

## **Fishery MSEs Integration for the Coastal Community Economic Development**

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**Abstract:** Fishery MSEs have a great role in Indonesia as a maritime country for alleviating poverty and improving the welfare of coastal communities and the preservation of fishery resources. The objectives of study are to identify the fishery enterprises operated by coastal communities to describe geographical potency and problems faced and to describe the opportunities of developing the integration of among fishery enterprises. The study conducted in two villages, Desa Kupa, Barru District and Desa Laikang, Takalar District. The case study used by two informants for each type of fishery enterprise. Data were analyzed for inter linkage business and development prospects based geographical position, raw materials and marketing sites. The potency of fishery MSEs development in the form of integration scheme in one location can establish a business cluster such as enterprises integration among fishing-processing-marketing in Kupa and integration enterprises of smoked fish-beach tourism-food and soft drink tavern and fishing floating cottage-beach tourism enterprises in Laikang. The involvement of government, private sector, financial institutions and other development agents who may have essential role are expected to support the fishery MSEs development.

**Key words:** Agribusiness, enterprise integration, processing, beach tourism, Indonesia, alleviating

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### **INTRODUCTION**

Micro and Small Enterprises (MSEs) is an economic sector that has great role in economic growth and employment opportunities for the community because it can be operated with a small capital, simple management and that close to market and suitable to be developed with the appropriate technology. Central Bureau of Statistic reported that the number of SMEs employment opportunities available increased steadily from 85 million in 1998-107 million jobs by 2012 with the number of entrepreneurs 56, 534, 592 units or 99.99% of the total 56,539,560 units enterprises, the remaining approximately 0.01% or 4, 968 units is employed by big company. The contribution to the national GDP of 1504.9 billion in 2012 with the average growth 2.96% annually for 2005-2012. SMEs also proved resistant to the economic crisis and even became the saver of the national economy at the time of the economic crisis in Indonesia in 1998 including the global economic crisis that hit also developed countries in recent years (Hening, 2013).

SMEs could be developed as engine of economic growth inline with the potency of fishery sector in Indonesia. Fishery MSEs is an economic sector that has great development opportunities in the fields of fisheries, catching, aquaculture, processing and marketing. Indonesia as a maritime country has abundant natural resources, around 17,000 islands with a coastline over 81,000 km with various types of resources such as

coral reefs, sea grass, mangrove, estuary of the river and small islands. This potential should be developed as the economic potency that will improve the welfare of coastal communities. The rate poverty of coastal community is higher than the national average. Poverty rate in coastal and island was very high or more than twice in the national level with percentage of poor people around 26.2% of the population living in coastal areas in 2011 (Bank Indonesia, 2016) while poverty rate in national level was 12.49%. One factor that causes the income of fishermen always small is the seasonal nature of production and marketing activities are not efficient because less supported by the handling and processing products. The nature of the immediate production is perishable, so often exploited by middlemen or middlemen at low prices. To overcome these problems based business integration development processing and marketing enterprises that are developed on a business cluster and coastal tourism will improve marketing performance, value-added products and increase the income of coastal communities.

One strategy for the fishery development is business integration development. Integration agro-industry as well as in fishery culture and catch with processing is an aiming for a steady supply of raw materials for agro-industry and an assurance of local markets for the products (Mckeller and Smardon, 2012). Integration of fishery enterprises is an outcome resultant to increase production and incomes. There are two type business

integration, fishery enterprises integration based processing and beach tourism. Some researchers emphasized tourism as an important means for income generation, employment and wealth in many countries (Lansing and De Vries, 2007; Choi and Sirakaya, 2006 and Lordkipanidze *et al.*, 2005). Indonesia as maritime country, beach tourism has a big role as an economic sector for development that can bring significant economic benefits to countries, especially for developing economies through economic growth and poverty reduction (Choi and Sirakaya, 2006).

The focus of study in the first stage is to identify the types of fishery enterprises and Appropriate Technologies (AT) already developed by coastal communities including the potential for development and its problems and to describe the potential for development in the scheme of integration of fisheries of all businesses existing fishing in coastal areas that could supporting fisheries business cluster beach based. The purpose of this study in general is a part of research activity planned for 3 years for developing the coastal aquaculture and fishing-based agribusiness related to the business of processing, catching, marketing, business travel beach (gazebo beach, business meals and drinks stall and fishing). The fishery MSEs development is supported by the appropriate technology based on local resources for the economic development of coastal communities.

