the Smithsonian, most notably in Rakhine, Ayeyarwady, and Tanintharyi, have demonstrated not only that there is a strong desire within communities to manage their own fishing grounds and improve value-added technology but also that the establishment of effective community co-management organizations requires considerable external support. (Fisheries Sector Report, 2019).

1) Darwin Initiative

The Darwin Initiative is a UK government grants scheme that helps protect biodiversity, the natural environment and the local communities that live alongside it in developing countries.

Most projects will include one or more of building environmental knowledge, capacity building, research, and implementing international biodiversity agreements. Since 1992, the Darwin Initiative has awarded over £164m to more than 1,143 projects across 159 countries.

The Darwin Initiative aims this inshore fishery co-management project to support fishing communities and government authorities to establish a co-management plan for the Thandwe District coastline in Rakhine State, Myanmar. And, to improve governance and sustainability of the inshore purse-seine fishery and include practices that recover stocks, mitigate bycatch and increase income stability for fishing communities.

2) Wildlife Conservation Society (WCS)

WCS is a US-based non-profit conservation organization that works in almost 60 countries and four oceans. WCS has been working in Myanmar since 1993, and was instrumental in the creation and expansion of several protected areas, including the country's first marine and aquatic protected areas.

WCS collaborates with the Ministry of Environmental Conservation and Forestry, the Ministry of Livestock, Fisheries and Rural Development and local civil society to assess the status of Myanmar's ecosystems and build capacity for wildlife conservation and natural resource and management. WCS has engaged the Department of Fisheries for over ten years on freshwater and marine projects, and has utilized its long-standing relationships to obtain inputs to – and support for – this project from local partners.

3) Pyoe Pin (PP) Programme

The Pyoe Pin programme, was formed in 2012 and supports local organizations, government departments, MPs, civil society groups, private sector and individuals to work cooperatively in meeting the needs and inspirations of Myanmar people. Through establishing coalitions of interest, Pyoe Pin undertakes a range of

activities that contribute to furthering the basis for democratic and accountable governance within Myanmar.

Through its work, the Rakhine Fisheries Partnership (RFP) has been established, with members including fishing communities, civil society organizations, NGOs, MPs, Government officials, the private sector and educational institutions. Pyoe Pin's work with the RFP focuses on reversing recent declines in the fisheries sector, and the RFP played an important role in the 2014 process that led to the drafting of the Rakhine State Freshwater Fisheries Law. The RFP is also engaged in promoting linkages including the Union level ministries and neighboring countries.

4) Rakhine Coastal Region Conservation Association (RCA)

The Rakhine Coastal Region Conservation Association (RCA) is a well-known and consolidated grass roots organization operating in the Rakhine State since 1987. Though a broad network of volunteers, they focus on the education of local communication on environmental sustainability issues in relation to local development.

RCA is a non-profit organization, established in 2007 focusing on natural resource conservation and sustainable resource governance by promoting an environmentally friendly livelihoods in Gwa, Kyeintali and Thandwe Townships. Since its establishment, RCA has worked with BANCA/ OIKOS on Coastal Environmental Sustainability (2010-2013); MERN on Coastal Livelihoods and Environmental Assets Restoration in Rakhine (2011-2014); and with MERN on a Forest Fund Facility Project (2015-2016). RCA also works closely on a community forestry model with an aim to enhancing the balance of ecological well-being and human well-being through community-based forestry conservation. In 2014, RCA became one of the key member organizations under the Rakhine Fisheries Partnership. Through this involvement it is bringing to RFP its considerable experiences in establishing and managing community forestry and fisheries.

5) Department of Fisheries (DOF)

Department of Fisheries is organized with the objectives of the conservation of fisheries resources, food security of sustainable fish consumption and contribution of aquaculture technology for the people.

As the fisheries project section, Department of Fisheries was established with 6 officers and 70 staffs under Land and Rural Development Cooperation since June, 1954. Since May, 2014, the recent organization structure of the Department of Fisheries was restructured again with 365 officers and 2104 staffs.

The DOF is responsible for the development of the fishery sector in Myanmar. The DOF in Rakhine is the host of, and the main coordinating body of the RFP. Consultations with the RFP members, ensures that the DOF remains fully aware of stakeholder concerns and priorities in the fisheries sector. DOF have also played a key role in Kyeintali Inshore Fisheries Co-Management implementation, through providing support for data collection and sharing, co-management planning and communicating to other States and Regions, and at the Union level. They also provided technical support to training courses and workshops.

Vision

Sustainable development of fisheries sector for food security, improvement of the socio-economic of rural people and contribution to the economic development of the nation based on fisheries industry.

Objectives

(a) Promulgation of fisheries laws and implementation of action plans in line with the sustainable development goals.
(b) Availability of qualified information and collection of statistical data related to fisheries sector in line with the standard indicators.
(c) Systematic implementation of fisheries co-management and ecosystem approach to improve the fisheries management.
(d) Development of aquaculture industry by implementation of advanced techniques including Good Aquaculture Practices.
(e) The implementation of research and development, extension and awareness services, and human resources development oriented towards sustainable use of fisheries resources.
(f) The compliance with quality standards of fishery products aligned with the market requirements.

