

# **SOCIO-ECONOMIC CONDITIONS, MARINE RESOURCES UTILIZATION AND DEMOGRAPHY OF SMALL-SCALE FISHING COMMUNITIES IN PALAW TOWNSHIP, TANINTHAYI REGION**

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## **Abstract**

A socio-economic assessment was conducted in fishing communities of Palaw Township. Key informant interviews (KII) data indicated that the infrastructure at community level was limited in these communities. Most respondents were identified as Burmese and Buddhist. Education attainment levels were higher in household head between the ages of 21-40 years than others and they also had degrees. Fishing was the main source of income for most respondents in these communities but their incomes were not enough for their livelihoods. They faced most difficulties in the rainy season (June-September). The primary occupations of some respondents were inshore fishing, collecting bivalves, fish (buying and selling), agriculture and shop keeping. Groupers, spanish mackerels, silver grunts, rays, sardinella, ponyfish, croaker and anchovy were caught around Anyin-pho, Anyin-ma, Ma-li, Kyunn-hla, Tha-mi-hla, Kyauk-kar, Khan-ti and Lit-ku throughout the year. The high dependence on marine resources at the household and community level perpetuated the threats on marine resources. Most household heads had low awareness of rules and regulations of marine resources. Most households did not want to participate in decision-making to conserve marine resources. Fishermen who had fishing experience answered that there was a decrease in the catch of marine resources at the present period. These small-scale fishing communities are required conservation plans to improve public awareness and to enforce fishery and forestry laws and to select marine protect area (MPA).

**Key words:** Fishing, households, livelihoods, marine resources, Palaw, socioeconomic.

## **Introduction**

Palaw fishing communities are located in Tanintharyi Region, the southern part of Myanmar. In Palaw, fishing is the main economic activity

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with emphasis on different kinds of fish, shrimps, bivalves, crabs, fish paste, dried fish, salted-fish, nypa sap, fermented nypa sap and nypa sugar production. Most people who live in fishing communities of Palaw are depending on the marine resources. Malleret (2004) observed that the most dependent villages on marine resources were seafront and mangrove villages.

A few years ago, marine resources including fish, shrimps, squids, crabs and marine bivalves (*Meretrix meretrix*) were common in Palaw fishing communities. Most local people collected the bivalves and exported dry products to other towns. However, marine resources have been decreasing year after year. As illegal fishing such as trawling and trap boats had entered inshore waters, the habitats where the bivalves lived were destroyed. Holmes *et al.* (2014) observed that fishermen were using inappropriate technologies in certain areas and this can lead to destructive fishing. Trawling was banned within 10 nautical miles of the coastline. Under the 1990 Marine Fisheries Law (amended in 1993), Department of fishery has banned destructive fishing gear, including pair trawling, push-net, electrofishing, and fishing using poisons, chemicals or explosives.

According to socio-economic surveys, semi-structured interview or focus group discussions (FGD) was important to assess coastal habitats and fisheries support systems, human activities and benefits associated with coastal and marine resources in the community. Key informant interviews (KII) data could support community-level demographics, infrastructure, coastal and marine activities and management plans. Socioeconomic information could be used to ensure that the concerns and interests of local communities were taken into account in the management process and to plan and direct education and awareness programmes (Kronen, *et al.* 2007). Socio-economic analysis of fisheries is used to support the conservation and management of fisheries industries, aquatic ecosystems and the people who base their livelihood on the exploitation of aquatic resources (Pinello, *et al.* 2017).

The objectives of the present study were: (1) to investigate the socio-economic context of Palaw fishing communities, (2) to determine the respondents' livelihood strategies, marine resource use, knowledge, attitudes and perceptions, (3) to assess the awareness of respondents on rules and regulations of marine resources and (4) to identify appropriate recommendations for the development of programme strategies and management advice.