### **Literature review**

**Processing as a driving forces in fishery sector:** Food processing has significant role to support the availability of food based on time, location and amount to do, so the nutritional needs for public health can also be met. Processing activities mitigate the problem of fishery products are perishable (perishable), seasonal and strongly influenced by climatic conditions. These aspects of production continuity and the prices are not stable, produced stretched, even in remote/isolated area, thus experiencing difficulties at the time of the carriage for mass weight (bulky), large volume (voluminous) and long distances from the production site to the consumer. Development of rural-based industry fishery product processing can solve problems and improve the welfare of fishery and coastal communities (Adjid, 1995). Processing of fishery products is the one of potential business to be developed for coastal communities. However, the activities have not been able to significantly increase people's income as well as the livelihoods of coastal communities. The development of fishery rural-based industry product processing can solve problems and improve the welfare of fishery and coastal

communities (Adjid, 1995). Appropriate technology introduced in the soft shell crab processing activities carried out by MSEs the could increase the added value, marketing network and quality of human resources, enhance its crab aquaculture as a provider of raw materials and employment (Fudjaja and Fujaya, 2014). The added value can be generated by the community with the processing of fishery products into refined products such as smoked fish, salted fish, dried anchovies, crackers, fish balls, beef jerky, shredded and other types of processed products to the driving sectors of the economy (Umary, 2013).

**Fishery SMEs development:** Processing activities in the fishery sector is one of economic sector to encourage the MSEs for the development of coastal areas and the equitable distribution of economic activity. This condition will put the fishery sector that has enormous economic potential and reliable in poverty alleviation, economic development and also will play an important role in the acceleration and sustainability of growth (Martini and Linberg, 2013). Fishery MSEs could be developed easily because they are supported by the very large potency of fishery resource. Most of the population or about 60% of the population in Indonesia live in coastal area as the market potency of processed fishery products. Coastal area has the potential development of an extensive marketing network which was supported better transportation network in the form of a land and sea transportations. All these potencies is a great opportunity for the MSE's sector to develop the economy for coastal marine and fisheries sector. China has experience with high growth from small enterprise contribution in particular township and village enterprises owned by local communities (Gibb and Li, 2003). Based on the empirical evidence of the economic crisis experienced both in 1998 and 2008, the SMEs sector in the Indonesian economy that were not affected by the influence of the global crisis (Hening, 2013).

Characteristics of SME are large provider of employment opportunities, the engine of growth, low investment enterprises and lowering the amount of poverty, especially for developing countries. The SMEs sector become the main driving force for job creation, poverty reduction, wealth creation, income distribution and reduction in income disparities (Fatusin, 2015), serve as the agents of change with the dynamic and evolutionary nature of scale of firms s the major job creators for the low income regions with intensive labor and low investment enterprises associated with the job creation in SMEs. Some above reviews stated that SMEs are considered to be the "engine of growth" for the

economy in developing countries (Advani, 1997). The SMEs promote entrepreneurial and innovative ventures to increase of competition and result wide benefits, improve growth of the economy and reduce the poverty levels in developing economies (Mukras, 2003; Beck *et al.*, 2005). The dispersion of these enterprises in these areas and their labor intensity may be very important in equal distribution of income. SMEs are firm types based in rural and smaller urban areas hence the development of SMEs may helpful for the economic stability, growth and employment. Beck *et al.* (2005) explored also the relationship between SMEs, growth and poverty with the important role of SMEs and growth in GDP per capita. SMEs contribute a higher economic growth which is above the national average with the characteristics of high level of public consumption, the conducive atmosphere to investment and geographically located close to the neighboring countries (Eravia and Handayani, 2015). Based on the existing potential in SMEs in Indonesia, it should MSE was developed as a provider of employment and sources of growth to reduce poverty in the fishery sector. Policy recommendations for poverty alleviation through strengthened SMEs who created jobs and growth (Sharafat *et al.*, 2014; Agyapong, 2010). SMEs serve also as a catalyst for technological development through innovation and indigenous technology (Ojo, 2006).