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

Kyeintali Town is located in Gwa Township of Rakhine State. It shares border with Gwa and (12) village tracts. Total population of Kyeintali Town is (23,581) with (6,081) households, according to 2014 census report. Average household size is (3.8) persons. Economically productive population between (15-64 years) is (66.4%), the total number of working populations is (9,027) people in this town. Percentage of urban population is only (24.9%). Total literacy rate is (96.0%) and disability rate is (8.7%). Employed persons (aged 15 – 64) of agriculture, forestry and fishing is totally 5,456 and it is the highest portion in skilled labor with 4,775 persons (52.9%). Kyeintali fishers and fish traders' population is 1,801 people. Although it is located in coastal area, almost 90% of households (5473/ 6081) are totally dependent on fishing. And in many villages 80 – 90% of households are engaged in fishing and the others are indirectly involved in (RCA, 2022).

Kyeintali and Gwa are chosen as survey areas because Kyeintali has inshore fisheries co-management area than other townships in Rakhine State, and is bordering with coastal area of Gwa Township. Gwa has total (1489.3) square km and it is comprised with (3) wards and (21) village tracts. Employed persons (aged 15 – 64) of agriculture, forestry and fishing is totally 9,695 and it is the highest portion in skilled labor with 8,880 persons (57.2%). Fishing is the primary industry in Gwa. Most residents fish in nearby waters, both for self-sustenance and trade with nearby towns.

Table (4.1) Survey Area and Number of Respondents in each Village

No.	Villages in Inshore Fisheries Co-Management area (Kyeintali Town)	Villages out of Inshore Fisheries Co-management area (Gwa Township)
1	Nyaung Pin Thar	Tainggyo
2	Pon Nyet	Gyaing Kauk
3	Chin Gwin	Ya Haing Ku Toet
4	Kyeintali (1)	Shwe Ya Chaing
5	Kyeintali (2)	Kan Ngu
6	Yamar Kyun	Tar Long Gyi
7	Palin Maw	Kyauk Chon
8	Kan Pauk	Ma Kyee Ngu
9	Ka Do Lay	Ah Maw
10	Kywe Gyaing	Laung Gyo

Source: Survey data, 2022

In Kyeintali, there are only 10 villages which livelihoods are fisheries. To compare the survey result significantly, another 10 villages in Gwa Township which are out of inshore fisheries co-management area were chosen for the survey.

4.2 Survey Design

The study is to analyze the inshore fisheries co-management in Kyeintali by quantitative research method for this survey. The questionnaires are divided into three parts. The first portion of the questionnaire is asked for obtaining the background information about the respondents of Kyeintali Town and Gwa Township. The second portion of the questionnaire is about socioeconomic of fishers. The last part of the questionnaire is about the awareness of fisheries by fishers.

The sample size of 200 respondents is fishers in Kyeintali Town and Gwa Township. The sampling method is a simple random method. Ten villages in Kyeintali Town and other ten villages in Gwa Township were selected geographically.

The study is formulated in combination of secondary data and primary data. Secondary data is obtained from RCA, DOF, MALI, other international organizations, libraries, documents, government websites and relevant web pages relating to the

fisheries sector. As a primary data, it was collected from fisheries, RCA and DOF from Rakhine State through formal and informal interviews, questionnaires by conducting the field survey. The data collection period was in December 2022. The answers of fishers were collected by organizing the fisheries of each village. Description in tabulations, and charts applied to compare and understand the situation of inshore fisheries co-management in Kyeintali, is used for more identification in the development of fishery sector in the study area.

4.3 Survey Result

In this section, the data analysis is described with the percentage of quantitative data collected from the 200 respondents, including 100 fishers from Kyeintali and another 100 fishers from Gwa. The analysis of data with percentage will be reported by dividing into three sections; respondents' profile and characteristics, socioeconomic, and awareness on fisheries sector.

4.3.1 Respondents' Profile and Characteristics (part I)

Demographical data of 200 respondents participated are shown in table (4.2).

Table (4.2) Baseline Characteristics of Respondents

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	(%)	Respondents	(%)
	Total	**100**	**100%**	**100**	**100%**
	Gender				
1	Male	100	100%	100	100%
2	Female	0	0%	0%	0%
	Age				
1	< 30	5	5%	9	9%
2	30 – 44	43	43%	50	50%
3	45 – 60	42	42%	31	31%
4	>60	10	10%	10	10%

Table (4.2) Baseline Characteristics of Respondents (Continued)

	Education				
1	Degree	7	7	1	1
2	High School	18	18	13	13
3	Middle School	47	47	49	49
4	Primary School	27	27	35	35
5	Others(monastic schools, the three Rs, etc)	1	1	2	2
	Family Members				
1	1 person	0	0%	2	2%
2	2 persons	3	3%	7	7%
3	3 persons	25	25%	28	28%
4	4 persons	40	40%	26	26%
5	5 persons and above	32	32%	37	37%

Source: Survey data, 2022

By the Table (4.2), majority of fishermen are 100% male in both survey area. Both in Kyeintali and Gwa, fishermen between the age of (30-60 years) were found the most according to the survey data.

Regarding education, most of the fishermen reached to middle school education. According to this education status, fishermen were weak in update technology and knowledge, which supports their livelihood.

As survey result, there were mostly middle-sized families with 4 persons and above family members in both Kyeintali and Gwa.

Table (4.3) Occupation of Respondents in Fisheries Sector

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
1	Owner	64	64%	56	56%
2	Repairer	1	1%	0	0%
3	Fishermen	34	34%	44	44%
4	Collector	1	1%	0	0%

Source: Survey data, 2022

Further, occupation levels of respondents were analyzed. Hence, owner is a person who owns fishing vessel, repairer means people who repair the fishing boat and fishing gear, and fishermen means local fishermen. Collector means people who collect fish resources got from inshore fishing, this may be both men and women. In this study, Table (4.3) states that majority of respondents were owners, and fishermen were the most common. Some of the owners are fishermen and some owners involved in both fishing and collecting in Kyeintali.

