Building Capacities of Fisherfolk Families to Use Local & Traditional Knowledge in Promoting Climate-Resilient Fisheries Resources Management

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INTRODUCTION

The 21st century is characterized by what is considered an irreversible phenomenon – climate change. Driven by incessant anthropogenic activities that has caused damage to the natural environment, warming temperatures, rising sea levels, and loss of biodiversity have alarmed scientists and conservationists over the years. Mangrove rehabilitation is an approach currently considered to be necessary in mitigating climate change. Mangroves are a diverse ecosystem found between terrestrial, estuarine, and marine systems in coastal zones (Spalding et al, 2010). The Philippines is considered one of the top 15 most mangrove-rich countries (Long & Giri, 2011), housing at least 50% of 65 known species of mangroves in the world (Primavera et al, 2004). Along with coral reefs and seagrass beds, these marine habitats provide ecosystem services to more than half of the Philippines' 1,500 towns and 42,000 villages (Primavera & Esteban, 2008, and Garcia et al, 2013). In the early 1900s, natural mangrove forest in the Philippines spanned 400,000-500,000 hectares, but only a remaining 25% is reported last 2008 (Asian Development Bank, 2014). They support livelihoods of coastal communities through provision of food and raw materials (Barbier et al, 2011). Mangroves are a source of plant products used as food, medicine, and forest products. They also serve as nesting grounds for birds and nurseries for marine organisms like fish and other mollusks (Garcia et al, 2013). Another valuable ecosystem service that mangroves provide are regulating services. These include *"coastal protection from typhoons and storm surges, erosion control, flood regulation, sediment trapping, and nutrient recycling"* (Primavera, 2008, Camacho, 2011). Moreover, mangroves protect coasts against rising sea levels and saltwater intrusion, and minimize siltation of eroded soil from the uplands, both of which are impacts caused by climate change (Camacho, 2011).

Mangroves are known to be excellent carbon sinks— capable of storing more carbon than it emits. Philippine mangroves have a total biomass of around 401.8 ton ha^{-1}, storing about 176.8 ton ha^{-1} of carbon (Lasco and Pulhin 2000, cited from Camacho 2011). Located along the tropical and subtropical coastlines, mangroves play a huge role in the carbon sequestration process, having the capacity to remove and store carbon from the atmosphere in equal and almost higher rates compared to forests (Donato et al, 2011). However, despite the benefits displayed by the mangrove ecosystem, considerable decrease in cover has been observed over time. Back in the 1920s, an estimated 400,000 to 500,000 hectares of cover was recorded. This declined to 120,000 hectares in 1994 (Garcia, 2014) before increasing to about 247,362 hectares in 2007, as reported by the Forest Management Bureau (Buitre et al, 2019). The average yearly loss of 0.3% was lower

than the global observed decline (-1.9%), but is still a considerable loss in mangrove cover in the Philippines.

The most common threats faced by mangrove ecosystems in the Philippines include aquaculture development, conversion to agriculture, urbanization, industry, and settlement, cutting of timber, and use of mangroves for fuel, and charcoal (Garcia, 2014). Aquaculture remains a major cause of mangrove decline. Half of the mangroves lost from 1951 to 1988 were developed into culture ponds (Primavera, 2000) for production of fish, shrimp, and other marine and aquatic resources. This practice not only decreases the mangrove area, but pollutes the ecosystem with effluents. Operation only lasts for about three to ten years before production declines and abandonment occurs, leaving the area behind polluted. Mangrove areas in the country will continue to decline if the practice of abandoning culture ponds and converting mangrove areas for new ponds continues (Garcia, 2014). The proximity of mangrove forests to population centers also make them ideal sites for sewage disposal, settlement, and industry development (Valiela et al. 2001). Due to its physical properties, mangroves are also preferred alternative fuel and construction materials. Its wood burns hot and evenly, ideal for domestic cooking. However, illegal and unregulated harvesting may cause considerable decrease in mangrove cover, compromising other benefits that may be derived from it.

Legislation pertaining to mangroves and associated activities are mainly issued by the Department of Environment and Natural Resources, the Department of Agriculture, and the Bureau of Fisheries and Aquatic Resources. It was only during the 1980s when Philippine laws covering mangrove areas were revised, separating mangrove conservation activities from more general forestry activities (Primavera, 2000). Subsequently, mangrove reforestation projects grew in the Philippines. Community-led projects started as early as the 1930s–1940s in Negros Oriental, and the 1950s–1960s in Bohol, while government-sponsored mangrove reforestation projects started in the 1980s. These projects are initiated mainly in the Visayas region, where islands are more frequently affected by typhoons, and thus, are vulnerable (Primavera, 2000). Since then, mangrove rehabilitation efforts have grown in the country, accompanied by studies that highlight the many ecosystem services it provides (Dimalen, 2019, Bigsang, 2016, Menendez et al, 2018).

Community participation is a key strategy in natural resource management efforts around the world. Participatory management acknowledges that both environmental and social concerns can be addressed collectively. A people-centered approach practiced in the Philippines is

community-based natural resource management. It “focuses on the collective management of ecosystems to improve human well-being”, and “aims to devolve authority for ecosystem management to the local (community) level, thereby empowering communities to manage their own resources without permanently damaging, depleting or degrading them” (Fabricius & Sollins, 2007). It puts the community as main stewards for managing resources around them. Both men and women, individuals, families, and leaders form a community. Having resided in the area for a considerable period of time, and whose livelihoods are dependent on their surroundings, the community recognizes the importance of and the benefits derived from the environment. They are also able to identify the issues that affect them and their surroundings, and possible solutions to these issues. Through partnership with various stakeholders, issues can be addressed through policy reforms, education, networking, to name a few. People’s participation is also shown to increase social capital, furthering social ties, forming stronger trust, and providing more access to both resources and information (Valenzuela, 2020). In case studies specifically on mangrove rehabilitation, likelihood of success is also influenced by the involvement of local people in management (Camacho et al, 2020).

One of the identified challenges both in the global and local scales is climate change. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as “a change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable periods of time” (UNFCCC, 1992). Last September 2015, the Philippines, together with other UN Member States, committed to achieving the 17 Sustainable Development Goals by 2030. These global goals address challenges faced by the current generation including poverty, environmental degradation, and inequality, to name a few. One of the global goals, Goal 13: Climate Action, necessitates urgent action to combat climate change and its impacts. Its targets include strengthening resilience and adaptive capacity to climate-related hazards, integration of climate change measures to policies, and improvement of human and institutional capacities on mitigation and impact reduction (United Nations, 2015).

While a global approach to mitigating its effects show promise, local efforts are equally necessary within the community to be able to mitigate and adapt to climate change. For these measures to be effective, it should acknowledge “multiples ways of knowing environments, of living in places and of imagining the future which are embedded in local cultural practices and knowledge-making traditions” (Hulme 2010). Such is the local ecological knowledge possessed by

community members who live in coastal areas. Local ecological knowledge (LEK), also referred to as traditional ecological knowledge (TEK), or local knowledge, refers to "the knowledge and know-how accumulated across generations, and renewed by each new generation, which guide human societies in their innumerable interactions with their surrounding environment" (Nakashima et al., 2013). TEK specifically, refers to "a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relation of living beings (including humans) with one another and with their environment" (Berkes et al, 2000), highlighting the continuity of passing knowledge and adapting practices to generations through culture and local life. This form of understanding the environment, as opposed to western scientific methods, is also considered a "way of life", an expression of culture and tradition (Hosen, 2020). Similarly, local ecological knowledge is acquired by an individual through experience and observations of the environment (Berkstrom, 2019).