## **MATERIALS AND METHODS**

The research was conducted in the two districts of South Sulawesi Province, Barru District represents the northern coastal areas and Takalar District represents southern coastal areas. In the first year/stage of the multiple research planned, one village selected for each District, Desa Kupa in the District of Barru and Desa Laikang in the District of Takalar. The location was chosen deliberately with the consideration that the village Kupa has a resting place at the beach, accessible by road of Makassar-Pare national road, there food, drinks and processed fishery products are sold. Settlements in the area around of Kupa are dominated by the population living in the economic activities of fisheries. Topejawa and Pungtondo are considered as coastal tourist location located in Desa Laikang, District of Takalar. Topejawa is a beach destination for a resting area with the renting simple cottage and tire floating for swimming while Pungtondo is a beach tourist destination with the environmental education supplemented modern cottages for overnight facilities and environmental education information.

The research was a case study in every type of business operated in both locations. The methods of data collection are interviews, observations and trial the

Appropriate Technology (AT) of fish smoking stove and Floating Linefishing Cottage (FLC). FLC tryout was conducted in Pungtondo because rented boat for fishing hobbies is provided by community. In addition, the trial was carried out to have information on the feasibility of the design. Informants for business performance selected in Barru District are the business of shredded fish processing, dried anchovy, soft crab and seaweed cracker processing, processing for dried anchovy and tuna, product marketing enterprises and beach stalls. Informants selected in Takalar District were the business of lobster and fish cultures with a floating net cages, rental boats for linefishing on Pungtondo, leasing gazebo, car tires to swim and beach stall at Desa Laikang.

Types of primary data collected are business performance, marketing systems, investment, working capital, rawmaterial sources, technology, institutional household-micro-small scale fishing enterprises and aquaculture system. The results of the first year of research will be made design the development agri-based coastal fisheries (integration of fishery enterprises) and to identify the locations for for fishery enterprises integration development. The selection criteria for the village for the enterprises integration development are the economic activities based fishery operated by coastal communities; located on Sulawesi national road that has the potential of marketing because it can be visited easily either accidentally or while passing through the area for travel; the beach that can be developed as a tourist beach which is suitable for resting area for traveling (traveler) while doing a culinary tour or as specifically traveled and needed beach to breathe the fresh air by using beach gazebo or while linefishing and supported by the local community and government. Business performance of fishery enterprise identified were value of investment, investment period and employment opportunity. Financial performance by using R/C ratio by using by using average straight line method for depreciation.

## **RESULTS AND DISCUSSION**

The results of the identification of potential industrial/fishing effort in Barru and Takalar Districts showed that in both areas have huge range of various type of enterprises. Some of all these enterprises can be integrated with each other to encourage the development of regional or fisheries business cluster. One way to increase the growth and competitiveness of SMEs are through cluster approach (Herliana, 2015). The following describes the way of fishing enterprises in the village Kupa, Barru District and Laikang Village, Takalar District which allows them to be integrated for the development.

Table 1: Investment, labor and working capital based types of fishery enterprises in Desa Kupa, Barru District

Types of enterprises	Investment (IDR million)	Investment period (year)	R/C ratio	Labor	Types of working capital
Sharadded fish	5.0	5	1.7	1-2	Raw material and stock
Tuna processing/marketing	2.5	1	1.5	1-2	Stock
Anchopy drying	1.0	1	1.4	1-2	Stock
Smoked fish	5.0	5	1.6	1-2	Raw material
Crab cracker	6.5	5	2.1	1-2	Raw material and stock
Seaweed cracker	5.0	5	1.8	1-2	Raw material and stock

Exchange rate = IDR 13,000/US\$

**MSEs in Desa Kupa:** Fishery MSEs run by community in the region are fish catching, crab aquaculture, fishery product processing, dried fish, soft shell crab, seaweed crackers and product marketing at the side of national road Makassar-parepare route. Processing and marketing enterprises are business undertaken by fishermen household to increase added value and deal with the excess production and the production of low quality. Micro enterprises category in general are low investment, small amount of labor and a small working capital requirements. The value of investment used are varied based on the type of business with a range between IDR 1-5 million with a workforce of 1-2 people. Capital requirements are only for raw materials and stock. There was a positive relationship between value investment and R/C ratio while the rate of production and profit has negative relation to the R/C ratio (Table 1).