### **Materials and Methods**

The socio-economic survey was conducted in two fishing communities of Palaw Township, Shat-pone village (12° 34" Lat, 98° 38" Long) and Palaw (13° 07" Lat, 98° 41" Long) from May, 2017 to May, 2018 (Figure 1). Interview questionnaires were used to obtain socio-economic data about this township. According to random sampling method, 50 households from Palaw and 30 households from Shat-pone village were selected to participate in the survey as respondents. It was important to select the most appropriate sources to obtain the required information. Therefore, interviews were conducted with heads of households HH, or informed household members, fishermen, key informants interviews KIIs (village leaders or seniors and informed members of the community) and groups of community members (men, women, young people, etc.). A data code sheet was developed by the team, and used to code the data uniformly for data entry purposes. Data were gathered using a combination of semi-structured interviews, secondary data collection and field observation notes were used to understand basic demographics (population size, ethnic composition, language, religion, education level, and adult literacy rates), primary and secondary occupation, basic services and infrastructure. Focus Group Discussions were conducted at the community level mainly with people who depended largely on marine resources. The data was entered into MS Excel and analyzed using the SPSS v.19 program.



**Figure 1.** Map showing the study area

## Results

### **Socio-demographic assessment of households**

In the present survey area, almost all respondents spoke in Myanmar. The ethnic groups of household members in these communities were Burmese (about 90%) and Kayin (less than 10%). Mean household size was 5.7 in this area according to the records of the present survey. Almost all respondents of this area were Buddhists. Education attainment levels were higher in respondents between the ages of 21-40 years than others and they also had degrees. Household members above the age of 40 did not pass grades 10-11. According to the overall percentages of school attendees, the formal education levels of the different age groups of household members were not very high (Figure 2).

### **Economic base and livelihood activities**

According to the household occupation and livelihood data from these communities, fishing inshore was the main occupation of the inhabitants and the sole source of income. The primary occupation of household heads included commercial fishing inshore (67%), agriculture (8.5%), fish (buying and selling) (7.6 %), dried fish and fermented fish productions (2.8%),

commercial fishing hook-lines (2.3%), collecting bivalves (10.4%) and shop keeping (1.9% ) (Figure 3). When respondents were asked about the main sources of old household heads' income, much of their earnings came from inshore fishing, collecting bivalves, fish (buying and selling) and agriculture. Hook-lines fishing, commercial fishing inshore, fish buying centers, dry fish and fermented fish production were the primary occupations for young household heads. The age profile and primary occupation of household heads are shown in Figure 4.

In these fishing communities, both men and women involved in fishing. Men caught fish while females dried the small fish or the left-over fish from the nets. The primary occupations of women were fish processing for salted-fish or dried-fish, dried bivalves production, fermented nypa sap, nypa sugar production, agriculture and shop keeping. While fishing was a major part of their livelihood, agriculture was also a secondary component as few families had access to some land, on which they cultivated on a subsistence basis.

The household survey provided the level of dependence on marine resources at the household level. Most fishermen spent 5 to 6 days of inshore fishing per week. A few days were taken off per month at the beginning of neap tide which was not considered a productive period. Most fishermen who owned small boats could not go fishing during the rainy season (June-September). There was a seasonal variation in income with low earnings during the rainy season with rough weather conditions. In the rainy season, about 70% of respondents found it very difficult to make their livelihoods. The results of socio-economic data showed that most fishing households did not get the major source of income from their fishing. This was in part due to the depletion of marine resources.

Material style of life (MSL) data was used in this study to give an indication of wealth across these communities. This indicator used household

assets as indicators of wealth or poverty. The assessment of the survey team found: poor housing status, artisanal fishing boats, lack of sanitary facilities, malnutrition in children, inability to earn enough for food and clothes. The wealth of individual households was determined according to 3 broad wealth classes – well off, moderate and poor. According to the criteria set in this study for wealth indication, the majority of the surveyed households in these communities were classified as poor (60%), moderately well off (25%) and very few households (15%) were qualified as well off.

