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The socio-economic survey on Atauro Island and Liquica Village, Timor Leste

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Abstract. The objective goal of this survey is to determine the socioeconomic conditions of the current Liquica and Atauro communities to be considered in preparation and implementation of marine protected area. Surveys were conducted in Liquica and Atauro using a questionnaire and combined with focus group discussions. The survey was conducted on fishermen, community leaders, travel service providers and local government. Survey results show that the socio-economic conditions of the Liquica and Atauro communities still need to be improved, as the income level of the community is almost equal to the level of its family's expenditure. In addition, the people of Liquica and Atauro are still very dependent on the condition of the coastal and marine areas, so it needs to be strengthened with the development of alternative livelihoods that can supplement family income. Ocean economic activities would be feasible to be implemented in Liquica and Atauro, especially fisheries, marine tourism and sea transportation. Tara Bandu's local institutions and regulations will very effectively serve as a bridge for institutional planning and implementation of management in Liquica and Atauro.

1. Introduction

The initiation of MPA establishment on Atauro Island was a part of Timor-Leste's CTI National Plan of Action¹. This plan of action includes establishing a MPA through the collection of biophysical and socioeconomic data. Both data that will aid in the design and development of a Marine Protect Area in Atauro Island and Liquica.

The nature and characteristics of coastal communities is strongly influenced by the type of their activities, such as fishing effort, fishery ponds, fishery product processing enterprises, and coastal agricultural that are predominantly carried out by them [9]. The socio-economic conditions of the Liquica and Atauro communities are one of the necessary materials for consideration in the process of planning and implementation of marine protected areas in both locations. Socioeconomic conditions may include conditions of human resource development which are demonstrated by three characteristics, namely (i) individual capacity and capability characteristics of the level of formal education undertaken, (ii) characteristic of socio-ecological system of society in the form of relationship between social system

¹ Edyvane et al. (2009).



with the existence of coastal and marine resources and (iii) local institutional characteristics in the management of natural resources and the surrounding environment. These three characteristics are discussed in detail based on interview results in the survey area. The objective goal of this survey is to determine the socioeconomic conditions of the current Liquica and Atauro communities to be considered in preparation and implementation of marine protected area.

2. Material and Methods

2.1. General approach to socioeconomic profile survey

Territory of a regional development should be based on the state of existing potential, issues and problems (natural resources, human resources, infrastructure, socio-economic, and so on) which are identified interrelated in order to support the assessment process of present condition, so that policies, strategies and development programs that would be applied may be able to answer the real issues and problems optimally [9]. Coastal areas as a union territory have various functions. A regional position itself is as a rapid area development. The basic functions of coastal areas could be identified among the densely populated district, industrial compact, solid service and so on, which can be found almost everywhere around the coastal areas.

That the number of functions assigned to the coastal region is increasingly significant influence, both positive and negative impacts. Positive influence that can be enjoyed by them is the increasing number of infrastructure development which in turn will enhance regional economic growth. While the negative effects that can be arise is the intensive utilization the coastal region. The more opportunities and increase the utilization overlap which in turn have an impact on the reduction in carrying capacity of the coastal environment. It's a wise effort when in development efforts of coastal villages, beginning with needs assessment process against potential base is owned by the coastal villages. It is important to be done so that the basic functions mentioned earlier really give the true sense of community around coastal areas [9].

Assessment efforts should be directed more to the effort to see the potential, issues and basic problems that occur on coastal communities and neighborhoods, so it can guide decision makers to make policy direction, strategy and development program that really completely in accordance with local conditions in the future. Although there is no standard agreement on the definition or limits the preparation of profiles, but important to implement the development program that can be accepted by all actors at the coast. Based on that understanding, that preparing profiles of coastal communities can be summed up as follows [9]:

1. The process of collecting data and information on coastal and marine areas is emphasized to identify the parameters of socio-economic and cultural community.
2. The results of data collection and information is expected to describe / illustrate in more real to the condition of coastal communities.
3. Profiling coastal communities is an attempt to describe objectively the condition of coastal communities through various surveys and studies and analysis of issues and problems.

That a few of things that should be considered in the preparation of socio-economic profile of coastal communities are as follows [9]:

1. Preparation of a good profile of coastal communities, is that profiling does not refer to the approach in an administrative one community alone, but refers to an approach that includes more than one administrative region (with many communities). Therefore, we need a profile that describes the real condition of coastal communities in comprehensive and objective.
2. The condition of the data and information on coastal communities are still owned by institutions / sectors, while they are still overlapping between sectors, so that data and information needs to be synchronized / organized in order to be used easily for each user.

3. The availability of data and information is still very lacking, so it is necessary to collect data and information. In this case, the profile of coastal communities prepared to facilitate the provision of data and information are valid and accurate to be used for coastal zone management plan and improving the welfare of coastal communities.

In this case, the socioeconomic survey of Liquica and Atauro conducted by using interview approach based questionnaire guidance and using focus group discussion to have a general and bigger overview of the general socioeconomic condition of the area of survey. Interview conducted on 45 respondent that distributed on 29 person of local fishermen from both site (Liquica 24.14 percent and Atauro 75.86 percent), 3 persons of local community leader, and 3 person as a representative of tourism providers. Interview conducted on 28 September – 8 October 2017.

3. Results and Discussion

3.1. Socioeconomic profile of Liquica and Atauro

That the nature and characteristics of coastal communities is strongly influenced by the type of their activities, such as fishing effort, fishery ponds, fishery product processing enterprises, and coastal agricultural that are predominantly carried out by them. Therefore, the discussion of the characteristics of the public beach/coast is focused on the group. Coastal communities have traits or certain characteristics typical/unique. This property is closely associated with the nature of business in the fishery itself. Due to the nature of the fishing effort is strongly influenced by factors such as environment, season and market, then the characteristics of coastal communities are also affected by these factors [9].

One of the natural resources of the fishery that is very prominent is that of sustainability or success of these efforts is very dependent on environmental conditions, especially water. This situation has very important implications for social and economic living conditions of coastal communities. Life of coastal communities to be highly dependent on environmental conditions and are vulnerable to environmental damage, particularly pollution, due to industrial waste and oil spills, for example, can shake the foundations of social and economic life of coastal communities. Pollution in the Java coast Indonesia some time ago, for example, has led to the production of shrimp ponds fell drastically. This certainly has great consequences on the lives of farmers pond [2].