All the raw materials used for products manufactured or sold are generated by the coastal communities and fishermen who live in Desa Kupa. Shredded fish is made from coconut milk and fish being smoked or boiled. Fishery processing are in the form of fish drying and smoked fish while crackers processing are produced by using rawmaterial from seaweed and low quality of soft crab or byproducts from processing crab meat. All business activities done household enterprises scale are profitable with the range of R/C ratios are 1.4-2.1.

**Sharadded fish:** Enterprise of shredded fish in the study site is a home industry, managed by women group from fishermen family. Shredded fish that was developed in Desa Kupa with tuna fish as the basic raw materials. Tuna is one type of fish that is most in demand for processed into shredded due to its delicious taste and a lot of its nutritional content which is believed to healthy adults and educating children. In addition, many fishermen in this area as tuna fishermen make tuna fish as raw material available and affordable by shredded fish producers, especially during the peak season where the price of tuna has become very low. Otherwise for the transitional season, the fishermen could only get low quality of fish as well as low price, then the fish of tuna is made for shredded fish to have added value. Shredded fish

produced by households in Desa Kupa and its surrounding areas with the manufacturing process and packaging are simple, so the product quality and competitiveness of shredded tuna produced in this region are very low. Shredded tuna product was mostly marketed locally. The products are sold in local markets and stalls on the roadside. There are two kinds of packages with different price, aluminium foil package with a net weight of 100 g is sold at IDR 15,000/pack and mica plastic package with a net weight of 100 g was sold at IDR 17,000/pack. The shredded product was used as supplement for sticky rice which was also sold by beach stall in sideroad.

Shredded fish enterprises have a potential for development by increasing the quality of products as well as its capacity by integrating with other business that the fishery enterprises will get mutual benefit as well as develop together. The quality and taste of shredded fish could be improved by using raw materials derived from smoked tuna which could be produced by using stove Appropriate Technology (AT). Smoked fish produced has more delicious taste also more durable. The shredded fish and and smoked fish integration will generate mutual benefits in both sides.

**Drying anchovy:** Drying anchovy is run in the scale of micro enterprise by coastal community in Desa Kupa and its surrounding area. Bojo and Bottoe villages are as the major market of dried fish products are located surrounding to Kupa with the distance respectively 5 and 15 km. Dried anchovy fish and other fishes that are marketed for household consumption and souvenir by the merchands in the along roadside in Kupa region. Some fishermen have abundant production in Desa Kupa and selling to traders who come directly to the fishermen living in the area. Although, the price is slightly cheaper but more fishermen are happy because traders buy continuously all the fishes that has been dried by fishermen. Kind of dried fish is vary depending on the season of fish, among others such as fishes of Losa-Losa, salted anchopy, dried, etc.

Drying fish enterprises in this region are still sideline enterprise. Fish catch dry when the catch are abundant, not absorbed by the market or low prices. Throughout the

high prices of fresh fish, fishermen prefer to sell their catch directly (usually the catch is sold to traders on the sea). The quality of dried fish is low due to simple drying process. Fish dry on a net that is placed on the open ground by using sunlight. The price of fish is higher when the smaller size of anchovy as well as fish longer drying-process (drying time with a hot sun, usually 1-3 days). Therefore, the prices of dried fishes also vary according to the type of fish. Anchovy is sold locally at between IDR 3,000-7,000/kg while the price sold at Makassar (Capital city of South Sulawesi Province) IDR10,000-15,000/kg. Dried fish enterprises on Kupa region has the potential to be developed because there is a available raw materials, labor of family members and can be marketed locally or outside the region. If the quality of dried fish can be improved with better processing, clean, hygines well packed and exciting, improved duraibty for stored and marketed as typical souvenirs from Desa Kupa, the drying fish has a significant role to develope Kupa fishery business cluster.