The town of Kabasalan in the province of Zamboanga Sibugay is home to hectares of mangrove forests that have been present since the 1970s. Despite the apparent destruction of the mangrove area in the past and the challenges the community faced, rehabilitation efforts by family farmers and organizations proved successful, and is now considered one of the best practices in the conservation of natural resources in the Philippines. The establishment of a community-based organization, use of their local knowledge about mangroves, and consultation and support with various stakeholders in the government and the academe resulted to a successful and recognized conservation effort. This paper outlines the timeline and experiences, including the processes undertaken in the mangrove rehabilitation efforts of Coalition of Municipal Fisherfolk Associations of Sibugay (COMFAS) the Sibuguey Bay area. It aims to:

1. Document and provide a comprehensive narrative of the mangrove rehabilitation efforts in Zamboanga Sibugay;
2. Identify and document local ecological knowledge and practices that aid communities in conservation and rehabilitation efforts;
3. Come up with key recommendations and challenges on how fisherfolk families and organizations can raise greater public awareness in sustainable fisheries resources management

The results of the study will inform COMFAS members, leaders and staff and feed the orientations to support investments at farm/family level and on policy choices for the agricultural/fisheries sector. The information will also be useful in strengthening the knowledge and capacities of family farmer organizations in sharing their stories and own solutions to the climate crisis.

METHODS AND MATERIALS

Study Area

Sibuguey Bay, part of the Moro Gulf in the larger Celebes Sea, is a tuna-fishing ground located in the province of Zamboanga Sibugay in Southern Philippines. Zamboanga Sibugay lies in the Zamboanga Peninsula in the western portion of Mindanao, the second largest island in the Philippines. The bay is surrounded by the LGUs of Tungawan, Roseller T. Lim, Ipil, Naga, Kabasalan, Siay, Payao, Alicia, Mabuhay and Olutanga, 10 of the 16 municipalities in Zamboanga Sibugay. The province is home to 633,129 individuals (2015 official census). Ipil is the most populated municipality, and is also the capital of the province.

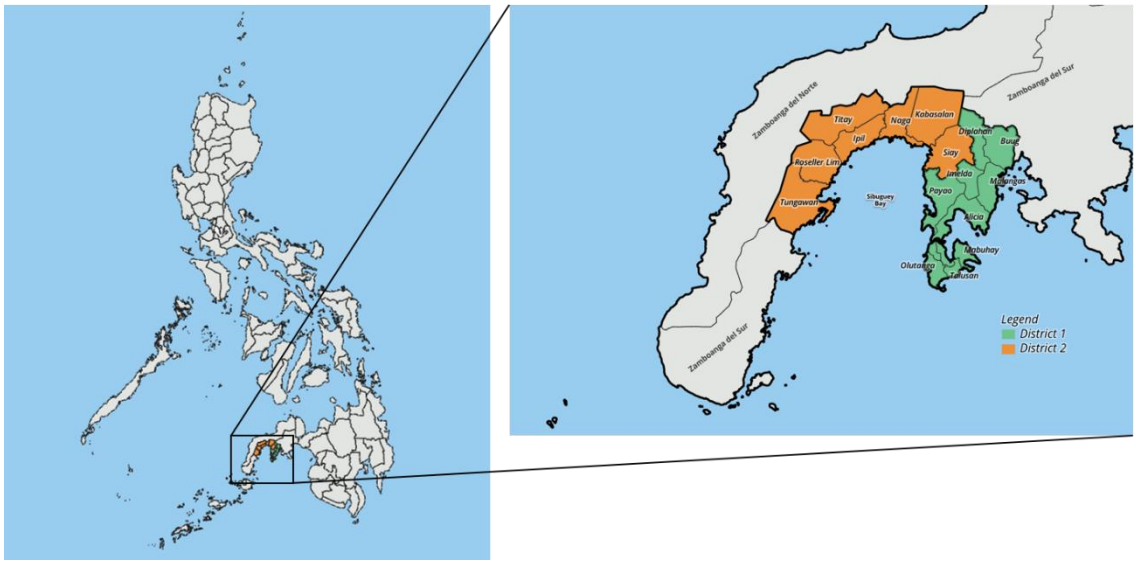

Figure 1. Location and map of Zamboanga Sibugay

Zamboanga Sibugay has two legislative districts. The first district is comprised of the municipalities Alicia, Buug, Diplahan, Imelda, Mabuhay, Malangas, Olutanga, Payao, and, Talusan. Among these, only Diplahan and Imelda are not involved in the mangrove rehabilitation activities, as they are both landlocked municipalities and are more distant from the coasts. The second district is comprised of the municipalities of Ipil, Kabasalan, Naga, Roseller Lim, Siay, Titay, Tungawan, and among these, only the municipality of Titay is not involved with the replanting efforts as it also has no direct access to the coastal area.

Various marine ecosystems can be found in the province. It is also known to be one of the top producers of fish and seafood products including oyster, crustaceans, and seaweeds in the Philippines and in Asia. However, illegal fishing and habitat destruction resulted to a decline in fish

catch in the 1990s. It is also home to the fisherfolk's mangrove reforestation efforts. Around 12,000 hectares are under the conservation and protection of the federation, and efforts continue to date to reach a target of 16,000 hectares – the original expanse of the mangrove forests before mangrove clearing and conversion to fishponds became rampant in the area. The loss and destruction of these coastal and marine resources threaten the food security and livelihood of the coastal community and residents of Zamboanga Sibugay.

Zamboanga Sibugay is also a flood-prone province. Rivers that traverse populated areas flow to the sea, and upstream cause damage to agricultural crops and flooding in coastal towns during the rainy season [July to October]. Mangrove deforestation and destruction of other coastal habitats in the 1980s to 1990s aggravated this problem. The continuous sea level rise and resulting from climate change also further increases vulnerability of coastal populations from floods and storm surges.

The town of Kabasalan lies between the 10 municipalities in Zamboanga Sibugay surrounding the bay. It has a population of 44,336 (2015 official census). It is home to fisherfolk who organized themselves with the vision of *"A Self Sufficient and Resilient Fisherfolk of Zamboanga Sibugay Sustainably Managing and Protecting the Coastal Resources and other Environmental Habitat for the Benefit of the Next Generation*". In 2014, they were officially recognized as the Coalition of Municipal Fisherfolk Association of Zamboanga Sibugay, or COMFAS.

Data Collection

The study employs various qualitative data gathering methods to comprehensively document the history of COMFAS and the mangrove rehabilitation efforts that have taken place since the organization's inception. An interview guide was prepared based on secondary data collected from the site and about the organization. Through a combination of Key Informant Interviews and a Focus Group Discussion, data on local ecological knowledge, community efforts, and the role of stakeholders were gathered and compiled. Participatory Action Research also enabled COMFAS and stakeholders to tell their stories on the mangrove rehabilitation and the role they played on rehabilitation efforts.

The interview guide incorporated questions on the beginnings of COMFAS and the mangrove rehabilitation efforts to help provide background and context to the current situation of the community. Included are questions on the issues they currently face, their perceived role in the rehabilitation efforts, and their observations, local knowledge and practices. Since the initiative has taken a multi-stakeholder approach, all informants representing the various groups and government offices were requested to share the role of their respective offices. The interview ended with questions related to social dimensions of conservation, such as their motivation for participation, perceived benefits, understanding of the importance of mangroves, and their vision for the federation and their families in the future.