### **Marine resource use**

The coastal and marine resources data (Coastal habitats and fisheries support systems), fishery resources data (fishing activities, fishing gears, fishing grounds and volume of catch) and marketing orientation were recorded from key informant interviews (KIIs) and focus group discussion (FGD). Fishing methods used in these communities included nets, traps and hook-lines. Fishing was carried out inshore day and night with small motorized boats. The fishing of Indian mackerels, silver pomfrets, tongue sole, shrimps and sand crabs were very common in Palaw waters during the rainy season (May-August). Groupers, spanish mackerels, silver grunts, rays, sardinella, ponyfish, croakers and anchovys were caught around Anyin-pho, Anyin-ma, Ma-li, Kyunn-hla, Tha-mi-hla, Kyauk-kar, Khan-ti and Lit-ku throughout the year (Figure 5). Ponyfish, croakers and anchovys were dried and salted in processing and the final products were exported to other towns. Among commercial species, lobster that was the highest value was caught by nets in deep water. The main fishing area of lobster was around Taung-thon-lon, Tha-mi-hla and Ma-li Islands. Shrimps were caught by three layers gillnet around Anyin-pho, Anyin-ma, Ma-li, Kyunn-hla, Tha- mi-hla, Kyauk-kar, Khan-ti and Lit-ku the whole year (Figure 5). The main fishing areas of sand crabs were Anyin-pho and Anyin-ma and they were caught by bottom net. Squids were caught light-fishing and trapping between October-April. The bivalves (*Meretrix meretrix*) were collected in the sandy bottom of Nan-eain-kan and

they were sold in the market of village. Some fishermen dried them under the sun to get dry products. The dried bivalve products were very popular in Taninthayi region. There were about seven fish buying centers, six dried fish production and eight dried bivalves production in these communities. Fish from fish buying centers were exported to cooling processing companies in Myeik or Thailand. Some fishermen contributed to the regional income by exporting fish, shrimps and lobsters.

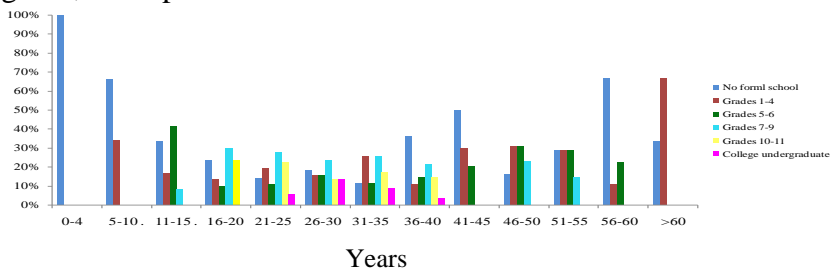


Figure 2. Household members' age and education levels in Palaw fishing communities



Figure 3. Household heads' primary occupation in Palaw fishing communities

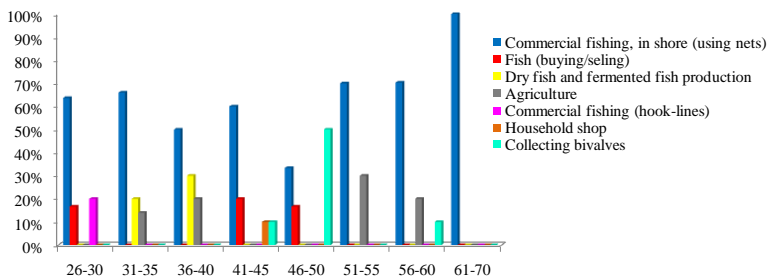


Figure 4. Household heads' primary occupation and age groups in Palaw fishing

### **Perception of resources conditions and perceived threats to coastal resources**

Most local fishermen and trader groups had perceived a decline in the coastal and marine resources. Dependence on marine resources was an indicator of potential threats to marine resources. The relatively high dependence on marine resources at the community level as well as at the household level perpetuated the threats on marine resources. Fifty-nine percentage of respondents perceived that the conditions of mangrove forests were moderate (Figure 6). Some local people converted mangrove to settlement. About 26% of respondents believed the coral ecology was decreased and 63% of respondents considered it was destroyed by illegal fishing activities (trawling or traps fishing) (Figure 7). Most respondents considered the beach condition to be good. There was no beach erosion caused by currents and waves and no pollution in Pho-Shan beach. Upland forests around these communities were cut for residential use in these communities. As different types of sediments deposited in the Palaw River, the depth and width of this river were low and narrow. Many boats faced the difficulties in transportation due to sedimentation in the river. Few local people did sand mining for the use of household. The condition of ground water supplies (rivers and streams) in these communities was considered to be good by the majority of interviewed residents. Some local people encountered the lack of fresh water in summer.