Table (4.4) Respondents' Involvement in Fisheries Sector

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	(%)	Respondents	(%)
		100	100%	100	100%
Why did you choose fisheries for your livelihood?					
1	Traditional	39	39%	61	61%
2	Regional Economy	55	55%	32	32%
3	No choice for other occupation	6	6%	7	7%
Years of Experiences in Fishery Sector					
1	<3 years	0	0%	1	1%
2	3 – 9 years	24	24%	22	22%
3	10 – 15 years	46	46%	24	24%
4	>15 years	30	30%	53	53%
How many family members are associated in fishery sector?					
1	1 person	85	85%	76	76%
2	2 persons	13	13%	15	15%
3	3 persons	2	2%	3	3%
4	4 persons and above	0	0%	6	6%

Source: Survey data, 2022

According to Table (4.4), most respondents in Kyeintali chose fisheries for their livelihood cause of regional economy. Kyeinali got regional income from fishery sector and regional economic system is better than Gwa Township. But in Gwa, inshore fisheries co-management system does not exist and regional economic system is based on agriculture and other sectors. So, most of the respondents chose fisheries for their livelihood as a traditional job.

According to the data, percent represented years of experience in the fisheries sector, with less than 3 years and more than 15 years engaged in fisheries. In Kyeintali, there were fair experiences on fishery sector respectively. Whether they had less or more experience, they participated in inshore fisheries co-management system. In Gwa, (53%) of respondents were more than 15 years experiences. Although Gwa had more experienced fishermen than Kyeintali, Gwa did not have

inshore fisheries co-management system. These traditional fishers would use normal fishing system and be hard to change.

From the survey data, most of respondents in Kyeintali and Gwa were associated in fishery sector by only themselves.

4.3.2 Socioeconomic Condition of Respondents (Part II)

Table (4.5) Housing Ownership of Respondents

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
Current Living Home is…					
1	Owned housing	100	100%	92	92%
2	Rental housing	0	0%	5	5%
3	Temporary Hut	0	0%	3	3%
If you rent, how much do you pay to rent this building?					
1	30,000 ks per year	0	0%	3	3%
2	40,000 ks per year	0	0%	2	2%

Source: Survey data, 2022

It is found that, it was found that there were three types of current living home. The first type is their owned housing (family owned, parents owned, …) and all respondents in Kyeintali and Gwa are living in their owned housing. But in Gwa, some respondents are living in rental housing. Renting fee was so cheap and this form of renting was unusal because some fishers were watching for their owner's boat, fishes while processing, and other accessories and tools. So, they were let to stay in owners' coconut farms with a little marginal price. And, a few respondents in Gwa were living in temporary hut with no fee.

Table (4.6) Household Income Level (Monthly)

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
Average household income					
1	Below 500,000 ks	24	24%	56	56%
2	500,000 – 1,000,000 ks	31	31%	27	27%
3	1,000,001 – 2,500,000 ks	43	43%	17	17%
4	Above 2,500,000 ks	2	2%	0	0%
Does your household income rely on fishery sector?					
1	Yes	88	88%	61	61%
2	No	12	12%	39	39%

Source: Survey data, 2022

According to the table (4.6), majority of household in Kyeintali had higher income status than Gwa, because of having inshore fisheries co-management system. Both in Kyeintali and Gwa, household income mainly relied on fishery sector.

Table (4.7) Monthly Expenditure of Respondents

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	(%)	Respondents	(%)
		100	100%	100	100%
The quantity of rice bought in cash per monthly					
1	Below 50,000 ks	3	3%	13	13%
2	50,000 – 100,000 ks	95	95%	80	80%
3	Above 100,000 ks	2	2%	7	7%
The quantity of oil bought in cash per monthly					
1	Below 10,000 ks	0	0%	5	5%
2	10,000 – 30,000 ks	100	100%	94	94%
3	Above 30,000 ks	0	0%	1	1%
For household consumption per monthly					
1	Below 100,000 ks	22	22%	45	45%
2	100,000 – 200,000 ks	60	60%	40	40%
3	Above 200,000 ks	18	18%	15	15%
Usage for gift and others per monthly					
1	Below 50,000 ks	20	20%	40	40%
2	50,000 – 100,000 ks	64	64%	49	49%
3	Above 100,000 ks	16	16%	11	11%
Usage for clothing and accessories per monthly					
1	Below 50,000 ks	95	95%	81	81%
2	50,000 – 100,000 ks	5	5%	18	18%
3	Above 100,000 ks	0	0%	1	1%

Source: Survey data, 2022

Table (4.7) show that most of the respondents in Kyeintali and Gwa used to buy rice between (50,000 – 100,000 ks) and oil between (10,000 – 30,000 ks). Here, Rakhine traditional food type is less oil than others.

According to survey data, Kyeintali and Gwa majority of household consumption per monthly was above (100,000 ks), usage for gift was below (100,000

ks), and usage for clothing was below (50,000 ks). Among the three basic needs for human, all of the respondents used their income mostly on food.