A focus group discussion and several key informant interviews were conducted from August to September 2020. Informants include COMFAS leaders, representative from women and youth from COMFAS, representatives from the Department of Environment and Natural Resources Community Environment and Natural Resources Office (CENRO), Municipal Environment and Natural Resources Office (MENRO), and the Provincial Environment and Natural Resources Office (PENRO), a representative from Department of Agriculture- Bureau of Fisheries and Aquatic Resources (DA-BFAR), a representative from Municipal Agriculture Office (MAO), Fr. Larry Helar from the Diocese of Ipil, and a representative from Xavier Agriculture Extension Services Foundation, Inc. (XAESFi). KIIs were carried out by the onsite Community Organizer.

RESULTS AND DISCUSSION

COMFAS and the beginnings of Mangrove Rehabilitation

In the early 1970's to 1980's, mangroves were huge and plentiful in Zamboanga Sibugay, which was then still considered part of Zamboanga del Sur as a separate district. Endowed with natural resources and beauty, its waters were clean, and surroundings green. Rivers were suitable for swimming and washing clothes, and seas were abundant with fish and marine plants like seagrasses. Zamboanga Sibugay boasted of its sand bars, beaches, rivers, falls, caves, and various species of plants, animals and birds. One can catch countless fish including wild milkfish (bangus) and wild crabs within just two hours of fishing. Fingerlings were abundant and nobody bought them because one can just catch them for free. Aquaculture was not prevalent then.

It was in the mid to late 1980's that marine resources started to decline due to massive mangrove cutting for charcoal and construction use and fishpond conversion. Coastal areas remained unpolluted; however, illegal logging and mangrove conversion into fishponds were already widespread. In the mid 1990's, fisheries declined and fishing communities struggled. Some fishermen resorted to illegal fishing activities like cyanide and dynamite fishing just to increase their catch, while others migrated to urban areas to look for work. Environmental degradation was already evident. Due to the increasing conduct of illegal activities and the necessary government intervention required to address them, residents of the third district of Zamboanga del Sur opted for the creation of a new province, and succeeded in 2001 as the province of Zamboanga Sibugay was finally inaugurated. However, environmentally-detrimental activities continued from 2003-2005, and surroundings of municipalities in the area were polluted due to improper solid waste disposal.

The seemingly irreversible and depleted state of the coastal areas, especially the mangroves, triggered the need for conservation. Mangrove forests were already denuded due to massive conversion and development into fishponds. Illegal cutting of mangrove trees for firewood/charcoal and housing materials use aggravated this. The decline in fish catch and observed loss of some species of shells, crabs, and oyster (talaba, etc.) resulted from mangrove deforestation and pollution of the coastal area. Eventually, catch and income derived from fishing were not enough to support their families, triggering the need to revisit their experiences and practices that may have led to these effects.

The history of Zamboanga Sibugay's mangrove rehabilitation efforts is closely intertwined with that of the establishment of COMFAS. The Catholic Church has always been proactive in the development of the people, management of the environment and in addressing the issues, concerns, and problems confronting society. Through its Social Action Ministry and Chapel (Kapilya) approach in integrating with the community, the church conducted Basic Ecology Seminar (BES) in 1989 at barangay Concepcion, Kabasalan where Fr. Larry Helar served as parish priest. Roberto Ballon (Ta Dodoy) was a youth leader at that time, and his family, friends, and the entire community were very involved with the chapel's activities. After the BES, a series of trainings and seminars followed and deepened their understanding of the importance of protecting, conserving, and managing the environment, especially the different ecosystems that support life.

Through raising their awareness and developing their critical thinking, they found out the need to group themselves into an organization in order to address the problems of their community. This motivated the fisherfolk in barangay Concepcion to form the Kapunongan sa Gagmay'ng Mangingisda sa Concepcion (KGMC) in 1986. At that time, mangrove forests were almost denuded, income of the families was already low, and illegal activities were prevalent. They had witnessed and experienced the effects of the activities around them and realized that as a group, they can do something to improve their situation.

KGMC spearheaded various environmental protection and management activities which were known to many people's organizations (POs) in the entire Zamboanga Sibugay. One of its first few activities was planting 50 hectares of mangrove trees. Members used their own money and resources for food and gasoline during the initial planting activities, but were not compensated by the LGU as they expected. KGMC started with 36 members, but over the years, went down to 18 and eventually to only 3-5 members (including Ta Dodoy). In 2001, the XAVIER Extension Services (XAES) with its Western Mindanao Coastal Integrated Program (WMCIP) funded by Department of Agrarian Reform (DAR) reorganized the KGMC. WMCIP covered 20 barangays and organized POs from barangay Buluan in Ipil up to barangay Concepcion in Kabasalan. One of its projects included the "one peso for one planted mangrove" project. Ta Dodoy was elected as chairperson of the organization and membership rose to 231. KGMC was strengthened with technical and financial support from XAES (now Xavier Agriculture Extension Services Foundation Inc. or XAESFi) on organizational development, livelihood, and mangrove protection and reforestation. It was in 2000 until 2003 that massive mangrove rehabilitation occurred. Even after the program's termination in 2003, mangrove rehabilitation was continued by the POs with

unrelenting support from XAESFi. It also assisted in providing diversified livelihood to fisherfolk to augment income lost from destructive fishing activities. In 2007, KGMC continued with mangrove reforestation activities, and began capacity-building activities two years later. In the succeeding years, government agencies like the Department of Environment and Natural Resources (DENR) implemented programs in line with the mangrove rehabilitation efforts. From 2012-2013, KGMC was able to again access funds for mangrove reforestation as the beneficiary of sports activities. Funds came from the proceeds of registration from marathon participants.

Table 1. Notable events in COMFAS' mangrove rehabilitation efforts

Period	Event
1980s	Observed decline of mangrove forest cover along forested areas in Sibuguey Bay
1986	Formation of the Kapunongan sa Gagmay'ng Mangingisda sa Concepcion (KGMC)
1990	Entry of Integrated Social Forestry (ISF) Program in Zamboanga Sibugay. It aims to provide forest land occupants with secure access to land as well as technical and material aid to make the land productive whilst conserving it
1996	Recorded collapse of prawn industry in the province, followed by emergence and development of mud crab farming
1997	Entry of Coastal Environment Program in the province
2000- 2003	KGMC began massive mangrove rehabilitation
2001	Zamboanga Sibugay was finally recognized as a separate province through a plebiscite
	Entry of the Western Mindanao Coastal Integrated Program (WMCIP) in Sibugay Bay area
2005	KGMC first observed results of their replanting efforts and proceeded to conduct massive coastal rehabilitation
2006	The Zamboanga Sibugay Coastal Resource Management Summit was held in Ipil, Zamboanga Sibugay where parties signed a joint declaration of support for the protection and proper management of Sibuguey Bay and part of the Dumanquillas bay.
2007	KGMC became an outstanding participating PO for the entire Sibuguey Bay in a mangrove rehabilitation project by XAES and Philippine Tropical Forest Conservation Foundation, Inc (PTFCF)
2009	KGMC began capacity-building activities
2011	Entry of the DENR National Greening Program (NGP) in Zamboanga Sibugay
2012- 2013	Proceeds of 2012 and 2013 Condura Skyway Marathon (CSM) were used by KGMC to replant 20 hectares of mangrove forest
2013-2015	Entry of the BFAR Mangrove Rehabilitation Program - Philippine Aquasilvi Culture Program anchored to the NGP

2014	COMFAS was formed and officially recognized
2016	COMFAS was able to establish 1,200 hectares mangrove forest with corresponding close monitoring and protection
2017	Ratification of the Unified Ordinance for the Management, Conservation, Utilization and Protection of the Coastal and Marine Resources of Kabasalan, Zamboanga Sibugay
	Entry of the Community Based Forest Management – Comprehensive Agrarian Reform Program (CBFM-CARP)
	The success of KGMC/ COMFAS' mangrove rehabilitation and protection became an added national landmark of the DENR National Greening Program
2020	COMFAS officially filed for a CBFM application with the DENR to have tenurial rights over the rehabilitation area

KGMC was looked upon as a model organization due to its strong advocacy for environmental protection and management. Meetings and consultations became a venue where POs shared their problems and concerns on rampant illegal fishing and degraded coastal habitats. In fact, because of KGMC's noted achievements, Ta Dodoy received an award as Outstanding Fisherfolk in 2006 from the National Government. But in 2014, KGMC realized that it cannot protect and rehabilitate the entire mangrove areas in the province by itself. With the help of XAES, KGMC initiated the consolidation of different people's organizations in the barangays and municipalities into one federation.