**Figure 5.** Map showing fishing areas in the waters off islands (1) Anyin-pho (2) Anyin-ma, (3) Nan-eain-kan, (4) Lit-ku, (5) Kyauk-kar (6) Ma-li (7) Tha-mi-hla and (8) Kyunn-hla

### **Awareness of rules and regulations**

Respondents of these communities were asked about their awareness of the rules and regulations of marine resources. The awareness of fishing rules was poor. The 38% of respondents were aware of fishing rules and regulations while 62% of respondents did not have this awareness (Figure 8). Awareness of the uses of mangrove was moderate among respondents of these communities. However, 75% of the respondents were unaware of forestry rules and regulations. It could be concluded that the awareness concerning environmental rules of resort/hotel development, residential development, tourism and marine transportation were low in these communities.

### **Attitudes to non-market value of resources/Environmental awareness**

To assess perceptions of non-market value of resources, as well as environmental awareness, respondents were read a series of eight statements, and asked if they “strongly agree”, “agree”, “neither agree nor disagree”, “disagree” and “strongly disagree” or “don’t know” (Figure 9). Attitudes to

the important of reefs for protecting land from storm waves was considerably lower with only 49% of respondents stating either “disagree” or “strongly disagree” and 14% stating neither agree nor disagree. The 67% of households disagreed strongly or slightly to restrict fishing in certain areas for fish and coral to grow and 65% of households also disagreed strongly or slightly to restrict development in some coastal areas as natural environments for future generations. The 60% of households did not have awareness of the importance of mangroves to be protected for fishing. In general, most household heads had low attitudes to environmental awareness.

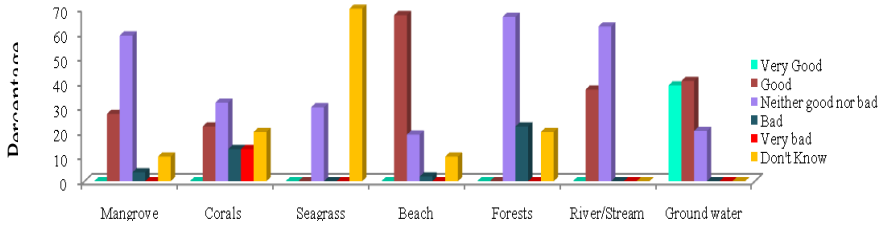
### **Participation in decision-making to manage marine resources**

According to household interview data, most households didn't want to participate in decision-making to manage marine resources. The 35% of household participated in decision-making on fishery resource but the 65% of household didn't participate (Figure 10). So, most people were not willing for participation in decision-making to manage fishery resources. Currently, most respondents didn't desire to participate in mangrove management.

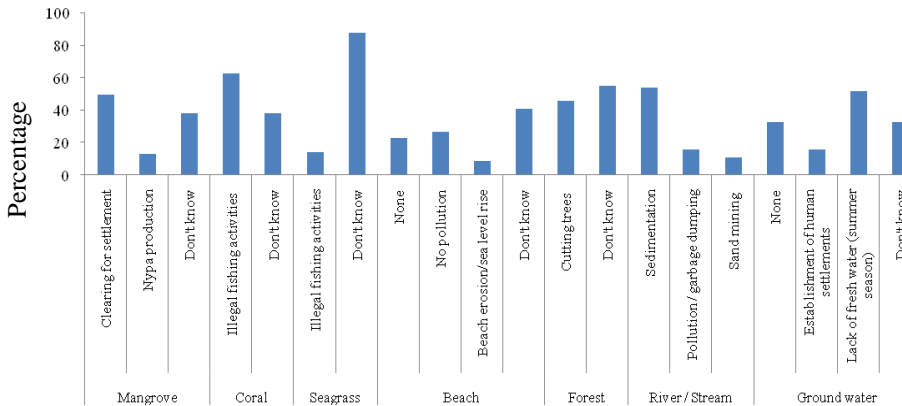
### **Catch trends of marine resources**