Table (4.8) Medical Fare of Respondents

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
1	Above 8,000 ks	100	100%	100	100%

Source: Survey data, 2022

According to survey data, totally 200 respondents in both Kyeintali and Gwa cost above 8,000 ks for their medical fare at one time. Because of the medical buildings were far and expensiveness of medicine, transportation charges. The main fact is that most people would not go to any clinic or hospital, they used traditional medicine or some medicines that can be easily bought at shop.

Table (4.9) Households Assets of Respondents

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
1	Car	11	11%	6	6%
2	Motorcycle	86	86%	65	65%
3	Bicycle	33	33%	32	32%
4	TV & Satellite	74	74%	62	62%
5	Radio	8	8%	7	7%
6	Mobile Phone	100	100%	96	96%
7	Livestock	81	81%	49	49%
8	Refrigerator	27	27%	25	25%

Source: Survey data, 2022

Generally, respondents in Kyeintali possessed more household assets than respondents in Gwa. Almost (100%) of respondents both in Kyeintali and Gwa possessed mobile phones and a few percentages of respondents both in Kyeintali and Gwa possessed radios. This shows that fishermen in selected survey area were familiar with the technology.

Table (4.10) Credit Condition of Respondents

Sr. No.	Particular	Kyeintali		Gwa		Total
		Respondents	(%)	Respondents	(%)	(%)
		100	100%	100	100%	100%
Are you receive loan?						
1	Yes	52	52%	76	76%	64%
2	No	48	48%	24	24%	36%
From whom did you receive loan?						
1	Relatives or friends	8	8%	6	6%	7%
2	Lenders	0	0%	2	2%	1%
3	Public banks/Government	0	0%	1	1%	0.5%
4	Agencies	14	14%	67	67%	40.5%
5	Other	30	30%	0	0%	15%
Interest Rates						
1	Under 3%	45	45%	24	24%	57%
2	3% - 5%	7	7%	4	4%	5.5%
3	6% - 10%	0	0%	42	42%	21%
4	Others	0	0%	6	6%	3%
Do you donate fish for social activities?						
1	Yes	90	90%	75	75%	82.5%
2	No	10	10%	25	25%	17.5%

Source: Survey data, 2022

According to the survey data, almost half of respondents in Kyeintali received loan. (30%) received loan from other sources, this means revolving fund which was excess fund from DARWIN Initiative. RCA managed that revolving fund and trained how to use at first. Then, RCA transferred that fund to the villagers and saved in bank with public saving account. So, villagers could receive loan from that fund with low interest rate around 3%. And in Gwa, majority of the respondents received loan and they mostly received loan from agencies. Their interest rates were mostly above 6%.

As survey result, majority of respondents in both Kyeintali and Gwa donate fish for social activities. This mean that fishers in Kyeintali had better income than in Gwa cause the more income people have, the more donate they can.

4.3.3 Awareness on Fishery Sector (Part III)

Table (4.11) Awareness on Inshore Fisheries Co-management

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	**(%)**	**Respondents**	**(%)**
		100	**100%**	**100**	**100%**
Do you know inshore fisheries co-management?					
1	Yes	100	100%	99	99%
2	No	0	0%	1	1%
Do you know inshore fisheries co-management area?					
1	Yes	99	99%	99	99%
2	No	1	1%	1	1%
Do you know how those areas are defined?					
1	Yes	99	99%	99	99%
2	No	1	1%	1	1%
Have you ever attended the trainings relating to fisheries?					
1	Yes	36	36%	4	4%
2	No	64	64%	96	96%
If yes, which training did you attend?					
1	Sea turtle	21	21%	0	0%
2	Awareness	20	20%	3	3%
3	Sustainable	21	21%	3	3%
Have you ever attended the meetings relating to fisheries?					
1	Yes	98	98%	53	53%
2	No	2	2%	47	47%

Source: Survey data, 2022

According to table (4.11), it shows that all respondents in Kyeintali knew inshore fisheries co-management. Almost all of respondents knew those area and how those were defined, with only (1%) did not know. That (1%) might be new migrants. And in Gwa, (99%) of respondents knew inshore fisheries co-management, those area and how those were defined. This can be said that inshore fisheries co-management system was accepted in surrounding villages and they knew well about the benefit of that system. The only (1%) did not know about with the system. As mentioned above, this (1%) might be migrants.

According to survey data, majority of the respondents in both Kyeintali and Gwa had never attended the trainings. In this case, only owners have a chance to attend the trainings and they reshare the training again to the fishers and others

workers in fishery sector. Most of the trainings were held by DARWIN Initiative, WCS, DOF and RCA. Fishermen in Kyeintali attended most trainings and meetings but fishermen in Gwa had fewer percent who attended trainings and meetings than Gwa. These meetings were mostly held by DOF and RCA. So, it can be said that all respondents in Kyeintali were connected with DOF and non-government organizations to get help and to manage the inshore fisheries co-management well. But Gwa is still need to closer with DOF and NGOs.