Thus, the COMFAS was created, comprising of small fisherfolk associations from the coastal municipalities of Zamboanga Sibugay. Formed through a consultation of different fisherfolk POs in the province, its primary purpose is to consolidate efforts in mangrove protection and rehabilitation and to address issues on coastal water pollution, illegal fishing, and livelihood. They also shared one vision of "family food forever". The creation of COMFAS was drawn from the successes of KGMC's initiatives, which paved the way for accessing various support from LGUs, government agencies and donor institutions. COMFAS is composed of 56 barangay-based organizations, with members coming from the municipalities of Tungwan, R.T. Lim, Ipil, Naga, Kabasalan, Siay, Payao, Alicia and Olutanga, a new member municipality with 17 barangay-based organizations. There are also indigenous people (IP) member organizations from the Subanen and Samal people.

In resolving their priority problems and concerns, COMFAS' initial step was to establish strong partnership with Xavier Agriculture Extension Services Foundation, Inc. (XAESFi), Barangay, Municipal and Provincial Local Government Units (B/M/PLGUs, including PENRO, PAO, MENRO and MAO) and concerned government agencies (i.e. DA-BFAR, DENR-CENRO, DOH-MHU/RHU), to access support in organizational development, technical capacity, and livelihood and enterprise development. COMFAS has lobbied for its inclusion in the membership of Barangay, Municipal and Provincial Development Councils (PDCs) and special bodies. It has also lobbied for the active enforcement of ordinances and environmental laws.

COMFAS developed and practiced their own techniques in planting mangroves. Nurseries are established first before planting mangroves. They do not introduce new species in areas where other mangrove species have indigenously or normally grown. They also use Bakawan propagules as sticking materials or markers. Bamboo eventually rots, generating waste in the water. This technique would minimize spreading decayed materials in the coast. Another aspect that makes COMFAS' environmental management unique is the collective approach instead of addressing environmental problems/issues individually. Within the organization itself, leadership is based on commitment with no personal interest. Visionary and strong leaders that can direct and manage their own organizations are chosen to lead the organization. Leaders and members are fisher farmers themselves, and therefore understand one another and share the same values and aspirations for the sector. Their "family" approach in conservation is also a unique and defining quality of COMFAS. Everybody in the family is involved, and planting mangroves is a family affair.

The federation adheres to strict policies, guidelines, and standards in the management of the organization/federation. If there are mistakes or discrepancies (especially among the leaders), action is immediately taken to address them. Monitoring and evaluation is regularly conducted in the implementation of the projects. It also works closely with the government to implement their projects successfully. Instead of criticizing the LGUs and concerned government agencies, it established strong partnership/collaboration with them, and influenced policy makers by joining the municipal and provincial development councils and special bodies such as Local Health Board (LHB), Local School Board (LSB), Local Peace and Order Council (LPOC), People's Law Enforcement Board (PLEB) and Local Pre-Qualification, Bids and Awards Committee (LPBAC). Above all, COMFAS has practiced a democratic, consultative, and participatory decision-making leadership/management. The organization has also initiated efforts on organizational development, policy support, enforcement of laws, and information, education, and

communication (IEC) campaigns to strengthen its environmental management, specifically mangrove conservation and rehabilitation. These include establishing strong partnership with stakeholders to provide capacity building and technical and livelihood assistance to its members. It has also lobbied for the enforcement of ordinances and environmental laws, and passed resolutions related to environmental protection to the Sangguniang Bayan (SB) and Sangguniang Panlalawigan (SP). It has provided capacity enhancement trainings/seminars on environmental laws and the fisheries code, and leadership and technical assistance on mangrove management to its member POs, and conducted massive IEC to communities and schools.

COMFAS believes that they are successful in rehabilitating the mangrove areas within their municipalities and in the entire province because denuded forests before are now thriving again. For example, in Ipil, mangrove forests are already protected and maintained in the barangays of Buluan, Makilas, Caparan, Tiayon, Magdaup, Sanito, Pangi and Upper Pangi. The rehabilitation was worth the time and costs invested especially now that some species are already reappearing. In 2018, abandoned fishponds and vacant mangrove areas were already fully replanted in District 2 of Zamboanga Sibugay, while still ongoing for District 1 due to the number of abandoned fishponds.

Illegal activities are very rare and immediately apprehended. In fact, to strengthen protection efforts, COMFAS and XAESFi organized Bantay Mangrove in 2016, recognized by the LGU of Ipil. Due to the increasing environmental, political and socio-cultural awareness of the fisherfolk, behavior change from illegal to legal fishing activities has also been apparent through the years. This did not only further unify the members towards their cause, but improved economic conditions of their families. Members were able to develop soft skills like financial management, and hard skills like planting mangroves and aquaculture and farming techniques, all of which can help increase their income while maintaining ecological integrity. Since family income has also improved, and a number are now able to send their kids to college (two out of five children), unlike before when they can only afford to send their kids until high school. College scholarships are also available for the member's children.

Issues and Challenges

The successes of COMFAS are not without challenges. The members and the leaders addressed environmental, institutional, and organizational concerns as they realized their vision. Illegal activities that cause harm to the environment persisted even before the official recognition of COMFAS, and some, although efforts have been made to address them, still exist.

Destruction of Mangrove Areas

The widespread conversion of mangrove forests to fishponds and seaports in the 1970s-1980s is the main reason for rapid decrease in mangrove forest cover. Illegal cutting of mangroves for housing materials and charcoal/firewood was also rampant prior to the start of rehabilitation efforts. Although now members of COMFAS, some fishermen were involved in illegal cutting of mangrove as their source of livelihood in the past.

Coastal Pollution

Coastal areas and the mangrove forests have also been severely affected by activities occurring in upland areas and in households. Effluents from widespread chemical-based farming in the uplands pollute coastal waters. Illegal logging, quarrying, and slash and burn farming (kaingin) also cause siltation in the rivers in Sibugay, eventually leading to sedimentation in coastal areas. Mismanaged fishponds lead to eutrophication in coastal waters. Such is the example of the collapse of the prawn industry in 2000, when production declined due to a disease caused by excessive use of cyanide in the fishponds.

The increase in population in coastal areas also contribute to coastal degradation. The lack of toilets in fishing households, weak implementation of the Integrated Solid Waste Management Act (RA 9003), and the absence of a sanitary landfill in the province lead to improper disposal of solid waste primarily in the bay and adjacent coastal areas.

Illegal Fishing Activities

Fishing is the main source of income for coastal communities along Sibuguey Bay, however, observed decrease in fish catch has largely been attributed to illegal fishing activities. Unregulated fishing activities and non-adoption of the LGU's good coastal resource management (CRM) practices has led to overfishing. Dynamite and cyanide fishing persisted until early 2010, while encroachment of commercial fishing vessels in municipal waters, and illegal fishing practices like bottom trawling and use of fine mesh nets are concerns that municipal fishermen still raise to date.