3.1.1. Number of family members. Based on data obtained during a survey of 29 fishermen at two locations, Liquica (7 people) and Atauro (22 people), the number average family member of Liquica reached 8 people per family, meanwhile Atauro reached 5 people per family. Characteristics of the number of respondents from Liquica themselves ranged from 1-12 people per family, meanwhile Atauro 1-10 people per family. The large number of family members indicates that Atauro and Liquica people have an average child of 6 and 3 people per family. Atauro and Liquica communities still adhere to traditional thinking that more and more children are owned, the more sustenance can be earned. The characteristic number of family per household of Liquica and Atauro is presented on Figure 1.

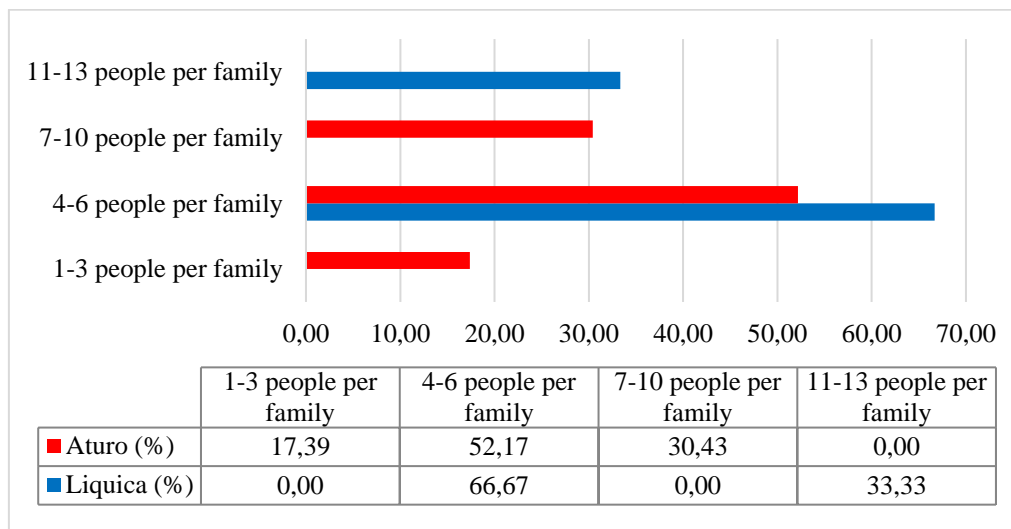


Figure 1. The characteristic number of family member local fishermen in Liquica and Atauro (percent).

3.1.2. Education. The average length of school of the fishermen of Liquica and Atauro is totally different. Atauro's fishermen is more educated than Liquica's fishermen. This can be demonstrated by the characteristics of the respondents comparison between Liquica and Atauro. In Liquica, the fishermen whom is at "non-school" to junior high school level amounted 85.71 percent and only 14.29 percent are educated at the same level and/or more from "high school ", meanwhile in Atauro, the fishermen whom are at "non-school" to junior high school level and are educated at the same level and/or more from "high school " have the same number, each 50 percent. This status indicates that the fishermen of Atauro more educated than Liquica (Figure 2).

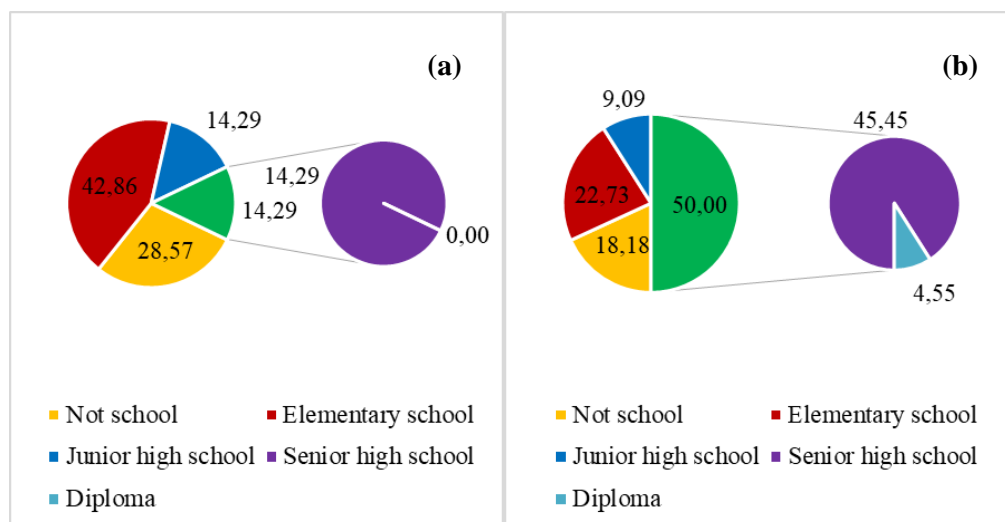


Figure 2. Education level of local fishermen in: (a) Liquica and (b) Atauro (percent).

3.1.3. Type of fishing gear. The dominant fishing gear used by Liquica and Atauro fishermen is nets, spears and fishing. These three fishing gear are included in traditional fishing gear and hereditary become favorite fishing gear. Nets are the most common fishing tools owned by the fishermen both in Liquica (43.75%) and Atauro (37.21%). The commonly mesh size of nets used by fishermen both in Liquica and Atauro is 1.5 to 2.5 inches.

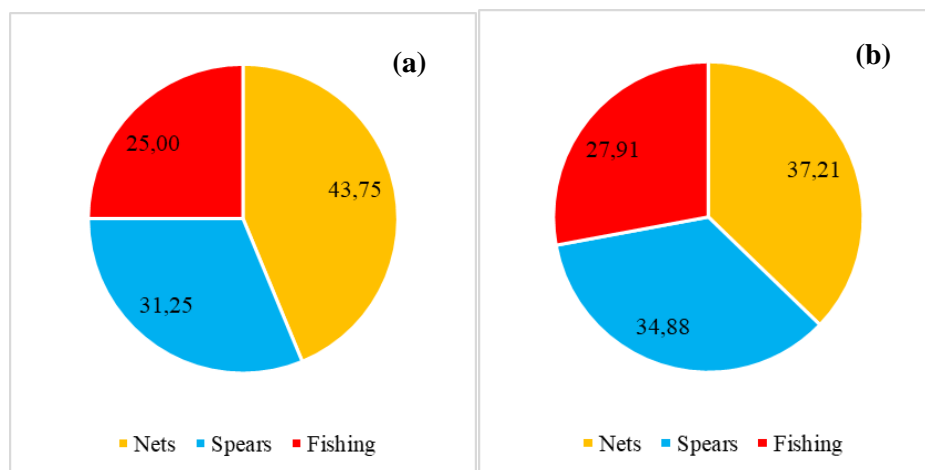


Figure 3. Type of fishing gear used by local fishermen in: (a) Liquica and (b) Atauro (percent).