Table (4.12) Respondents knowledge on inshore fisheries co-management system

Sr. No.	Particular	Kyeintali		Gwa	
		Respondents	(%)	Respondents	(%)
		100	100%	100	100%
From where do you get the knowledge and information of fisheries?					
1	Department of Fisheries	99	99%	92	92%
2	NGOs	92	92%	90	90%
3	Internet, TV & Radios	33	33%	32	32%
4	Newspapers, journals & pamphlet	96	96%	83	83%
5	Others	3	3%	1	1%
To increase the fisheries sector, who is responsible?					
1	Fishers and fisheries associated workers	63	63%	58	58%
2	Local community	95	95%	86	86%
3	NGOs	99	99%	92	92%
4	DOF	99	99%	98	98%
5	All of the above	31	31%	49	49%
Do you know laws, rules, and regulations established by DOF?					
1	Only know laws	19	19%	8	8%
2	Only know rules & regulations	100	100%	98	98%
3	Know laws, rules & regulations	4	4%	3	3%
4	I don't know anything	0	0%	2	2%

Source: Survey data, 2022

Table (4.12) shows that majority of respondents in both Kyeintali and Gwa got the knowledge and information of fisheries from all the channels (DOF, NGOs, media, …). According to table (4.9), it is said that (100%) of respondents in Kyeintali and (96%) of respondents in Gwa had mobile phone. But percentage of respondents who got knowledge and information from mobile phone is a little low.

As a survey result, majority of respondents in both Kyeintali and Gwa thought that local community, NGOs and DOF are responsible to increase the fisheries sector. The inshore fisheries co-management in Kyeintali was implemented by all together to achieve the benefits.

From the survey, majority of respondents in both Kyeintali and Gwa knew only rules & regulations. But there were no respondents in Kyeintali who did not know anything. This means that DOF participated as a key role in Kyeintali inshore fisheries co-management system.

CHAPTER V
CONCLUSION

5.1 Findings

This study was aimed to examine the inshore fisheries co-management is needed to develop the whole fisheries sector of Myanmar and to learn the socio-economic status of fishermen in co-management area. The survey was conducted by 200 respondents in selected area: Rakhine State (Kyeintali Town and Gwa Township).

This study found that there is still gender inequality cause all respondents were males. While fishers in the target communities are predominately men, females play significant roles in fish processing and often manage household finances. Securing the participation of females in fisheries management and community development has been challenging due to long-established cultural norms and expectations.

This study found that both in Kyeintali and Gwa, middle aged groups between (30-60) were found most. The results indicate that most of this aged people in inshore coastal area are fishers.

Accordance to the survey data, (7%) of respondents in Kyeintali got degree and in Gwa there was (1%). To effectively run their society, the fishermen need to be better informed. In order to inspire and teach the traditional fishermen to adopt a new method, they might study a variety of contemporary approaches.

This study found that (55%) of respondents in Kyeintali chose fisheries for regional economy and (61%) of respondents in Gwa chose fisheries for traditional livelihood. This difference shows that Kyeintali's inshore fisheries co-management can solve its regional economy.

This study found that (46%) of respondents in Kyeintali and (24%) in Gwa had experienced between (10-15) years,and (30%) in Kyeintali and (53%) in Gwa had over 15 years experiences. Therefore, the fisheries sector has competent and experienced fishermen.

According to the survey results, all respondents in Kyeintali owned houses. In Gwa, there were still (5%) renting houses and (3%) in temporary huts. Fishermen in

Kyeintali have easy access to one of their fundamental necessities since they own their own houses.

This study found that (43%) of respondents in Kyeintali's family income was between 1,000,000 – 2,500,000 ks and (56%) of respondents in Gwa was below 500,000 ks. The size of the family, the age and gender of the household members, the socioeconomic status of the household, education, health, social capital, assets and endowments, and employment may all have a role in the extent of the difference.

By the survey results, (88%) of respondents in Kyeintali's household income rely on fisheries sector and in Gwa (61%) rely on fisheries sector. It may be suggested that the fishery sector may be the dominant industry and source of revenue in their region.

By the survey results and comparison of Kyeintali and Gwa survey data, the probabilities of respondents in Kyeintali owning household assets is much higher such as cars, motorcycles and livestock with (11%), (86%), (81%) than Gwa with (6%), (64%), (49%). More assets mean more wealth is created. Kyeintali is hence considered to be richer than Gwa.

According to the survey finding on loan and interest rate, Kyeintali has revolving fund system which is associated with inshore fisheries co-management system. Fishers can receive loan with low interest rate. A funding program for fishermen should be included if a new fisheries co-management system is set into place in order to help them with their financial issues. Fishermen's everyday life relies on debt that comes with high interest rates from additional sources, so this cycle never stops.

By the survey result, it can be seen as significant effort to build awareness by the participation of DOF and RCA. They supported awareness raising activities in Kyeintali and further afield to promote the values of marine ecosystems, and have engaged communities to develop co-management strategies.

By the survey results, possessing mobile phone rates were (100%) in Kyeintali and (96%) in Gwa. But the respondents got the knowledge and information of fisheries from internet, TV and radios rate were (33%) in Kyeintali and (32%) in Gwa. This may be because of their education level and they might not know how to use mobile phone to get knowledge. In the current digital era, it is necessary to attempt to raise awareness through social media and should teach fishermen how to utilize.

According to study results, just (63%) of fishermen in Kyeintali and (58%) of fishermen in Gwa considered they were in charge of the fishery sector. They all recognized that DOF, NGOs, and the local community have the most responsibility. Fishermen need greater involvement and accountability in order to have a more effective co-management system.

This survey found that only (19%) of respondents in Kyeintali and (8%) in Gwa knew laws. In Gwa, 2% of respondents said they had no knowledge. This finding highlights the need for DOF to encourage greater legal awareness. Many fishers knew rules and regulations but they mostly did not know what would be happen when they broke those rules and regulations.