Institutional Arrangements

In the past, low environmental knowledge, and awareness on environment and fishery laws partly contributed to the proliferation of environmental problems. Communities are now more informed, however, the weak implementation of existing laws and policies, including bureaucratic processes, hinder the community's capability to fully conduct its plans and activities for mangrove rehabilitation. Specifically pertaining to the coastal environment, the LGU lacks legislation and implementation of environmental laws and policies. One of the challenges mentioned by the stakeholders is the lack of an action plan on environmental protection and management at the provincial level. Even with the existence of inter-LGU environmental, zoning, and fishery ordinances and laws, weak enforcement limits the capacity of all stakeholders in fully participating in conservation activities.

Proliferation of Fishponds

The renewal of Fishpond Lease Agreements (FLA) for another 25 years also poses a threat to mangrove rehabilitation. These fishponds have been abandoned for years, however, when owners continue to pay taxes, the area is effectively excluded from reforestation, and mangrove trees are allowed to be cut. In some cases, FLA renewal is granted without field validation, causing massive cutting of mangrove trees. Another problem is the lack of monitoring of fishpond operations and abandoned fishponds. A tripartite team composed of the LGU, BFAR, and DENR is responsible for conducting joint inspection, but this has not been exercised. The municipality of Siay has the largest recorded active fishpond area, spanning 1,107 hectares, followed by Ipil at 796 hectares, Naga at 644 hectares and Kabasalan at 638 (data from BFAR IX). These municipalities are all located in the heart of the bay area and in District 2 of the province, slowing down replanting efforts in the district.

Lack of Coordination

Some government agencies also do not coordinate with LGUs in implementing projects in the municipality. This causes problems like cutting of mangroves for tourism and road purposes. Mangrove rehabilitation is successful but faces many challenges especially with infrastructure-related programs of the government that sometimes do not harmonize with environmental protection activities spearheaded by POs.

Climate Change

Continuous warming of the seas also pose a threat to the fishing community of Zamboanga Sibugay. Fishermen have noted a change in the spawning period of their target species from March to August. Typhoons have also been more frequent compared to two decades ago, and strong winds and tides are more pronounced. Calamities also cause flooding to low-lying and coastal communities. Sea-level rise is a noticeable effect of climate change, and necessitates coastal families to maintain safer homes by constructing higher and sturdier houses to protect them from strong rains, winds, tides, and flash floods. The same goes for maintenance of fishponds and fish cages, which often become flooded due to rising sea levels and strong waves brought about by typhoons.

Stakeholders in Mangrove Rehabilitation

As evidenced by the history of COMFAS' establishment and the beginnings of mangrove rehabilitation, various individuals, organizations, and offices have been involved in its different stages – from its establishment to its management. To sustain its efforts, it is important to have a clear understanding of the roles and opportunities for each stakeholder.

A. Coalition of Municipal Fisherfolk Association of Zamboanga Sibugay (COMFAS)

The primary stakeholder involved in mangrove rehabilitation is COMFAS. The members of the organization perform different roles, not only for mangrove rehabilitation efforts but also for conservation in general. They are concerned with environmental protection and management, especially mangrove rehabilitation. They organize internal activities that support members like capacity building through trainings/seminars and technical and livelihood support. They also assist government agencies in conducting IEC on environmental laws and policies, sharing information on sustainable practices, and by performing the role of sea wardens or 'bantay dagat'.

COMFAS leaders concretize the roadmap of the federation towards achieving successful mangrove rehabilitation and environmental protection. They have taken the lead in establishing strong linkages with other stakeholders like XAESFi, DENR, BFAR, LGUs (barangay, municipal and provincial levels), and the PNP to support their initiative. Within the organization, they also build their relationship with younger members to develop

second liners, and involve women with tasks and activities apart from their role of encouraging and leading their families to plant mangroves. Women and youth leaders support conservation activities by lobbying to the LGUs for the delivery of basic services to the coastal communities, like potable water supply and toilet facilities, which can improve not only health and sanitation, but reduce waste pollution as well.

KGMC/COMFAS has helped the LGU and concerned government agencies like the DENR, BFAR, and PNP towards coastal environmental protection and mangrove rehabilitation. Without a strong PO, the government will not succeed in its mandate of environmental protection, conservation, and rehabilitation.

B. Department of Environment and Natural Resources (DENR)

The mandate of the Department of Environment and Natural Resources is to conserve, manage, develop and properly use the country's natural resources. The agency aims to have a productive and sustainable environment that could provide equitable access to the growing population of the country. It devolves its functions to different local government units in the barangay, municipal, city or provincial level through the Community Environment and Natural Resources Office (CENRO), Municipal Environment and Natural Resources Office (MENRO), and the Provincial Environment and Natural Resources Office (PENRO).

At the community level, DENR CENRO facilitates the strict implementation of environmental laws, especially on the apprehension of violators and deterrence of illegal activities like establishment of fishponds in vegetation areas and entry of claimants to abandoned fishponds already reforested by POs. It also closely monitors fishpond operations and imposes the use of environment-friendly treatment to avoid chemical pollution. DENR-CENRO has the capacity to grant tenurial rights to the community for mangrove protection and rehabilitation.

At the municipal level, DENR assists COMFAS in lobbying to the chief executive for the adoption of mangrove rehabilitation/management as one of the main programs of the LGU. As mandated by Republic Act 7160 or the Local Government Code of 1991, MENRO provides advice to the executive and Municipal Council or the Sangguniang Bayan (SB) on

conservation efforts, including mangrove rehabilitation initiative by COMFAS. It also implements the National Greening Program and the CBFM-CARP, in partnership with COMFAS and other POs in the province since 2011. Similar with the CENRO, it pushes for strict enforcement of environmental and fishery ordinances.

DENR-PENRO in Zamboanga Sibugay is responsible for overall activities related to conservation. This includes constant capacity-building and training of field officers, and IEC campaigns on environmental laws and policies. They also assist LGUs in crafting their respective integrated solid waste management plans, forestry management plans, and protected area management plans. They facilitate the creation of inter-LGU alliances for unified law enforcement. Presently, they help in formulating a province-wide environmental code, which not only addresses threats and issues specific to COMFAS and the mangrove rehabilitation efforts, but general environmental concerns within the province. As the provincial office of the DENR in Zamboanga Sibugay, they coordinate with and lobby at the national level to strengthen law enforcement measures within the province through the creation of an enforcement bureau. This aims to address illegal activities and apprehend violators easily.

C. Department of Agriculture - Bureau of Fisheries and Aquatic Resources (DA-BFAR)

The Bureau of Fisheries and Aquatic Resources (BFAR) is a line bureau under the Department of Agriculture that was reconstituted by virtue of R.A 8550 or the Fisheries Code of 1998. Its mandate is to lead the development, management, and conservation of the country's fishery and aquatic resources. It is also involved extensively in the sector – from research and development, production, processing, and marketing of fishery products, and formulation and enforcement of laws and regulations.

BFAR Region 9 ensures that coastal communities and fisherfolk in Sibuguey Bay area have environmentally friendly livelihood and sources of income. Such is the establishment of a government run hatchery of mud crab (Megalopa) in the mangrove areas. They also encourage adoption of good CRM practices by regulating fishing activities through registration of fisherfolk per LGU. To ensure that conservation measures are recognized whilst supporting fishery-related livelihoods, their office also recommends adoption of good aquaculture practices like regulating the release of wastes from fishponds, and use of nontoxic chemicals in fishpond operations.

The agency's provincial office was most involved in the mangrove rehabilitation in 2013-2015 through its Philippine Aquasilvi Culture Program anchored to the NGP. The DENR national office has also provided an annual budget for mangrove planting and maintenance in Zamboanga Sibugay.