Often fishermen whom use a combination of fishing tools as their fishing gear, and some of them choose to have all three types of fishing gear. The classic but logical reason for using a combination of the three fishing gear is that they can more freely determine which fishing gear to use is adapted to the current situation and conditions of the waters that have been their fishing grounds. The distribution type of each fishing gear used by fishermen of Liquica and Atauro is presented on Figure 3.

3.1.4. Boat specification. Atauro's fishermen has relatively more modern boat comparing to Liquica's fishermen. Although the fishermen of Liquica (85.71%) and Atauro (50%) generally use rowing boats as fishing fleet, but only Atauro has more than two alternative fishing boat. As many as 85.71 percent of Liquica's fishermen and 50% of Atauro's fishermen whom been respondents generally have only rowing boats. Fishermen of Liquica have only catching fleets in the form of outbout wooden boat as their alternative fishing fleet (14.89 percent), while fishermen of Atauro has two different alternative of fishing fleet, those are using outbout wooden boat (36.36%) and outbout fiber boat (13.64 percent). The use of fishing fleets such as this indicates that the fishermen of Liquica and Atauro are still included in the category of traditional fishermen and usually the targeted fish catch is around the coastal location only. The distribution type of boats used by fishermen of Liquica and Atauro is presented on Figure 4.

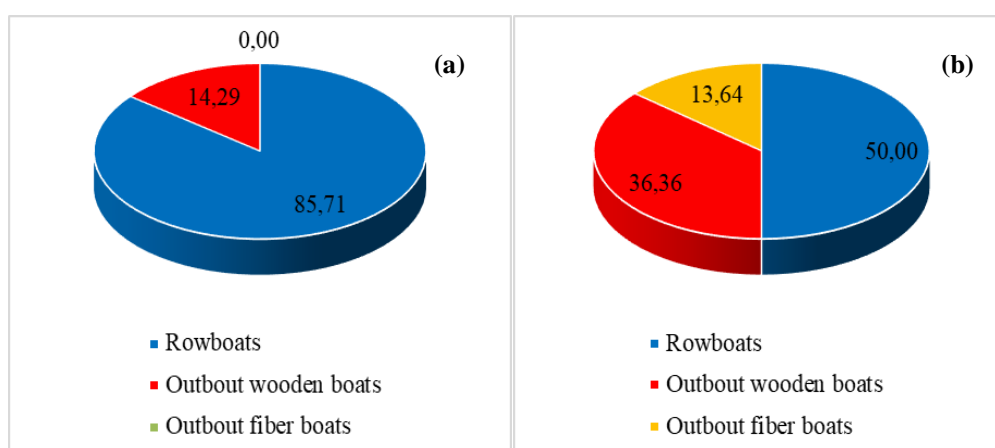


Figure 4. The distribution type of boats used by fishermen of: (a) Liquica and (b) Atauro.

3.1.5. Type of fish target. Based on interviews with fishermen Liquica and Atauro, there are 16 species of fish that became the target of caught. Bainar mean, bainar mutih, bainar fatuk and daun fishes are the four most dominant fish species can be caught. The dominance of the four species of fish as the dominant target fish is not surprising when considering the most common and dominant fishing gear

used by Liquica and Atauro fishermen is the net. The percentage of species type of captured fishes presented on Figure 5.

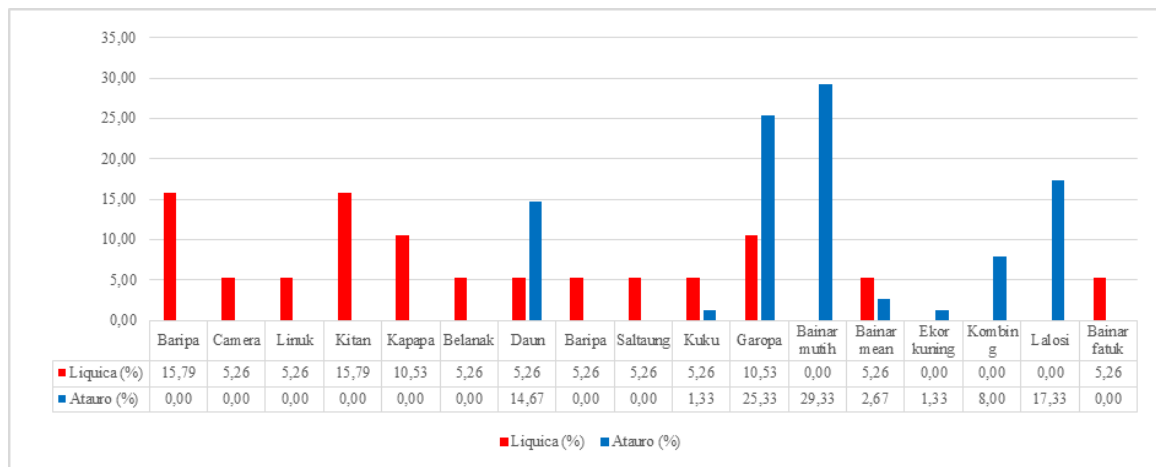


Figure 5. The percentage of species type of captured fishes by fishermen of Liquica and Atauro.

3.1.6. Total catch per trip. Based on interviews with fishermen Liquica, the average catch of fish reached as many as 40 tails in interval 5-20 bundle per trip, meanwhile in Atauro around 50 tails in interval 10-30 bundle per trip. Both Liquica or Atauro fishermen is not familiar with standard volume sizes, so they generally use tail units and or bundles as standard units of fish buying and selling. The number of fish per bundle in general varies depending on the size of the fish tied, but still within the interval of 2-8 tails per bundle.

3.1.7. Season of fishing. The particular characteristic that is striking among coastal communities, particularly fishing communities, is their dependence on the season. Dependence on the greater this season for the small fishermen. In the fishing season is very busy fishermen go to sea. In contrast, the activities of fishing season 'peceklik' (bad season/scarced fishes) be reduced so that many fishermen are involuntarily unemployed [9].

Liquica and Atauro fishermen recognize three fishing seasons, namely harvest time, bad seasons and moderate season. Liquica and Atauro has the different harvest time. Harvest time in Liquica usually occurs in October-December, bad season occurs in January-April and moderate catching season generally occurs in April-August. Meanwhile harvest time in Atauro usually occurs in September-October, bad season occurs in November-March and moderate catching season generally occurs in April-August. Figure 6 shows the distribution of the season of fishing of Liquica and Atauro's fishermen.