Most fisher groups and traders interviewed had perceived that most resources were in a state of decline in the last 5 years. The numbers of fishermen perceived a drop in catches and income despite an increase of fish prices. The 90% of fishermen who caught bivalves, inshore and pelagic fish estimated that their catches had dropped by half in the last 5 years. More than half fishermen perceived that the catches of sand crabs, prawns and lobsters had dropped. Fishermen sold lobsters live or dead. If lobsters were live lobsters, they fetched a better price. Rays and sharks catches were perceived to have dropped in the last five years. So, these above information showed that marine resources were under high pressure. It was said that the numbers of traders/collectors of bivalves had decreased due to the illegal fishing boats or trawling. So, most households did not depend on it sufficiently to consider it

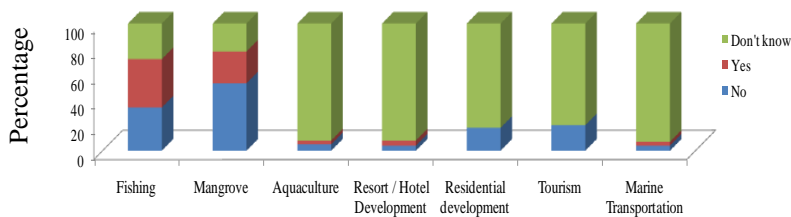
as a livelihood activity. Old fishermen who had fishing experience answered that there was a decrease in the catch of marine resources at the present time (2017-18). (Figure 11).



**Figure 6.** Perception of coastal and marine resources conditions in Palaw fishing communities



**Figure 7.** Perceived threats to coastal resources in Palaw fishing communities



**Figure 8.** Awareness of rules and regulations of marine resources

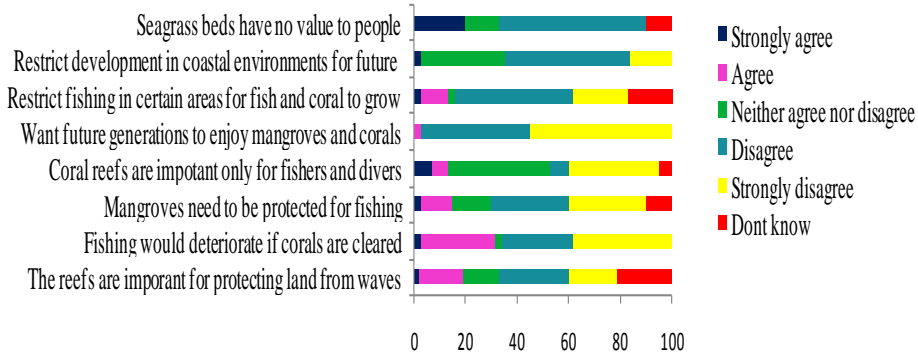


Figure 9. Perceived threats to coastal resources in Palaw fishing communities

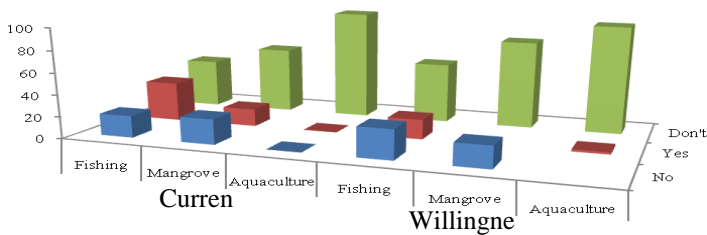


Figure 10. Participation in decision-making to manage marine resources in Palaw fishing communities

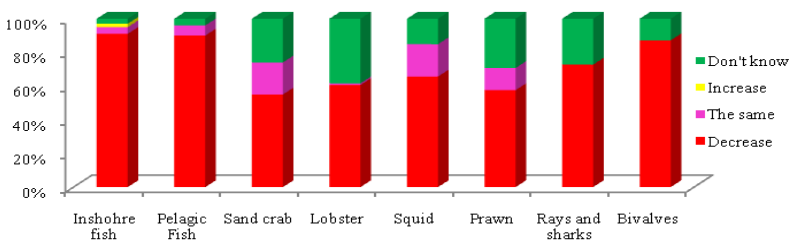


Figure 11. Catch trends of marine resources in Palaw fishing communities

### Discussion

The present results from the socio-economic baseline assessment pointed out how to use the marine resources, which resources were facing high pressure, and what threatens the marine resources in these communities.