According to the survey, the most challenges of fishers in inshore fisheries co-management area are difficulties in access to finance, lack of modern equipment, poor technology, and lack of skilled labor. According to the DOF policy of "Ensuring food security, food safety and sustainable development of fisheries sector by conservation of fisheries resources in accordance with the fisheries laws", fisheries co-management becomes a main source to get food security, food safety and sustainable development of fisheries sector. According to the (25) plans released by DOF; Kyeintali inshore fisheries co-management system is consistency with (8) plans.

5.2 Recommendations

Inshore fisheries co-management in Kyeintali provided information on current status of fishers' situation in Kyeintali and this survey was implemented to examine the inshore fisheries co-management in Kyeintali but further surveys are needed. For example, (i) difficulties and challenges in fisheries co-management, (ii) Stakeholders' participations in fisheries co-management, (iii) financial problems in fishers' life beyond fisheries co-management, and (iv) awareness for fisheries laws, rules and regulations. These detailed surveyed results will be more helpful to develop the fisheries sector.

In order to find a more suitable way to sustain livelihood for fisherman, one recommendation needs to be provided. Government, local communities, and NGOs participated together to implement the inshore fisheries co-management but in addition to the initial period of fisheries co-management, there is not much interest. Fishers need more technology and consultation to enter the developed fish market. If there are stakeholders to implement this, fisheries sector will get more development.

So, income beyond the life of fisheries co-management will get stable and their financial problems will decrease.

Japan has been successful with “One Village One Product (OVOP)” programme and Thailand has been successful with “One Town One Product (OTOP)”. Myanmar inspired OTOP but it aimed to local products, including handicrafts, textiles and garments. Like Myanmar OTOP, OVOP in fisheries sector should be implemented in coastal areas.

The local community's and fishermen's socioeconomic situation are enhanced by the fisheries co-management system, which also maintains and provides a surplus of fishery resources. On the other hand, developing a unique market like the OVOP program will improve the livelihoods of fishermen. Women will participate more and gender equality will be achieved.

Finally, recommended to encourage on knowledge sharing of fisheries co-management awareness around the country side of Myanmar because of low education level of fishers in general. Technological expert persons should be participated in this fisheries sector to save time and manpower.