**Crab processing:** Crackers enterprises using seaweed and crabs as raw materilas were found in the Desa Bojo. The location of housing production enterprises of seaweed crackers was quite close to the area of food and drink stalls located on the edge of the highway lane Makassar-Parepare on the beach area of Kupa. This enterprises developed by women as a part of fishermen family who also work as labor in the soft-shelled crabs culture in Desa Bojo.

Seaweed crackers products developed consist of two variations of flavors, namely sweet purple and crab. It was sold at a price of IDR 15.000/pack with a net weight of 250 g. Processing use simple technology and dried in the sun, therefore, crackers that can be produced is limited in number. Marketing area is also still limited, mostly sold locally in the form of raw crackers and a small portion is sold to the final consumer in Makassar.

**Fish processing and marketing:** Catching of anchovy and other sea fish species is still a kind of individual or household enterprise spread in coastal areas of Barru District. Most of the male in the region of Kupa are fishermen. Men in this village are forced to go fishing during the high wave season to fulfill their family needs. High wave season in this region generally is for seven months from April until the beginning of October. At that time, the fishermen can not optimize catches of tuna in particular because the strong ocean wind speed makes fishermen difficult to catch fish, so the fishermen could only catch limited in number, small size and low price. Tuna caught this season partly

usedas raw materials in the manufacture of shredded fish but it can also be used as a smoked fish to create add value and to improve the durability to be stored. The use of appropriate technology curing furnaces, smoked tuna fish can be produced with good quality (in terms of color, taste and aroma), so as to boost the market and demand for tuna. In contrast, during the peak season, the number of catches of tuna quite large and can not be absorbed by the market, thus partially making to dried tuna fish. This is because very limited cold storage company operating in the areas of Barru District. Phillips cold storage is a company that buys tuna from Kupa and surrounding areas but amost of the catch does not meet the criterion for export. Rejected fish for export is sole to the local market with the prices vary due to the size of the fish. Big size of tuna fish (around 1 kg) usually only valued around Rp 10,000 per head, then the small size (around 0.5 kg) sold for only IDR 5,000 per head. The fish were rejected and and not sold in fresh fish which can be processed into smoked fish and shredded fish. Smoked tuna fish is used as basic materials for the manufacture of shredded fish but it can be made of smoked fish to get added value and to increase the quality and storing durability as well. By using stove Appropriate Technology (AT), smoked tuna fish can be produced with good quality (in terms of color, taste and aroma), so the demand for tuna fish will increase in the Kupa and the market in other regions.

**Fishery MSEs desa laikang:** Fishery MSEs identified as having the potential developed through the integrated enterprises based beach tourism in the village of Laikang (Desa Laikang) are floating cage net of lobster and fish, rental boats for fishing, food and drink stalls on the beach, beach gazebo rental and rental swimming floating tires. The MSEs are using small number in the forms of investment and labor with very limited working capital.

The investments needs vary greatly from Rp. 0.5-15 million. Only lobster and fish in floating net cages and stalls businesses need working capital. The working capital are eed and stock for enlargement aquaculture for lobster and fish floating net cages and raw materials for the food andrink stall. There is negative relationship between value investment and the rate of R/C ratio except beach gazebo. The lowest rate of R/C ratio the highest of profit and high volume of volume attended (Table 2).

**Floating cage net lobster culture:** Enlargement of lobster aquaculture in floating cage net is developed fishermen community in Desa Laikang. The aquaculture technics and the maintenance are quite easy as well as the market

Table 2: Investment, investment periode, R/C ratio, labor and working capital based on types fishery enterprises Desa Laikang, Takalar District

Types of enterprises	Investment (IDR million)	Investment periode (year)	R/C ratio	Labor	Types of working capital
Lobster culture	8.0	5	1.5	1	Fry and stock
Beach gazebo	12.5	5	2.7	2	-
Swimming tire floating	0.5	5	>5.0	1	-
Rental fishing boat	10.0	10	2.5	1	-
Beach food/drink stall	15.0	10	1.7	2-3	Raw material

Exchange rate = IDR 13,000/US\$

potency is promising to make the fishermen in this area to be very optimistic to run enlargement lobster farming.