D. Municipal Agriculture Office (MAO)

The vision of Kabasalan's MAO is aligned with that of COMFAS, which is to protect and rehabilitate the coastal environment. It facilitated in the reorganization and strengthening of the KGMC and later on COMFAS, by providing technical and livelihood assistance. As mandated by law, it will continue to facilitate deputization of fish wardens from the fisherfolk sector to enhance enforcement of fishery laws and ordinances. It also continues to lobby to the municipal mayor and other municipal agriculture officers to strengthen the implementation and institutionalize inter-LGU alliances within the Sibuguey Bay area.

E. Parish Church

The role of the church was most pronounced in the beginnings of KGMC and mangrove rehabilitation efforts, particularly in the municipalities of Siay and Kabasalan. It continues to advocate for a clean, peaceful and safe environment for all people. Its various ministries like Social Action, Indigenous People Apostolate, Community-Based Health Program, Youth, Justice and Peace, Family Life Apostolate, and Catechism collaborate with the government, NGOs, and various sectors to discuss the issues and concerns of the province and how to solve them. Through these dialogues, the church has concretely involved itself in finding solutions to the problems of the people. Each ministry has a focal issue that it addresses.

At present, the church has no direct involvement with COMFAS. However, it continues to advocate for environmental protection, conservation, and sustainable development in the province through environmental education and lobbying for policy support. However, each parish's involvement differs, as some diocese are hindered by lack of funding. They continue to support conservation activities in their own ways in their respective municipalities.

F. Xavier Agriculture Extension Services Foundation, Inc. (XAESFi), formerly XAES

XAESFi, more commonly referred to as XAES, is one of the earliest partners of KGMC/COMFAS. It provided technical and financial support, including mobilization efforts in the delineation of municipal waters, conduct of coastal zoning, and lobbying for the enforcement of environmental laws and fishery ordinances. Over the years, it has lobbied at the barangay and municipal LGUs for the formulation of a support policy adopting mangrove areas as protected areas, or non-reactivation of abandoned fishponds already planted with mangroves. One of XAES' main contributions is its baseline study on the contribution of mangroves in the coastal environment and to the communities. Through this, XAES facilitated the mangrove replanting and protection in the province and helped raise the consciousness of the people towards environmental protection.

XAESFi has been with KGMC and COMFAS for two decades. Other conservation activities it facilitates and advocates for include planting of fruit trees and rubber trees in upland areas, enforcement of environmental laws and policies, and the creation of a mixed group composed of CSOs, lawyers, the private sector, and other professionals to help in environmental advocacy in the province. At present, it assists COMFAS in its CBFM application.

COMFAS Initiatives

COMFAS has initiated various efforts in organizational development, policy support, law enforcement and environmental education to strengthen its mangrove conservation and rehabilitation. Their efforts also aim to address the threats to the coastal and marine ecosystem and community.

Residents observed evident decline in catch due to overfishing back in 2010. Various types of fishing activities also proliferated, such as new *look* (stationary bag net), *baklad/bungsod* (fish corral), and *patuloy* (surface-set gillnets). Commercial and illegal fishing (cyanide and dynamite) were also rampant in the entire province. At the municipal level, KGMC passed a resolution for the zoning of the municipal waters. In addition, constant information dissemination and trainings to then violators transformed them and have now become deputized fish wardens (bantay dagat) who assist the LGU in law enforcement. However, solving the problem in Kabasalan alone cannot address overfishing and illegal fishing in the entire province. The formation of COMFAS (from

KGMC) hopes to address this by connecting municipalities and fisherfolk communities with each other.

Waste disposal was also a widespread concern in the province back around the same period. Trash and other solid waste from the rivers piled up in mangrove areas and damaged some trees. To address this, KGMC initiated an activity called “Pera sa Basura” to encourage the residents to collect a sack of solid waste in exchange of one (1) raffle ticket. Raffle tickets were drawn every month for the participants. Alongside this activity, KGMC has conducted massive IEC to fisherfolk and upland communities, including regular coastal clean-ups.

It was not only solid waste that destroyed mangrove areas, but siltation due to eroded soil from upland farms. COMFAS planted mangroves along the dikes of fishponds, riverbanks, and coastal areas to prevent eroded soil from further reaching other mangrove areas. It also conducted environmental education to the farmers and upland residents. COMFAS linked them with the MAO and DA to avail of livelihood assistance and learn more about organic farming, and to the DENR to inform and educate them on the National Greening Program (NGP). Since then, COMFAS has helped both the MAO and DENR in monitoring upland activities. Furthermore, it also passed a resolution to the SB for the regular monitoring of the upland areas and mountains especially in the watershed areas. Aside from pollution in mangrove areas due to siltation, the use of chemical pesticides and fertilizers in farmlands, as well as chemical products in fishpond operations posed harm not only to mangrove trees but also to the species in the ecosystem, all the way to the oceans. COMFAS lobbied to DA-BFAR, the LGU, and DENR-CENRO for the strict enforcement of environmental laws, and to the DA and Provincial Agriculture Office (PAO) on use of organic pesticides and fertilizers as an alternative for chemicals, both for fishpond operators and farmers.

But mangrove areas did not only become basins of litter, but objects of interest to those seeking light construction materials. COMFAS responded to rampant illegal cutting of mangroves by initiating dialogues with violators themselves, and connected them with government offices that can help provide financial support and starting capital to help them engage in more biodiversity-friendly livelihood.

Still, full rehabilitation of deforested areas and abandoned fishponds is not possible unless COMFAS is legally recognized as having rights over the area concerned. To have full rights and

control over the mangrove conservation area, COMFAS has applied for a Community-based Forest Management (CBFM) tenurial agreement with the Department of Environment and Natural Resources (DENR) to have tenurial rights. With funding from the Philippine Tropical Forest Conservation Foundation (PTFCF) and Foundation for the Philippine Environment (FPE) to support the application of CBFM with the CENRO-DENR for the entire 26,000-hectare mangrove areas in the province, COMFAS was able to lodge the application last May 2020. To date, around 10,000 to 12,000 hectares of mangrove areas (including abandoned fishponds) are being protected and rehabilitated by the federation. Seventy percent (70%) of the total mangrove areas has already been surveyed by the DENR, and COMFAS has shouldered survey costs to speed up its application for CBFM. There are 21 barangay-based organizations included in the CBFM application, and 17 of these still need to be registered to the Securities and Exchange Commission (SEC) or Cooperative Development Authority (CDA).

COMFAS has lobbied for its inclusion in the membership of the Provincial Development Council (PDC) and special bodies. Not only has it provided capacity enhancement trainings and seminars on environmental laws and the fisheries code, and leadership and technical assistance on mangrove management to its member POs, but has also conducted massive IEC to communities and schools.

Local Ecological Knowledge

Fisherfolk knowledge about the environment is characterized by their familiarity with marine and other species, and observation regarding changes in their surroundings that they directly experience.