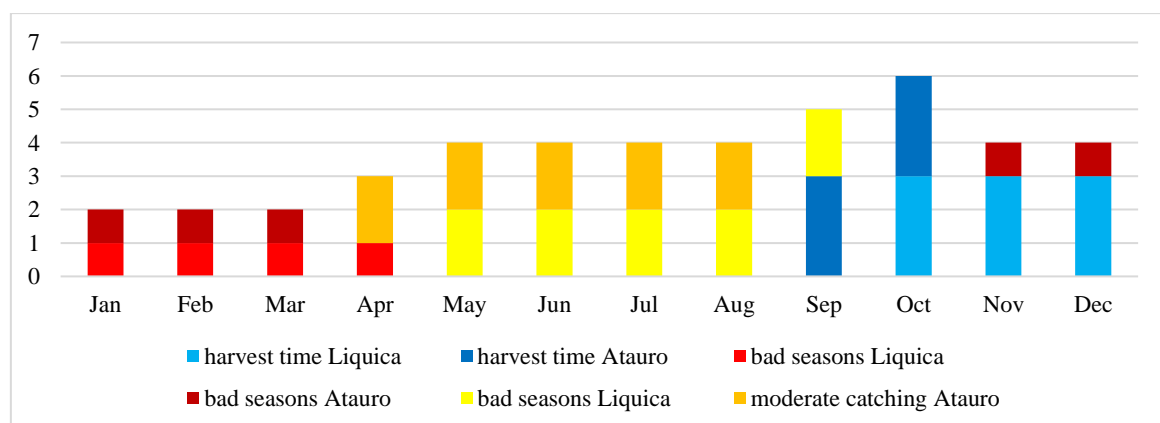


Figure 6. Season of fishing of Liquica and Atauro's fishermen.

3.1.8. Fishing trend. Based on the results of the interview, it can be concluded that generally fishermen Liquica and Atauro (74.07 percent) have increased the catch compared to before. Fishermen of Liquica has a contradictive perspective about this catch activities. 100 percent fishermen from Liquica stated that the fish resources getting declining as well as the decreasing number of their catches, meanwhile the fishermen of Atauro stated the opposite (100% percent increases).

In general, the positive trends of these fish catches indicate that fish stocks in the coastal waters of both survey sites are still showing positive growth symptoms. However, 25.93 percent of fishermen who claimed to have decreased fishing results obtained, still need to get attention. There are several factors that can potentially cause differences of views, including: weather factors, changes in the use of fishing gear, changes in fisheries management rules, change of fishing fleet, and so forth.

3.1.9. Fishing ground. The fishing areas of fishermen of Liquica and Atauro are the waters around Atauro and the coast of Liquica. Fishermen with rowing boats are usually only within 100-300 meters of the coast of Liquica and Atauro, while fishermen with outboard wooden motorboats and outboard fiber motorboats are usually able to catch fish up to a radius of 2 miles from the nearest beach. The favorite locations of the fishermen of Liquica and Atauro are the waters in their border areas.

3.1.10. Market. Fish catches of fishermen of Liquica and Atauro are generally sold in the villages that are the homebase of the fishermen concerned. Liquica and Atauro fishermen can sell their fish directly to consumers and/or through small agents in the village. Usually there are fish collectors in each village who work as a container trader (big agent). It's very often when big fisherman also doubles as collectors. However, usually there are collectors who are not fishermen, so the trader is a class of its own. They usually occupy a dominant position when dealing with small fishermen [2].

Captured fish are collected first before being transported to Dili City for sale to other containers in the nation's capital. However, there are also fishermen who choose to directly sell their catch fish to Dili. The detail diagram presented in the market area of fish captured by fishermen from Liquica and Atauro can be shown on Figure 7, meanwhile their mean market channel presented on Figure 8.

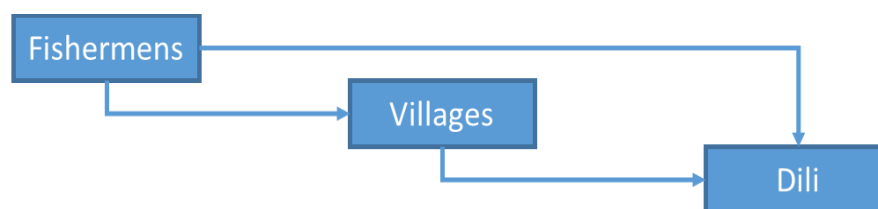


Figure 7. Market area of captured fish of fishermen of Liquica and Atauro.

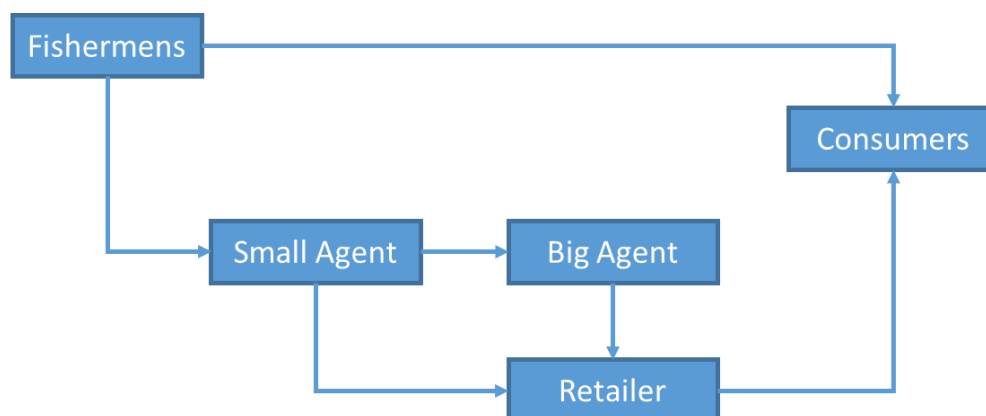


Figure 8. Market channel of captured fish of fishermen of Liquica and Atauro.

3.1.11. Self consume. The fishermen of Liquica and Atauro usually do not sell whole fish to the market. Usually fishermen Liquica and Atauro put aside some fish catch for their own consumption needs. The

average needs of fisherman to self consume their fish reached 2 tails per day (Liquica) with an interval number of 1-5 tails per day and 7 tails per day (Atauro) with an interval number of 2-10 tails per day. When the average family of fishermen in Liquica is 8 people, the average of each member of the fishermen household consumes 1/4 tail fish per day, meanwhile in Atauro (5 people) can consume 1.4 tails per day. This means that the needs of animal protein of fisherman of Liquica is lower than Atauro every day. Even this indicates that the fisheries of Liquica and Atauro have provided food security to the surrounding population, at least for the residents whose heads of family work as fishermen, but Atauro household has a better supply of fish protein than Liquica. This situation look like want to shows that why the education level of Atauro relatively higher than Liquica.