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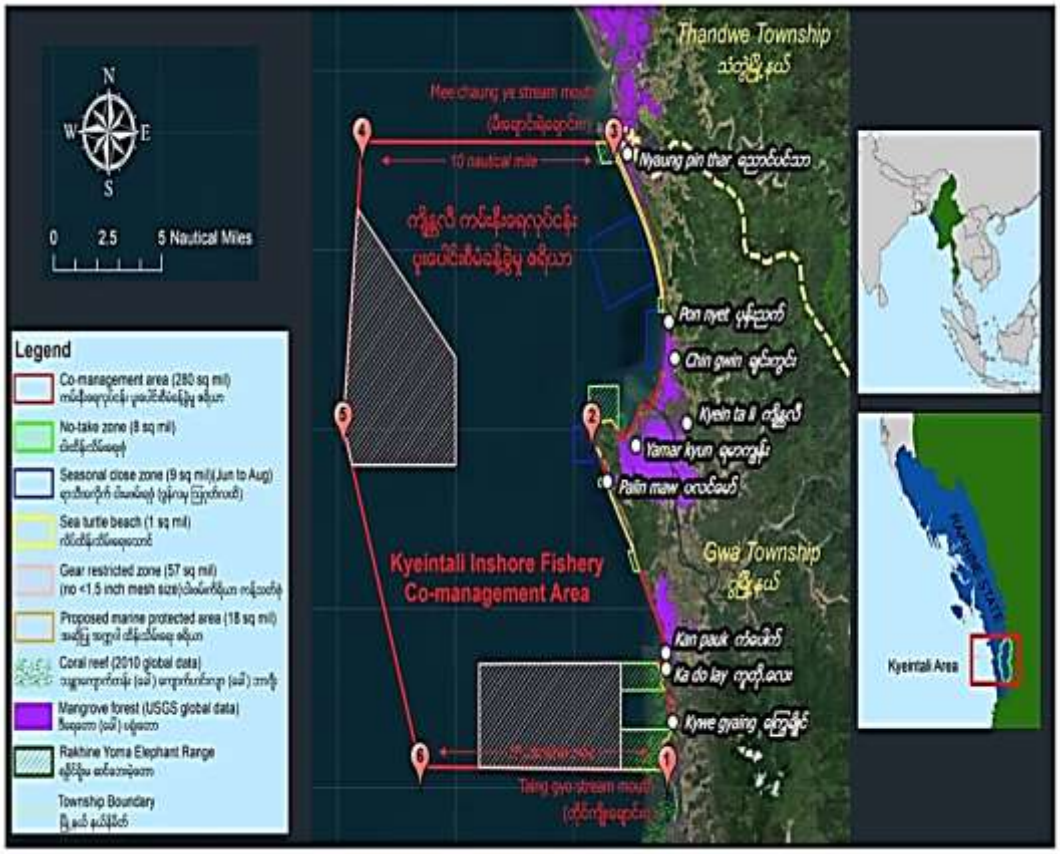
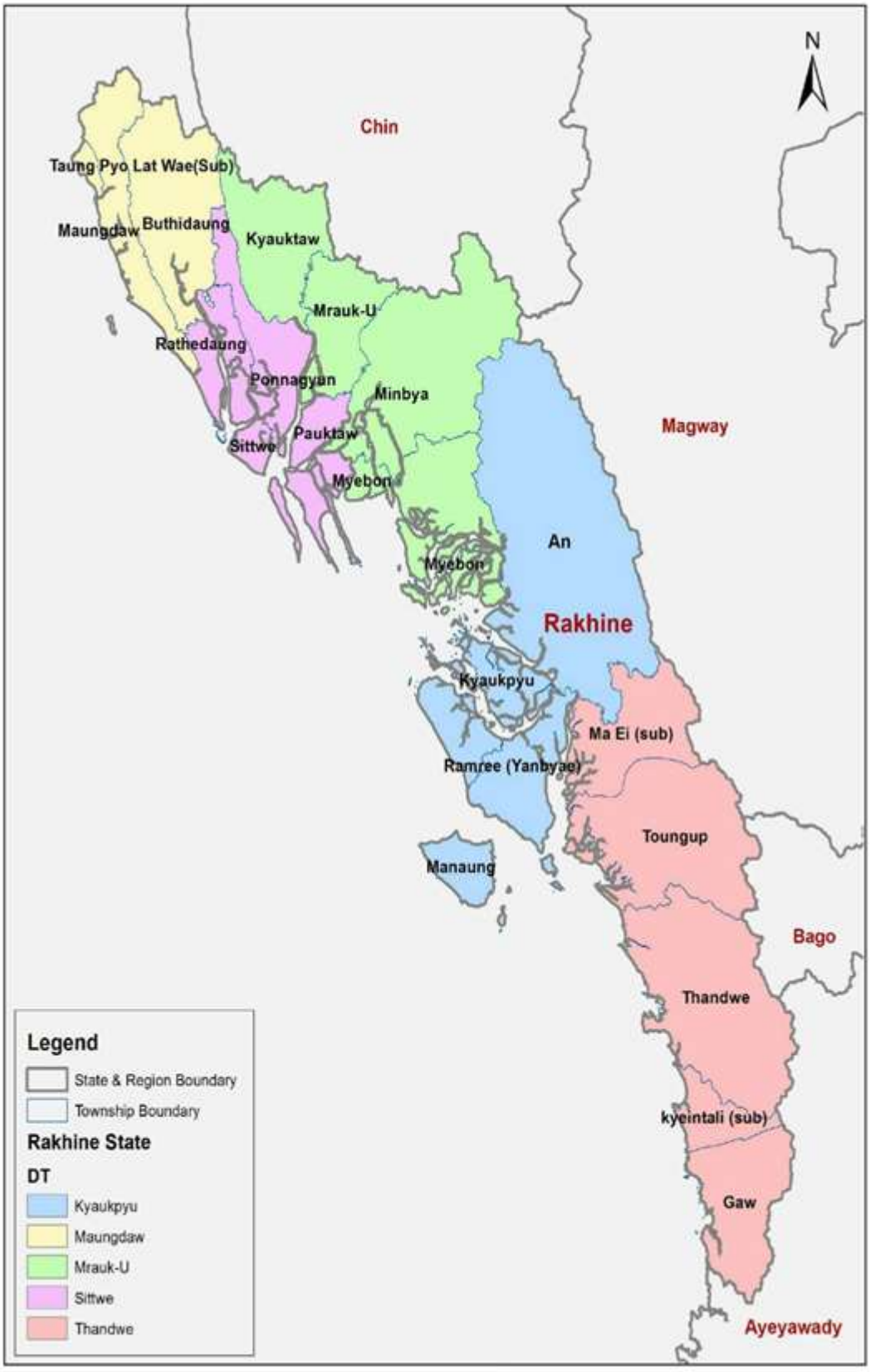
APPENDIX - A

Inshore Fisheries Co-management Area in Kyeintali Town



APPENDIX - B

Kyeintali Town and Gwa Township



A Study on Inshore Fisheries Co-management:
Case Study in Kyeintali, Rakhine State

I am a student of Master of Public Administration Programme from Yangon University of Economics. I am writing my thesis about "A Study on Inshore Fisheries Co-management in Rakhine State". I would be very grateful if you could answer my question on this questionnaire. The information collected is "private and confidential and it will not be used for assessment. No part will be revealed without consent.

Background Information

1. **Where do you live?**
   - Villages which have Inshore fisheries co-management areas
   - Villages which don't have Inshore fisheries co-management areas

2. **Gender**
   - Male
   - Female

3. **Age**
   - Under 30
   - 30-44
   - 45-60
   - Above 60

4. **Education level**
   - Bachelor's Degree
   - High School
   - Middle School
   - Primary School

5. **Occupation**
   - Owner
   - Repairer

- Fishing
- Collector
- Processing men

6. **Why did you choose fisheries for your livelihood?**
   - Traditional
   - Regional economy
   - No choice for other occupation

7. **Years of experience in Fishery Sector**
   - Under 3 years
   - 3 to 9 years
   - 10 to 15 years
   - Above 15 years

8. **Number of Family Member**
   - 1
   - 2
   - 3
   - 4 and above

9. **How many family members are associated in fishery sector?**
   - 1
   - 2
   - 3
   - 4 and above

<u>Socioeconomic Status</u>

10. **Current living home is**
    - Own
    - Rent
    - Other

11. If you rent, how much do you pay to rent this building?

- 30,000 ks per year
- 40,000 ks per year

12. Average family income

- Below 500,000 ks
- 500,000 – 1,000,000 ks
- 1,000,001 – 2,500,000 ks
- Above 2,500,000 ks