Appearance and disappearance of certain species appear as indicators of environmental change. Prior to the mangrove rehabilitation, there were only seven (7) species of mangrove left. Bakawan (Rhizophora spp.) and Pagatpat (*Sonneratia alba*) were gone. When mangroves became abundant again, 17 species of mangroves reappeared including Bakawan (Rhizophora spp.), Pagatpat (*Sonneratia alba*), Miapi (*Avicennia marina*), Tungog *(Ceriops tagal)*, Tabigue *(Xylocarpus granatum)* and Putotan (Rhizophora spp.). Among these, the major ones in the province are Bakawan, Pagtpat and Miapi. There is however, and observed decrease in Tabigue, which is known to be an ideal material for furniture. There was also noticeable increase number of fish species

such as Kitong *(Siganus guttatus),* Kikiro *(Scatophagus argus)* and Asuos (Sillaginidae spp.). Fish that had disappeared but can now be seen again include Guisao (Mugilidae spp.) and Asuos. Shell species such as Punaw *(Marcia hiantina),* Litob (Anadara spp.), and Burnay also reappeared and some observers described an increase in their numbers, as well as Talaba *(Crassostrea iredalei)* and the indigenous Imbao *(Anodontia edentula).* The salt water crab Lambay *(Portunus pelagicus)* is noted to have also reappear since mangroves have been planted again. One particular species that is distinct is Pahi (Palaemonidae spp.), shrimp family that lives in brackish water as it almost became extinct. In Siay, the parish created a month-long "Pahi-Pahi Festival" to raise the awareness on the status of Pahi and how people can help protect it. This indigenous shrimp species is observed to have reappeared in the brackish waters of Logpond, Siay.

Along with noted reappearances of some species is the absence or change in habitat of others. Birds like Abucai *(Cacatua haematuropygia)* which used to be found in Dona Josefa, Ipil, and doves in Ipil downtown, including species of wild pigs, have now disappeared. Some bird species are also observed to have moved from upland forests to mangrove areas, similar with deep sea fishes now being found in shallow coastlines and beaches.

According to DENR, Sibugay Bay is considered the East Asian Fly Way of migratory birds. Their feeding areas are excluded from mangrove replanting to ensure that flight and feeding patterns are not disturbed. Fisherfolk note appearance of migratory birds from Russia, China, and Australia, as well as the bird Tulabong *(Egretta garzetta)*. Other creatures such as wild ducks, monkeys, and bats are said to have also reappeared in municipalities of Ipil, Tungawan, Siay and Kabasalan.

Apart from these observations is the noted change in the immediate surroundings where they coexist. Climate change, being a major threat in the sustainability of mangrove rehabilitation and fishing livelihood, manifest through the frequent occurrence of typhoons and rains. Zamboanga Sibugay is not located in the typhoon belt area in the Philippines, so strong typhoons like Vinta (2017) and storm surges are unexpected. This flooded the low-lying areas of Kabasalan, took hundreds of lives, and caused damage to properties and farmlands. Coastal erosion brought about by these weather conditions changes the natural landscape of the municipalities near the bay, especially during instances of sea-level rise where families are forced to retreat farther from the coast.

Erratic weather conditions during El Niño and La Niña (extreme dry and wet seasons, respectively), and global heating phenomenon has caused increase in water temperature and death of mangrove propagules in the replanting area. Corals in Buluan Island, a marine protected area adjacent to the coast of Zamboanga Sibugay, are affected by bleaching events. Fish kill is also attributed by the residents to warming waters, while sudden appearance of pests in rice fields and diseases in rice and corn plants and fishes and seaweeds are associated with irregular weather and temperature changes. Onset of wet and dry seasons also do not follow expected months, compared to almost two decades ago.

Knowledge Acquisition and Exchange

COMFAS' long history of working with different stakeholders has enriched their knowledge and understanding about mangroves and the environment in general, and allowed them to share their personal observations as well.

All stakeholders recognize the role and importance of modern technology and the internet in sharing their efforts and best practices for the protection and conservation of mangroves. This is especially true for younger COMFAS members, who are receptive to new information found in digital and social media sites like Facebook and online news channels. For government offices and POs, personal interaction, discussions, mentoring, and seminars still serve as excellent venues for exchange of information and ideas. Traditional communication forms like print media, TV, and radio still also serve as sources of information for the residents, especially older COMFAS members.

Prior to stakeholder engagement, knowledge and awareness of COMFAS members towards the environment were based on their personal observations, experiences, and perceived benefits from the seas. Before KGMC or COMFAS was established, there was little concern on the marine environment, as long as there are fishes that can be caught and sold to the market. Abundance of mangroves makes fishing for small fisherfolk easier since fish can be caught nearby.

From observation and lifetime experience in planting mangroves, members of COMFAS were able to identify which species are best suited for different types of substrates. When planting mangroves, the salinity of the water and the type of substrates present in the area must be

considered in identifying what species are suitable. In Zamboanga Sibugay, the substrate that is common province-wide is the sandy/muddy type, where Pagatpat *(Sonneratia alba)* thrives most. Reforestation practices were enhanced with trainings from DENR, academic partners, and NGOs. Sharing and exchange of knowledge, both local and gained from trainings, have been present within COMFAS since its establishment.

Their understanding of the value of mangroves also come from direct experiences and knowledge sharing with partners. Mangroves protect the communities against strong winds, storm, typhoons, waves and floods. They minimize soil erosion, filter sediments and maintain water quality and clarity. They also help maintain biodiversity of the coastal ecosystems, thereby increasing food supply and income for families. After trainings and IEC campaigns, COMFAS members were able to enhance techniques in planting mangroves, and identify mangrove species and other plants and animals in the coastal area. Further, their relationship with the environment and with other stakeholders has deepened their knowledge and skills on how to protect, rehabilitate and manage it, and how local knowledge and scientific information can be harmonized for this purpose.

CONCLUSION AND RECOMMENDATIONS

Tracing back the beginnings of COMFAS and the mangrove rehabilitation, it is evident that concern for the environment has grown since information about its value and importance was

shared and discussed with the fisherfolk. This led to the development of a relationship with their environment. COMFAS members, leaders, and women and youth representatives consider the environment, especially mangrove ecosystem, as their "true love" because they get their source of livelihood from it. As long as care is put in the management of coastal ecosystems (mangrove, corals, and seagrass), they will survive and will be able to provide the basic needs for their families. The environment does not only support marine species, but supports the lives of the people who depend on it. Rooted with the teachings of the church when KGMC and COMFAS was yet to be established, humans and everything that surround it are created by a higher being with purpose. Superior intelligence is afforded to men to use and manage the resources responsibly without compromising the needs of the future generation. This belief is, in fact, streamlined with the mandate of the DENR of protecting and conserving natural resources for sustainable development.

COMFAS is comprised of members of different faiths, including Muslims and Christians. Some members are also from the indigenous groups Samal, Yakan, and Subanen, which are native in Southern Philippines. Every member has contributed greatly to the success of the federation. Their belief systems, which shared the same God or belief to a higher being (Allah for Muslims, God for Christians and Magbabaya for IPs) also form the foundation and guiding principles of the federation. The common belief that all men and women are created to become stewards of all creations also entails a duty and responsibility to protect and live harmoniously with the environment.

Although faith is one of their motivations for pursuing conservation, COMFAS recognizes that undertakings must be science-based. This is why their partnerships with government offices, and policy support sought include proper zoning and planting of appropriate species in the most suitable substrate. In partnership with XAES during their early years, fisherfolk have recognized their role as stewards of the environment that manage, protect, and conserve it effectively. As mangrove cover declined in the 1980s, population increased over the years. From a very few households, there are now more than 700 households living in Kabasalan alone. Environmental values such as returning what has been taken and taking only what is enough for their needs must be instilled to every member to maintain the biodiversity and abundance of their natural resources.

The efforts and investment towards mangrove rehabilitation have not only improved livelihood opportunities and helped fisherfolk in conserving and protecting the environment, but also helped members of the federation gain knowledge and build new skills. As the scope of the

rehabilitation efforts expand geographically and in terms of management, continuous capacity-building is necessary for members to manage the program better. Below are recommendations for the federation in taking the next steps of their initiative.