Most fishing households depended solely on marine resources for their livelihoods. Their primary occupations were fishing, agriculture, shop keeping and collecting bivalves in Palaw. Likewise, the people in Kyauk-Phyar and Thit-Yar-Wa villages depended on the marine resources for their livelihood (Zin Lin Khine and Hnin Hnin Maw, 2016).

According to the present survey, more than half of fishing households faced difficulties in earning livelihoods during the rainy season. Their boats were not able to go fishing due to the rough weather conditions. As they could get low incomes in the rainy season, their incomes were varied seasonally in these communities. Similarly, most fishing households of Myeik Archipelago found that it was very difficult to make their livelihoods in the rainy seasons. According to previous and present data, most fishing households did not consider fishing could provide a sufficient source of income to sustain them, despite ranking fishing as their main source of income. Most fishermen reported the catches of marine resources and fish were depleting year after year in Tanintharyi region (Saw Han Shein *et al.* 2013, Schneider *et al.* 2014, BOBLME 2015, Zin Lin Khine and Hnin Hnin Maw, 2017).

According to the present data, fishermen caught Indian mackerels, silver pomfrets, tongue sole, shrimps, sand crabs, groupers, spanish mackerels, silver grunts, rays, sardinella, ponyfish, croakers, anchovy, etc. by different nets in Palaw waters. From the previous data (Saw Han Shein *et al.* 2013; Schneider *et al.* 2014; BOBLME 2015), the major fishing activities of fishermen included artisanal fishing by stationary nets, driftnets, cage fishing and spear fishing using compressors to catch different marine species. According to the present survey, fishermen who fished by compressor diving and spear fishing were not found and some fishermen collected bivalves. The present observation showed that mangroves were converted to human settlement, corals and seagrass ecology were destroyed by illegal fishing activities (trawling or fishing traps). Holmes *et al.* (2014) reported that Illegal,

Unregulated and Unreported (IUU) fishing was widespread in Myanmar. Watersheds, mangroves, corals and seagrass could be degraded through poorly regulated and planned coastal and riverside activities.

In the present study, the respondents' awareness of rules and regulations indicated that they had low level of awareness in fishing laws. However, the awareness of household members on forestry was moderate level in these communities. The marine fishery law (1990) and the forestry law (1992) were enacted to preserve and protect marine environment (Trachtman, 1997). From the present results, most local people did not know or agree with the importance of corals and mangroves for fishing. Most respondents had low attitudes to conserve marine resources. Environmental awareness decreased among local people. According to the previous observations, a high proportion of respondents did not have knowledge about resource conditions and awareness of rules and regulations (Schneider *et al.* 2014)

Many fishing groups and traders from the present survey area perceived that there was a decrease in the catches of marine resources at the present time (2018) than the last five years. Marine bivalves declined drastically in numbers and their sizes were very small in the current period (2018) as the results of overfishing or illegal fishing methods. As the catch trends of marine resources dropped, most fishermen faced with a lot difficulty in earning livelihoods in the present survey area. According to the previous surveys, marine resources in Myanmar had a dramatic decline in over the past 30 years (BOBLME, 2015 and Howard, 2018).

### **Conclusion**

In socioeconomic survey, household demographic data, economic and livelihoods, coastal and marine activities were assessed and analyzed. Most local people had low attitudes to manage marine resources and they had perceived a decline in coastal and marine resources in the present period

(2018). But most households did not want to participate in decision-making to manage marine resources in both present and future. Marine and coastal resources management and conservation training is needed to increase public awareness about marine and coastal resources rules and regulations. If so, they can establish no take zone (NTZ) and locally managed marine area (LMMA) in the first step. Finally, they can create marine protect areas (MPA) in these communities.

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