13. Does your household income rely on fishery sector?

- Yes
- No

14. What was the quantity of rice bought in cash per monthly?

- Below 50,000 ks
- 50,000 – 100,000 ks
- Above 100,000 ks

15. What was the quantity of oil bought in cash per monthly?

- Below 10,000 ks
- 10,000 – 30,000 ks
- Above 30,000 ks

16. How much do you spend in cash for household consumption per monthly?

- Below 100,000 ks
- 100,000 – 200,000 ks
- Above 200,000 ks

17. How much do you use for gift and others? (Monthly)

- Below 50,000 ks
- 50,000 – 100,000 ks
- Above 100,000 ks

18. How much do you use for clothing accessories? (Monthly)

- Below 50,000 ks
- 50,000 – 100,000 ks
- Above 100,000 ks

19. How much do you spend for medical fare? (one time)

- Below Ks 5,000
- Ks 5,000 – Ks 8,000
- Above Ks 8000

20. Household Assets

- Car
- Motorcycle
- Bicycle
- Tv & Satellite
- Radio
- Mobile Phone
- Livestock
- Refrigerator
- Cart
- Others

21. Are you receive loan?

- Yes
- No

22. From whom did you receive loan?

- Relatives or friends
- Lenders
- Public bank/ Government
- Agencies
- Other

23. What interest rate to pay for a 30-days?

- Under 3%
- 3% - 5%
- 5% - 10%
- Other

24. Do you donate fish for social activities?

- Yes
- No

Awareness about Fisheries

26. Do you know inshore fisheries co-management?

- Yes
- No

25. Do you know inshore fisheries co-management area?

- Yes
- No

26. Do you know how those areas are defined?

- Yes
- No

27. Have you ever attended the trainings relating to fisheries?

- Yes
- No

28. If yes, which training did you attend?

- Sea turtle conservation training
- Awareness raising training
- Bycatch reduction training
- Sustainable fisheries management training
- Others

29. Have you ever attended the meetings relating to fisheries?

- Yes
- No

30. From where do you get the knowledge and information of fisheries?

- Department of Fisheries
- Non-Government organizations
- Internet, TV & Radios
- Newspapers, journals & pamphlet
- Others

31. In order to increase fisheries, what do you think who is responsible? (You can pick more than one answer)

- Fishers and fisheries associated workers
- Local community
- Non-government organizations
- Department of Fisheries
- All of the above

32. Do you know laws, rules, and regulations established by DOF?

- Only know laws
- Only know rules & regulations
- Know laws, rules & regulations
- I don’t know anything

Plans set up by the Department of Fisheries,
Ministry of Agriculture, Livestock and Irrigation

(a) For fisheries development, collaboration with local, international organizations and development partners to implement plans and projects formulated in accordance with the policies.

(b) The compliance of the fisheries laws and rules and regulations amended, updated and aligned with international standards, best practice and provisions.

(c) Processing of fisheries statistical data to meet the requirements of the standard indicators of related Ministries.

(d) Obtaining technical assistance from local and international organizations for the development of a system for data collection, analysis and information dissemination system for fisheries management.

(e) The establishment of accurate operational frame work for systematic improvement and implementation of fisheries co-management and ecosystem approach to fisheries management.

(f) Implementation of the fisheries co-management and ecosystem approach to fisheries management, by promoting community fisheries organizations and their fisheries co-management committees, capacity building, gender promotion (women empowerment) and provision of technical assistance to fisheries sector.

(g) Implementation of National Plan of Action Combating Illegal, Unreported and Unregulated (IUU) Fishing.

(h) Promoting collaboration with related Ministries, Local, Regional and International Organizations for the implementation of the International, and Regional provisions, ASEAN declarations and commitments.

(i) Promotion of conservation areas for marine and freshwater resources in critically important habitats.

(j) Promotion of community fisheries organizations for improved fisheries resource management and rural development.

(k) Allowing import of high-quality fish/ shrimp seeds and brood-stock and producing genetically improved fish species.

(l) Conservation of indigenous fish species and conducting research in breeding and culture of those species.

(m) Cooperation with public, private and local/ international organizations for the promotion of sustainable fresh water and marine aquaculture industries.

(n) Adoption of climate-smart fish species and their related breeding and culture techniques.

(o) Cooperation with regional and international organizations for preventing and controlling of fish and shrimp diseases.

(p) Encouraging the production and extensive application of qualified compound feed in aquaculture sub-sector.

(q) Strengthening human resources development, by enhancement of fisheries related technical and vocational training (T-Vet), pre-employment training (PET), and on job training (OJT).

(r) Conducting routine research on marine and freshwater habitats for fish species identification and stock assessment.

(s) Enhancing research activities in support of fisheries management and development.

(t) Conducting research in conservation and protection of enlisted endangered aquatic species and their habitats.

(u) Strengthening development and research by promoting cooperation with international and regional scientific and best practice organizations.

(v) Facilitating export of fishery products in accordance with the regional and international market requirements, and in compliance with Sanitary and Phyto-Sanitary (SPS) agreements and standards of the World Trade Organization.

(w) Monitoring and controlling the production and processing of fishery products in line with the food safety standards of importing countries, and as documented in the official control manual of Department of Fisheries.

(x) Providing technical assistance to Small and Medium Enterprises for the improvement of quantity and quality of fishery products.

(y) Ensuring maintenance and enhancement of the capacities of Laboratories recognized by international ISO: 17025 certification for control and inspection of quality fishery products.