Lobster enlargement on floating cage net with the size of 3×3m<sup>2</sup> and putting fry was operated by fishermen with approximately 4 months for each production period. The price of lobster IDR 300,000-300,000 per kg or as much as 8-10 lobster fries. Stocking density of 80 fries per cage. After about 4 months cultured the weight approximately be 3-3.5 ounces per head.

The lobster aquaculture as micro enterprise is enough potential to be developed in addition to its price and demand are high and lobster aquaculture enlargement can also be combined with two or three aquaculture commodities called aquaculture integration system. The farming methods could increase the growth rate of lobster and other fishes that are integrated where waste from nutrition/feed consumption could be consumed by other cultured organism, so that the water quality can also be maintained. The combination of integration can be done by combining aquaculture fish like grouper and lobster. Both of these commodities can be supplied to a restaurant in the city or food stall in the beach which is also increasingly encouraging the development of tourist sites in the area of Desa Laikang.

**Gazebo rent:** Desa Laikang is one beach village in District of Takalar which has coastlines quite long and very beautiful lay directly opposite the Makassar Strait. Many visitors who come specifically to enjoy the beauty of beach. Most visitors still come from the local community who want a weekend and traveled coast. Along the coast, there are several gazebos for rent so that visitors can take a break while enjoying a view of the beach. The gazebos are managed by the local government and community privately. Gazebo provided local governments are rented Rp. 50,000/Unit/day and supplied by the local people at Rp. 40,000/Unit/day.

**Swimming tire floating rent:** The rental of a tire for a swim at the beach is developed as well as the developing of coastal tourist village of Laikang. New habits that arise among people Takalar known as a cheerful week also impacted the increase of visitors to this area for a weekend with the family and other relatives. On this

beach, visitors can perform activities such as swimming and snorkling. But still have to be careful because a lot of rocks are slippery and sharp. The lease tires for wear swim varies between IDR 5,000-25,000/day depending on the size of the tire rent. The larger the tire, the higher the rental price of the tire.

**Boat rent for fishing:** Laikang area is a location visited by many line fishing hobbyists. Fishing activities have an impact on local communities in the form of rental boats used by anglers. Bot rent varies between IDR 150-250 thousand per day not including labor wages for boat operator that also sometimes accompany anglers. All boat are owned by fishermen and renting the linefishing hobbies as secondary enterprise.

**The potency of enterprise integration:** Integration of fishery enterprises has an outcome resultant to increase the production and incomes. It may also encourage the scale of business, marketing network and institutional strengthening. Two types of AT (Appropriate Technology) of smoking stove and AT Linefishing Floating Lodge (LFL) were regarded as the driving force for the integration of fishery enterprise and coastal community development Stove AT is used to smoke fish and AT LFL equipped with rafts and anchored outside on the into a deep minimum of 5 m and the distance of 50-200 m from the shoreline. Rafts was tied up and drowned under FLL with functions to attract fish so that the LFL becomes easier and more convenient for anglers. Both types of AT is a renewed interest in the field of Appropriate Technology (AT) for sustainable development (Buitenhuis and Pearce, 2010). This innovation is fit local conditions and are easily and economically utilized from readily available resources by local communities to meet their needs (Zelenika and Pearce, 2011) therefore, it will be more effectively utilized by the communities (Chambers, 1983).

**Fishery enterprise integration:** MSEs is run by costal community in the beach of Kupa with processing shredded fish, catching anchovy, tuna processing/marketing, curing fish and processing crackers of crab and seaweed. Drying anchovy enterprise development could be achieved by increasing the processing and packaging