3.1.12. Fish prices. Fish catches of Liquica and Atauro fishermen have varying prices depending on the type and quantity. Fish prices are calculated not based on standard raw volumes, but the agreed standards are in the form of tail and/or bundle (depending on species and size of fish). Kuku fish and Garopa fish are the highest selling value of US \$ 12/tails and USD 6/tails (USD 30/binds). The price of captured fishes from Liquica and Atauro's fishermen presented on Figure 9 and Figure 10.

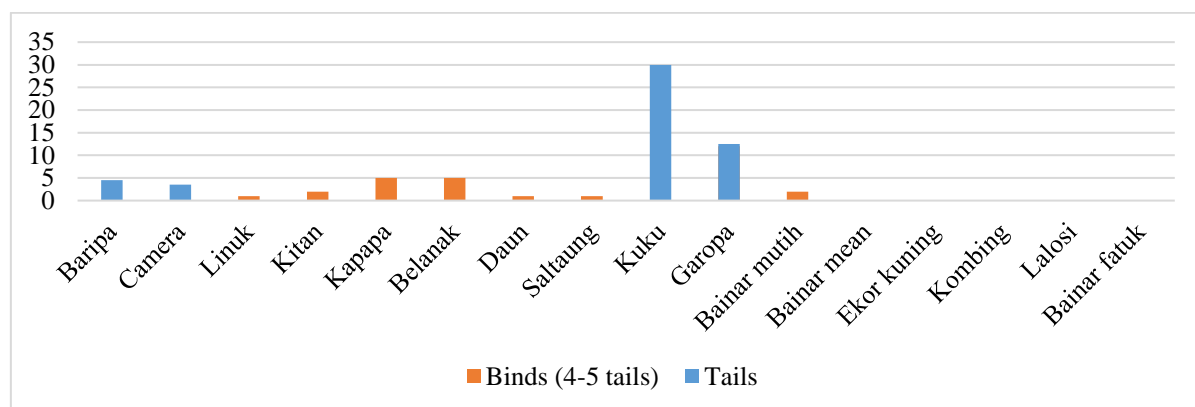


Figure 9. The price of captured fishes from Liquica's fishermen.

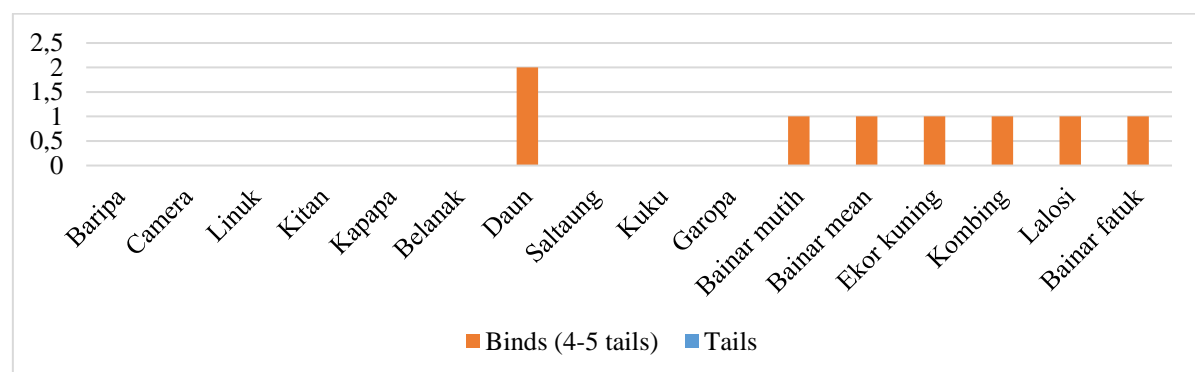


Figure 10. The price of captured fishes from Atauro's fishermen.

3.1.13. Income and side job. Based on interview, the income range of fishermen of Liquica and Atauro is between USD 3-500 per day. Liquica has an income range USD 15-100 per day, meanwhile Atauro has USD 5-3500 per day. After classifying into several ranges of income, most of fishermen of Liquica (71.43%) and Atauro (68.18%) classified as in range USD 10-50 per day. This value indicates that the Liquica and Atauro fishermen classified already meet the minimum revenue standards per day. However, it is important to know how much the actual expenditure of fishermen's family per day or per month, so it can be known whether the income is sufficient or not. Based on the results of separate interviews obtained the average expenditures of fishermen Liquica and Atauro which reached USD 500-1000 per month or about USD 15-30 per day. This means that in general the value of income of USD

10-50 per day is still quite enough to meet the needs of his family. The characteristic fishermen's income per day based classification presented on Figure 11.

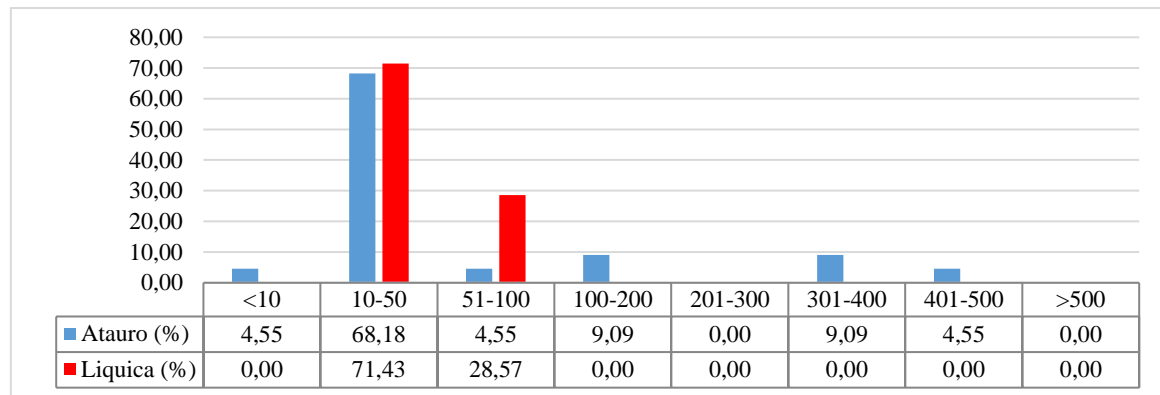


Figure 11. Characteristic fishermen's income per day based classification range of income (USD/day).