1. *Knowledge on Mangroves*

   Additional knowledge about mangroves, specifically on effective management approaches and techniques adapted to the local initiative and replicable to the area is sought by the organization. They believe in continuous learning to upgrade themselves and enhance their knowledge and skills in mangrove protection/rehabilitation. This includes both local and scientific knowledge and observations. Further research and development on seed production areas, nursery techniques, and modern technology and equipment for monitoring the status of replanted mangroves can also improve their rehabilitation efforts.

2. *Building Communication Skills*

   Through partnerships established over the years, COMFAS leaders have shared their experiences in mangrove rehabilitation to various audiences. Their initiatives are also considered one of the best conservation practices in the Philippines. COMFAS members will benefit with added knowledge and skills in communication, such as videography and journalism to be able to document their own activities and experiences to share to others. This would greatly help in their IEC and advocacy campaigns. To become relevant to the needs of the federation and other organizations, other stakeholders like church members should also be upgraded with skills in advocacy and social media management. Especially with the youth being groomed as second liners of the federation, their constant use of social media can be utilized to incorporate conservation goals and build environmental values not only for COMFAS members but for all residents of the province and even the region.

3. *Enhancement of financial management skills*

   Government offices, from the municipal to the provincial level, recognize the need for COMFAS members to enhance their capacity in financial management to develop and establish an internal system and procedure. As the federation is large, and there is a need to find a strategy or mechanism to allocate resources to the member organizations. Training on enterprise development, business management, and marketing will help since COMFAS is now engaging in business and enterprise. Basic skills training for bookkeeping

should be available to all members, and a secretariat in place will help the federation focus on this specific area of growth. Tracking and feedback mechanisms in place will further promote transparency within the federation.

COMFAS must develop strategic programs by areas and develop approaches on how these programs/projects would trickle down to its individual members and help uplift their condition.

4. *Provision of livelihood support*

   Mangrove rehabilitation cannot stand alone if there is no livelihood support for the POs. It is necessary that while POs are doing environmental protection/ conservation/ rehabilitation, they can also survive and meet their daily needs. For the sustainability of the rehabilitation efforts, an income generating fishery-based livelihood, and/or biodiversity-friendly farming culture and production (talaba farming and oyster sauce production) can be implemented. Livelihood activities like mangrove aquasilvi, grouper cage culture, oyster (talaba) farming, seaweed farming, and boneless dried fish production are currently implemented by COMFAS to augment family member's income, while helping minimize overfishing in the municipal waters.

5. *Development of second-liners*

   Since COMFAS is comprised of family fishers and farmers, children or the youth are involved with planting efforts at a young age. Further development of young second liners to have commitment and love for the sector is encouraged to ensure the sustainability of the initiative and of the organization. Households can encourage their children who finish college to help in the recording and financial management of the federation, and even in advocacies and sharing of best practices in various traditional and digital media channels. COMFAS has been leader-centered since its official recognition, and it is now time to look for the younger, second generation, future leaders who will eventually take the role of the current leaders.

6. *Enforcement of fishery and environmental laws*

   Strong implementation of environmental laws was also considered important contributors to the success of mangrove rehabilitation. Mangrove, coral reef, seagrass and estuaries

should be recognized by LGUs as critical habitats and ensure their protection through ordinances. Mangrove replanting efforts can be improved by implementing coastal zoning. Problems like pollution and improper waste disposal should be addressed by stricter implementation of the Solid Waste Management Act (RA 9003). Aside from mangrove conservation/rehabilitation, COMFAS also assists LGUs and the DENR in the enforcement of fishery and environmental laws as most of the members are deputized fish wardens (bantay dagat) in their respective municipalities. For maintenance and protection of the reforested area, DENR needs support from other government agencies (especially from the military and PNP) and LGUs to strengthen law enforcement and provide budget for logistics (gasoline, patrol boat, etc.) for their personnel. Not only should COMFAS members be trained and deputized as fish wardens, but trained as forest protection guards too.

7. *Adoption of a comprehensive management plan*

Although COMFAS is already champion in conservation, it needs a sustainability plan to ensure continuity of the federation and its initiatives. A comprehensive mangrove management plan should be formulated and developed to serve as a roadmap for future related conservation activities not only for COMFAS, but for the LGUs. COMFAS must work with the LGU's system to influence policy makers in mainstreaming their agenda, especially those related to mangrove and environmental protection and management. The establishment of a local mangrove database will also help in knowledge management and transfer to future environmental managers of the area.

COMFAS should also maintain its continued and strengthened partnership with XAES, government agencies, LGUs, academic institutions, private/professional groups, the church, other NGOs and POs, and individuals. Relationship between the different stakeholders, and their role in the conservation efforts should be clear, and a balance on their involvement should be observed, as they have roles that are specific to the needs of the federation. For example, livelihood support plans formulated must always meet environment-friendly standards, and involvement with private groups and corporations should seek advice from non-business or non-enterprise related partners.

8. *Continued involvement in other conservation activities*

Participation is key to commitment. Apart from conserving the mangrove areas, COMFAS is also involved in seagrass and coral reef conservation projects in other municipalities.

Initiated by the LGU in Siay, COMFAS member organizations have also protected and replanted 20 hectares of seagrass since 2013. The nursery techniques they use in mangrove rehabilitation are also shared to different organizations within Mindanao and in other parts of the Philippines.

9. *Tenurial rights over the conservation area*

COMFAS members believe that their organization and their efforts in mangrove protection and rehabilitation would be strengthened especially if the CBFM tenurial rights is finally awarded to the federation. This will ensure that protection of mangrove forest will be continued and sustained.

Future Directions

To the COMFAS members, the environment is part of their lives. They live in the environment, and get their food and source of livelihood from the environment. Mangroves are treasures. They are banks for the poor because keeping them healthy is akin to keeping their own families healthy. Planting is equivalent to saving, and what you get from the sea is the result of years of hardwork and commitment. The benefits members derive now are the same benefits, if not more, that their children will have. Mangroves are also compared to natural treasures that members can bequeath to their children. It is a give and take relationship: maintaining its abundance and biodiversity so that the next generation will inherit a healthy coastal environment and live a prosperous life.

While scientific knowledge has contributed to the understanding of the value of mangroves, local knowledge and moral values have all played a role in the success of the mangrove rehabilitation. Protecting the environment is not only a responsibility of being a COMFAS member and a resident of Zamboanga Sibugay, but a moral obligation. Members strive for a healthy and economically stable family life in a healthy and abundant coastal environment. They envision a future where coastal and marine resources can provide/support the needs of their families, where poverty is reduced among fisherfolk families, and where there is food security. This translates to their vision of *"family food forever*".

Problems are complex, but an efficient leader is able to overcome these intricacies, build a relationship with people, and motivate them for a common cause. Over the years, Ta Dodoy has

exhibited resilience, determination, commitment, and patience, and actively supported COMFAS and the initiative of its member organizations. Such is the relationship built between the federation and numerous stakeholders over the years, driven by a common vision and belief that people are stewards of their environment. Continued partnership is necessary to build the attitudes of the younger and future generations towards the environment, and to adapt to the changing times. Partnership with government agencies, NGOs, LGUs, academic institutions, private/professional groups, and other POs is a contributing factor to the success of the initiative, and has opened doors for knowledge sharing within and outside the federation, opportunities for trainings and seminars, and financial and policy support.

Since COMFAS is already developing young members as second liners, there would be future leaders to replace them as they age, and the organization will live and continue protecting the environment. Families work hard to send their children to school and complete their education, while ensuring that they grow up environmentally-aware and compassionate. The next generation of COMFAS leaders and members will harvest what the present COMFAS leaders sow today. They will be a community of economically stable fisherfolk families living in a healthy environment.

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