**Table 3: Enterprises integration potency based fishery processing products**

Type of enterprises	Enterprise scale	Backward linkage	Foorward linkage
Shradded fish	Micro, small	Tuna fishing, smoked fish	Smoked sticky rice
Drying anchovy	Micro	Fishing catch	Packaging
Tuna processing/marketing	Micro, small	Fishing catch	
Smoked fish	Micro	Fishing catch	Shradded fish
Cracker processing	Micro, small	Fish farmers	

methods. This business is very good because it can be integrated fishing effort and it can generate added value and the stable of fish price. Seasonal nature of this business and the resulting catch is abundant and difficult to dry because of the limited means of drying. The nature of the production process or catching anchovy and limited means of processing causes the problems facing fishermen. Very difficult marketed in fresh form because it is not worthy to be saved by means of refrigeration (frozen). The ability of fishermen to drying activities is also very limited because the number of the fish is abundant including the technology used is very simple and thus the quality of processed products is becoming low. In addition, the problems facing fishermen is the quality of salt used to preserve fish on drying activity is not good for health. Salt used for drying fish fishermen as a preservative can be mixed with formaldehyde so that the salt being traded is not easy to melt. This condition makes the processed fish products deemed to contain formalin while fishermen do not understand that salt used containing formaldehyde because fishermen do not use formalin are included at the time of drying except only use salt (Table 3).

Based on these issues, anchovy processing business is a potential enterprise to develope and stimulate the economy of coastal community. Enterprises may be encouraged through processing business with a particular technology to produce a good quality product, durable, does not contain formaldehyde with attractive packaging so that easily stored and carried, consumers favored. This product can be marketed in fishery business cluster which is expected to grow at the location where the fishermen live.

Shredded fish is produced by fishermen households with better technical processing. The product is already marketed in the food and drinking stalls located on Kupa beach area, the edge of the highway lane Makassar-Parepare. Shredded fish produced by households are integrated with the fishermen. The price of fresh tuna fish is low during peak season therefore, partially processed into shredded fish. Fish processing business could be scaled through the diversification of product ingredients based on the type of fish as the fish raw materials, improved quality and increased marketing area. Through the use of smoked fish that have been tested in the research stage could be used to smoke

different types of fish and even fish that low economic value to be used as raw material for making shredded fish. With the use of smoked fish for raw material that have economic value as low as raw material for making shredded fish, shredded fish cost can be reduced so that the selling price more competitive. In addition, variations of shredded fish product can be a lot of choice for consumers and encourage the development of fishery business cluster.

Stove Appropriate Techlogy (AT) is a means to increase the diversification of products and at the same time the quality of fishery products. These conditions will be increasingly in demand of consumers that will encourage the development of diversified products marketed in the fishery business cluster. The existence of stove AT and various fisheries products will attract a wide range of fishery products more marketable in the fishery business cluster.

There are two types of processing business in the beach region of Kupa, namely seaweed crackers and soft-shelled crabs crackers. The crab crackers is integrated with the soft-shelled crabs aquaculture. The raw materials for making crackers is coming form byproduct and low quality of soft-shelled crab that are not exported or byproduct from the production of soft-shelled crab meat. Crab cracker products can be marketed in Kupa business cluster that is expected to encourage the development of chips business crabs and crab culture and extends the fishery products marketing out side of Kupa business cluster. This business integration can be done because the aquculture of soft-shelled crab in the Desa Bojo located about 5 km from Kupa. Despite of these enterprises serve the export market, soft-shelled crab aquculture can also support the development of crab product processing business such as seaweed crackers business who use crab meat and or waste crab (crab shell) as an ingredient of crackers.

Enterprises integration of seaweed cracker with seaweed culture can also be developed in Kupa because many people in this region are culture seaweed. Potential business development of seaweed crackers has big enough because it supported the availability of raw materials and marketing locations. Seaweed can be obtained from seaweed farmers in the area Kupa and crabs soft-shelled crabs obtained from the farmers in the Bojo area. Seaweed farming is done by the people in

Table 4: Enterprises integration potency based beach tourism in Desa Lakang, Barru District

Type of enterprises	Enterprise scale	Backward linkage	Forward linkage
Lobster/fish enlargement aquaculture	Micro, small	Fishing catch	Beach stall
Beach Gazebo rent	Micro		Floating cotage fishing
Swim tire floating	Micro	Gazebo	
Fishing boat rent	Micro		Floating linfishing lodge
Beach stall	Micro, small	Lobster/fish aquaculture and fishing catch	
Smoked fish	Micro	Fishing	Shradded fish

Desa Kupa and surrounding area. Seaweed culture techniques that are easy and simple by using longline methods which is very flexible and low cost small-scale businesses. Generally, seaweed farmers started this business by providing seed and stretch rope provided by the Barru District Office of Marine and Fishery. The implementation of culture techniques is simple and easy to do by the farmers so that the coastal community interest to cultivate seaweed quite large. Management of seaweed farming in Desa Kupa, generally involve all family members. The husband and children do the mounting straps stretch while seaweed seedlings and drying done by the wives and children. Both types of businesses are increasing the value-added crackers, business scale, resource use of family labor and encourages collaboration household members to develop the fishing effort and aquaculture to the processing (Amandaria, 2014).