Fishermen of Liquica and Atauro in general not only rely on the results of fishing as a source of income family. Most of the reason that fishermen in Liquica and Atauro have alternative livelihood because of the unstable season, which is several month they can not go to fishing due to the weather. This condition also has major implications on the socioeconomic conditions of coastal communities in general and the fishermen in particular. They may be able to buy expensive items such as food, drink, chairs, tables, cabinets, and so on. Conversely, in a bad season their incomes dropped dramatically, so that their lives are also getting worse [8]; [5].

In addition to anticipate those problem, beside fishing in the sea, most of the Liquica and Atauro fishermen (92.31 percent) perform some other economic activities as a byproduct, such as farmers/planters/ cultivators, breeders, fuel collectors, furniture makers, woodcarvers, builders, and security. Only 7.69 percent of Liquica and Atauro fishermen have no other jobs and only depend on their livelihoods from sea fishing. The distribution side of the fishermen of Luquica and Atauro could be shown on Figure 12.

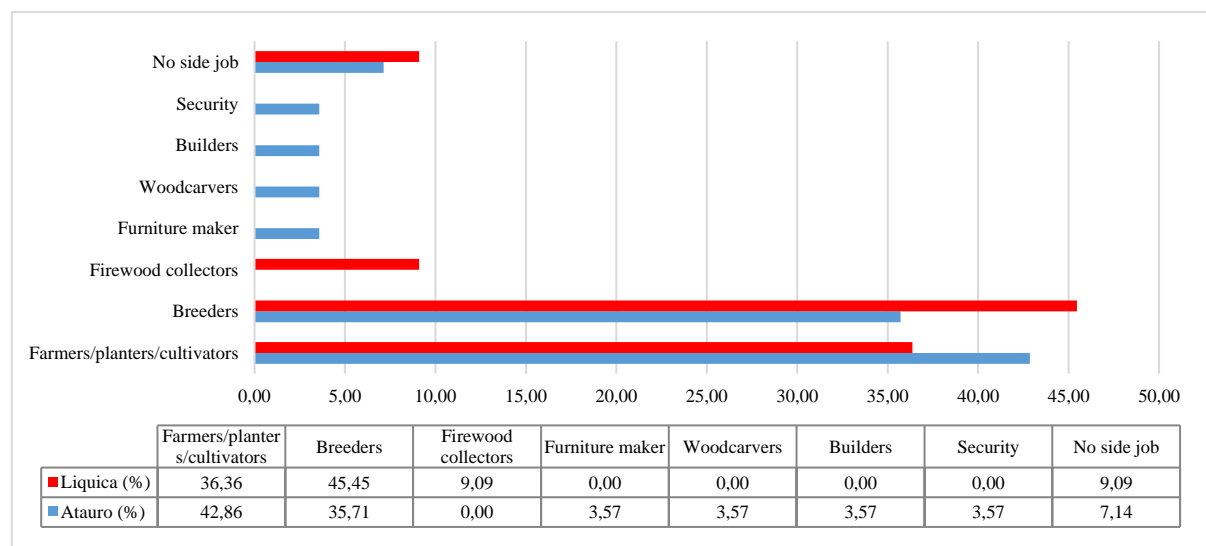


Figure 12. The distribution sidejob of fishermen of Luquica and Atauro (percent).

3.1.14. IUU fishing. Fishermen of Liquica and Atauro claim that IUU fishing activities still occur in their fishing areas. Illegal fishing by Indonesian fishermen is still happening in the region. Similarly,

unregulated fishing activities, stated still done by fishermen who come from outside the region. The self consumption became one of the unreported fishing activities that occurred in both survey areas. Some of the unregulated fishing activities that were successfully caught were bombs, cyanides, trawlers and traps.

3.1.15. Outsider fishermen. Based on interviews with the fishermen of Liquica and Atauro obtained information that migrant fishermen come from the island and or neighboring villages that are geographically adjacent areas and separated by the surrounding waters. Fishing areas of Liquica and Atauro fishermen often meet each other in the same water space, so competition between them is often happened. The intersection of space and time of fishing in the surrounding waters at least provides limited movement for both. Not infrequently fishermen Liquica and Atauro race each other to occupy the available fishing space.

3.1.16. Fishermen conflict. Based on the results of the interview obtained a phenomenon that states that almost no conflict that occurs between one fisherman with other fishermen. Although they occur, they usually resolve quickly and cause no greater conflicts of exhalation. Fishing conflicts that occur are usually associated with a violation of the use of fishing gear in a zone that should not be a catch zone acquired for a particular fishing gear. Conflict resolution is always done with kinship and mutual forgiveness. Figure 13 shows the perception of the fishermen.

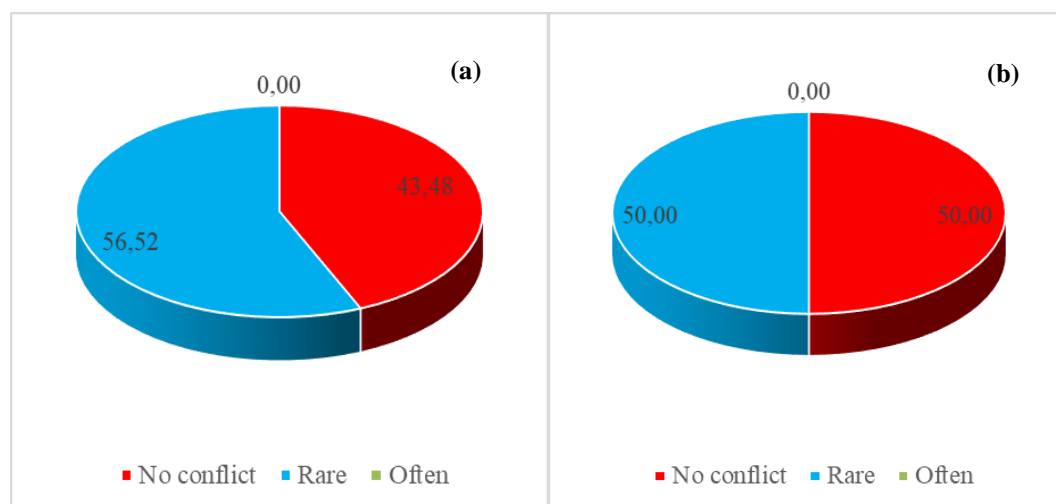


Figure 13. Fishermen's conflict perception.

3.2. Local customary related with marine protected area management

Timor Leste as well as their neighbor country, Indonesia, recognizes the existence of international law, the law of faith-based (religious law) and the law based on customary law [12]; [7]. In practice the religion law adopted as positive law, such as the determination of the law of inheritance, marriage, and other laws. Similarly, customary law, some people still use the customary law as the rule of law in managing the social, economic and cultural as well as environmental and natural resource management.

Timor Leste has a known local custom called "Tara Bandu". "Tara Bandu" is a good tradition that needs to be conserved for the development of the life of the community. The environment can be protected and the agricultural community can sustain the support of the lives of the village population. "Tara Bandu" is a local custom that regulates the relationship between humans and the environment surrounding them. In the era of independence, everywhere communities are reviving the Tara Bandu ceremony to determine the times when it is forbidden to fell trees, to pick and collect the produce from plants in certain places that are considered to be sacred. Places that are considered to be sacred are those places from which many people derive their means of existence. For example, places around water

sources or the forest that are ecologically useful to maintain water flows and avoid erosion. This is evidence that our ancestors had a high level of consciousness about environmental protection.

The patterns of sustainable use has been proven to provide sustainable utilization, as they did with the 'open-close' like SASI in Indonesia [12]; [6], which take into account the time, quality and quantity of this type of natural resources and environment in the thrill. Principles of conservation, sustainability, and equity optimization is reflected in the attitudes, behaviors and actions that uphold communal interests over the interests of individuals and groups who appear in the status and grouping property system of the land and utilization of natural resources and environment in the Tara Bantu system that implicitly contains the concept of ownership land, both terrestrial and marine resources.

This substance of "Tara Bantu" can be implemented as well as local rule to marine protected area. "Tara Bantu" can help local people to learn and sustainable manage their coastal and marine resources. Liquica and Atauro implemented also this local custom as their non-formal rule beside the formal regulation from the government. Following

Table 1 presented formal and non-formal rule to manage the natural resources in Liquica and Atauro.

Table 1. Formal and non-formal rule to manage the natural resources in Liquica and Atauro.

Nr	Local Custom	Punishment	Government Rule	Punishment	Conflict	Hope
1	Rule of fishing		the mesh size is not less than 1 inch prohibited from catching turtles, pearl shells, dugongs, whales, dolphins and napoleon	pay \$ 500 - 5000 or jail for 1-5 years	Not happened	other meetings may be held to various elements in other areas
2	Event customs: harvest of areca nut, honey and coconut (festival once a year)	For thieves, subject to sanction of pig / goat 1 tails, 1 sack of rice and a shoulder (2 sack) of areca nut \$ 100- \$ 5000				
3	Tara bandu for marine protected area	catch fish etc in the MPA core area (0 - 200 m)				

Sources: FGD and primary data processed

That the adoption of local value system is important considering that: the parties more directly affected due to changes in natural resources, both positive and negative impacts are local communities, those who are more familiar with the characteristics of the natural resources and environment of a region is the local community, the parties have a greater sense of ownership over natural resources are public, the most widely depending on the availability of natural resources and the environment and have the

right to obtain more work opportunities are local people, and party who knows the system of ownership of natural resources and the environment in the region is the community [12].

Adopting the value system 'Tara Bantu' should know some key indicators of success implementation as well as proposed [3]. Pomeroy and William stated that there are nine key to the success of collaborative management model (adoption of local value), including: the boundaries of the area to be defined, there must be clarity in the management of membership, there must be a strong attachment in the group, the benefits received after the adoption of this value must be greater than the costs, the management is done is simple and understandable, the legalization of management shall be binding and comprehensive, establishment of cooperation between the leadership in the community, the decentralization and delegation of authority, and the importance of the intensity and quality of coordination between the government and society of mutual benefit for the maximum ecological and economic sustainability of natural resources and the environment.

Marine protected area will benefit local people to fulfill their needs. The existence of marine protected area will provide ecosystem services, such as provisioning services, regulating services, cultural services and supporting services ([4]; 2018). One example of this services was recreational fishing that may provide direct and indirect economic impacts and induce demand, based on how the economic value of the ecosystem is distributed, so that the purchasing power of the coastal communities in surrounding areas is strengthened [11].

3.3. Ocean economic activities

In the maritime sector, there are seven economic spectrums that have the potential to contribute greatly to the development of coastal and marine areas, both at national, regional and local levels. The seven sectors of the marine economy are supposedly very capable of contributing to the national GDP and in turn can increase the share of marine and fisheries development as a whole [10]. Mentions that the seven spectrum of marine economy are fisheries, marine tourism, marine transportation, offshore esdm, marine industry, marine buildings and marine services [1].

The coastal communities of Liquica and Atauro in this respect have been well acquainted with the six marine economic activities, including fisheries, marine tourism, marine transportation, marine industry, marine buildings and marine services. Capture fishery has now become the main activity of the population of Liquica and Atauro, as well as sea transportation, where the interaction of Atauro Island community with the outside community is mostly done by sea. The communities of these two survey sites also recognize the marine industry, although still traditional, such as fish processing, shipbuilding, and so on. The marine tourism activities have also been known as one of the new business opportunities, although to participate and take a part actively in capturing the tourism market opportunity requires a large capacity and capability in order to compete or at least take some role that can not be done big investors. The existence of ports / docks is one of the important infrastructures for an island and / or coastal area, as well as the existence of coastal and marine ecosystems becoming a major factor for the development of marine tourism sector in Liquica and Atauro.

Given that the marine economic activity is very specific, the economic sector implementation opportunities in Liquica and Atauro can only be prioritized in the development of fishery and its derivative industries (capture fisheries, fishery processing and traditional shipbuilding), marine tourism economy and its supporting facilities (marine tourism spot , accommodation, logistics and mobility) as well as sea transportation (port facilities / wharves, ships and fuel).

Fishery economy directed to produce commodities that have high selling/added value and able to mutual benefit and meet demand of marine tourism market demand. Marine tourism is geared to capture opportunities for accommodation and logistics, while sea transportation is directed at providing ships that can serve as a means of transportation for mapped tourist locations to become maritime attractions in Liquica and Atauro.

3.4. Ecotourism economic in Atauro Island and Liquica

3.4.1. Atauro Island. Atauro Island has great ecotourism potential with its richness of “adat” and natural beauty and underwater. There are several potential attractions in Atauro Island, namely underwater

beauty with biodiversity of fish and corals, dolphins and whales, Boneca de Atauro craft center, Mackuili tribal woodcraft, white sand beach and hot springs. The most popular tourist activities are diving to enjoy the underwater beauty of Atauro and the crafts of Boneca de Atauro.