**Fishery enterprises integration based beach tourism:**

Topejawa beach is a beach tourist area visited by many people. This beach has sand and choppy and is equipped with gazebo as a resting place for the family traveled. In addition, the beach is also equipped with waterboom travel that makes this beach gets crowded during the weekends. MSEs run coastal community is leasing gazebo, swim tire floating and food and drinking stall.

Pungtondo beach is located nearest away from tourist areas of Topejawa beach providing some business activities such as the integrated environmental education and beach tourist supplemented with modern cottage, floating net cages for lobsters and fish developed by coastal community and renting boat for linefishing hobbyists. This location is visited by those environmentalists who are mostly from the education community and linefishing hobbies. Floating cage net and floating linefishing lodge could be considered as a technology and increased income and employment by coastal community (Gaffar, 2015) and to promote industrialisation and economic growth (Overa, 2011).

Around the tourist sites of Topejawa beach found as fishermen residential center where their fish catch sold to local fish trader that are living in the settlement of Topejawa. This fish trader sell fish to

several seafood restaurants in Makassar and tourists who come in Topejawa during the weekend. In general, travelers in Topejawa bring food or grilling fish brought from home or bought fish from local trader.

There is a potency of MSEs in Desa Laikang that can be integrated to encourage the development of beach tourism as a gazebo and the swim tire floating rent, boat rent integrated with LFL, food and drink stall, lobster/fisf floating net cage aquaculture including stove AT for fish. The integration between these businesses will provide the business efficiency, effective utilization of resources and sustainable business (Darma *et al.*, 2015) (Table 4).

Based on the existing potential in the tourist beaches of Topejawa and Pungtondo, enterprises integration can be developed. The catching, curingthe and marketing integration in coastal area of Topejawa. This integration can be supported by the development of Floating Linefishing Lodge (FLL) that has been tested in Pungtondo. FLL can be used in coastal areas of Topejawa when no waves and moved in the Pungtondo when big waves. The distance between the location Topejawa and Pungtondo is about 5 km.

Enterprises integration between the business of smoked fish-catching-and FLL will encourage Topejawa beach tourism because travelers will be attracted to swim, rest, fishing and culinary in the beach. This condition is expected to increase employment opportunities and incomes of coastal communities and regions. Fish landing harbor is located near to Topejawa making traveled to purchase fish and bring to the Topejawa beach and to bake/cooked with a very simple method.

This location has the potential for the utilization of AT smoked fish stove which provide ready smoked fish to eat for tourists with raw materials derived from fish landing harbor and angler fish. The AT smoked fish stove can also be used by the angler fish by exchanging the fish catch with the fish being smoked to take home as a result of linefishing (Darma *et al.*, 2015).

**CONCLUSION**

Coastal fisheries sector can be developed the integration of fishery enterprises based on processing and coastal tourism. MSEs can be managed by coastal



community because of the values of investment and capital are small with simple technologies and that can be developed with the Appropriate Technology (AT). AT strengthens the enterprises integration development and increases efficiency as well as encouraging the development of fishery business clusters based on processing and beach tourism. Use of AT stove for smoked fish can improve the quality of processed fishery products while developing AT Floating Linefishing Load encourages the development of beach tourism. Both of these development schemes can increase the scale of fishery enterprises, marketing share and networks, employment and product and region comparative advantages which in turn to reduce poverty and improve the economy in coastal areas. In the next step of research plan will be conducted for the feasibility analysis of enterprises integration, supported by the design of business development and institutional arrangement, AT development for fishery MSEs and business cluster. It is also expected that the local government engage in the development of enterprise integration and fishery business cluster.

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