Figure 14. Diving and Snorkelling of Atauro.

The Boneca De Atauro craft center is one of the handicraft centers that empowers local Atauro Island women through the sale of dolls, bags and other merchandises to local and foreign tourists alike. There are 30-40 women involved in the process of making this doll. This handicraft center is located in one shade of cooperative institution managed by self-help by local community USD 500-1000/day can be generated from the sale of this doll. Each craftsman can earn a monthly income of USD 100-300 per month from the center of this craft. Every local and foreign tourists must visit this location after enjoying the main tour, diving, snorkeling and swimming at Atauro.



Figure 15. Product of Boneca de Atauro.

Hot springs are found in the villages of Mackuili and Biquelli. The potential of tourist attraction hot springs has not been optimized and not many local and foreign tourists know the potential of this tour. Local people also have not utilized the efficacy of these hot tears for their lives. It appears that this location is left natural and is not conserved or utilized.



Figure 16. Hot springs in Mackuili village.



Figure 17. View of Atauro cliffs.

Most tourists come from Australia because Australia is the closest country to the characteristics of tourists who love the beauty of the beach and the underwater is large enough. They love the richness of marine ecotourism. June to August is a busy season of visitors from local and foreign tourists because of that time tourists entering the school holidays and European, American and Australian tourists enter the dry season.



Figure 18. Beloi white sand beach and sunset.

Atauro Island has the Association of Tourists of Atauro with an elected President of the Association in 2015 named Marcelina De Araujo Balamba. The Turismo De Atauro Association was founded by local tourism businesses at Atauro and Roman Luan NGOs in the hope of keeping together the security, comfort and good service of all the tourists who come to Atauro. They also initiated to educate the surrounding community and tourists to jointly maintain the nature of Atauro Island. One form of initiation with the village community to do a conservation area of the sea called Tara Bando. Marcelina owner Barry Ecolodge, the best ecolodge on the island of Atauro, asks tourists to set aside some of their money for \$ 2 for maintenance and conservation of the sea at Atauro. Since June - October 2017 has collected \$ 2700.

The average number of visitors in Barry Eco Lodge and Beloi Beach Hotel range from 30-40 tourists from abroad and most of Australia with 80% percentage, the rest of Portugal, America and Europe. Local tourists come to Atauro Island by ferry boat on Sundays. Mostly they only do beach activities

along Beloi. There are more than 200 people crowded Beloi Beach every week. Around 50-100 people out of total visitors other than on the beach, tourists also enjoy Atauro from the heights of Beloi Beach Hotel Bar and Cafe.



Figure 19. Beloi beach culinary tour thursday and Sunday.

There are several types of accommodation on Atauro Island, namely ecolodge, home stay, camping ground and hotel. The famous and bestselling Ecolodge is Barry Eco Lodge with a rate of \$ 30-40 per night for 1 tourist. Tourists get lodging facilities and eat 3 times in 1 day. In addition to Barry's, the other Ecolodge there is the Old Coin Ecolodge. The Old Coins started to be established since 2001 gradually started from a simple layover made of local materials. Beginning in 2009-2011, Roman Luan hired Tua Koin for 10 years with funding from Australia Aid. It's been a long time since landowners want to run Old Coins themselves but to this day have not started to operate again. In addition to the ecolodge, Atauro also has several homestays run by local communities. One of the most famous homestays is Manucoco Homestay. This homestay was established in 2004 with the support of Italian Fathers to increase the income of village women in Atauro. Since 2015 with boneca de Atauro joined "Kooperativa Polibolente" boneca de Atauro. Rates apply for \$ 15 per night per person with lodging facilities (bathroom inside) and breakfast. The \$ 13 rate is charged for the lodging facilities with an outside bathroom. Not many visitors choose to stay in this Homestay only 3-5 people per week.



Figure 20. Guest house for rent.

Camping ground is located on Adera Beach and Beloi Resort at a cost of \$ 10-15 / night / person. Camping ground is quite liked by the tourists who like adventure trips, generally preferred by foreign tourists. In addition to camping ground, ecolodge and homestay, Atauro Island also has one big enough hotel that is Beloi Beach Hotel. Beloi Beach Hotel established since 2014, and in 2016-2017 build facilities cabin house and cafe bar to complete service to tourists. Beloi Beach Hotel has hotel rooms

with rate of \$ 80 / night / person, cabin \$ 60 / night / person. On Saturdays and Sundays, a total of 20-50 people use the accommodation facilities at this hotel. The cafe bar is open not only to hotel visitors but also to visitors outside the hotel who want to enjoy the Atauro view from the hill Belo Beach Hotel with a note of having to buy food and drink here. A total of more than 50 people each week visit this cafe bar.

3.4.2. Liquica. Liquica is a beautiful coastal tourist area with white sand, historic Portuguese heritage museums, mangrove forests and beautiful views of the Liquica hills leading to the sea and coast. Liquica is a popular tourist destination for East Timorese people due to easy and cheap access to family holidays on weekends or school holidays. Over 1000 people visit white sand in Liquica. This white sand managed self-help by local coastal communities. Tourists can use the gazebo at a cost of \$ 10-15 all day.



Figure 21. White sand beach of Liquica.



Figure 22. Historical item of Ai Prison Liquica.

Figure 23. Mangrove forest ecosystem of Liquica.

Mangrove forest is still present along the coast of Liquica and has the potential to become ecotourism of mangrove and seaweed. Seen also the population of monkeys living in the Liquica mangrove forest. Mangrove forests have not been utilized for nature tourism.

Ibar Beach Retreat Hotel is a pretty good hotel along the coast of Liquica. The hotel in stands since 2001 belongs to Lui Gonzalvez of Los Palos. Number of visitors as many as 10-11 people / week mostly from Australia with rate of \$ 80 / night / person. The number of existing workstations in the hotel amounted to 19 people, all from Liquica. Lately, visitors are declining is not known the cause.



Figure 24. View from the top of Hotel Ibar Retreat.

4. Conclusion

This socioeconomics survey was a starting point to figure the state of the Coast of Atauro Island and Liquica village, especially in term of socioeconomic condition. This would be benefit to know the social-economic background of these locations. Atauro Island and Liquica have a potential value to be developed, especially for local economic development based coastal and marine resources. The approach of ocean economics development could be implemented to encourage these location to be the best destination for tourism and related economic activities, such as fisheries, marine industry, sea transportation, and ecosystem services.

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