

# Linkages between Extension Institutions and Stakeholders in the Development of Sustainable Fisheries in Lampung Province

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## Linkages between Extension Institutions and Stakeholders in the Development of Sustainable Fisheries in Lampung Province

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**Abstract.** Demand for animal food consumption, particularly fish, is quite high. This fact shows that fish is still the main source of animal protein in Indonesian society. Fish is a source of unsaturated fatty acids, taurine, and omega-3 fatty acids which are good for the human body, thus many people increase the consumption of protein derived from fish compared to livestock source meat. Given the important role of fish for human resource quality, it is necessary to have sufficient stock of fish to be consumed. Therefore, sustainable fishery business is needed from its aspects of economic, social and environmental and the role of extension agents and stakeholders in supporting sustainable fisheries. The aim of this study is how to support extension institutions and stakeholders in supporting sustainable fisheries business in Lampung Province. The method used a qualitative research approach. This research was carried out in Lampung Province, particularly in Pringsewu District, East Lampung and Tanggamus in July-August 2018. The number of research respondents was 235 fish processors. The type of data collected includes primary data and secondary data. Data collected through in-depth interviews and questionnaires were then analyzed using a qualitative descriptive approach. The results of the study revealed that the role of extension institutions needs to be improved, through the intensity of extension activities with an appropriate method, the extension media conducted by extension agents visiting fish processing sites. Fisheries extension institutions can coordinate with universities, the Directorate General of Marine and Fisheries Product Improvement Competitiveness of Ministry of Marine Affairs and Fisheries, Ministry of Tourism, Ministry of Industry, Ministry of Trade, and collaborate with hoteliers, culinary companies and retail gift companies in the regions for the development of sustainable fisheries

### 1. Introduction

The importance of sustainable fisheries development has become evident in Indonesia. The existence of Law No. 31 of 2004 concerning Fisheries obtained the fact that fisheries management is intended to open employment opportunities, improve the welfare of fish farmers and fishermen, and maintain fisheries and environmental resources sustainability. Therefore, aspects of fisheries development activities, including traditional fisheries should be in the view of sustainable development.

In 1987, the Bruntland Commission published its report, Our Common Future, in an effort to link the issues of economic development and environmental stability. In doing so, this report provided the oft-cited definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [1,2]. Sustainable development is not solely oriented to increase production, but also to influence cultivation efforts surrounding environment sustainability, as well as the demands of quality and product safety by



consumers and applicable rules. Sustainable Development is defined as development that meets the needs of the present without comprising the ability of future generations to meet their own needs [3,4]. For this reason, it is necessary to improve technology and management systems that lead to environmentally friendly production processes and concern about food security [5]. Basically, sustainable development activities apply the principles of sustainable fisheries to cover the main aspects of ecology, social and economics. To fulfill sustainable development not only involves human resources but also other resources or capital including environmental capital, economic capital, technology, politics and social capital [6,7].

Since it was declared through The World Commission on Environment and Development (WCED) in 1987, sustainable development concept continues to grow through the implementation of global development agendas such as Millennium Development Goals which have ended in 2015 and now through Sustainable Development Goals or SDGs [5,8,9]. SDGs are agendas that have been agreed upon by the world through UN resolution Number A/Res/70/1 with five main considerations namely People, Planet, Peace, Prosperity, and Partnership as main considerations in materializing sustainable development [10]. The five aspects above are then translated into 17 goals or the Goals sustainable development with 169 targets broader in scope and will be able to respond further to the root causes of poverty and the universal need for development which works for everyone compared to the MDGs [11–13]. The supporting component of processing business according to PP No. 15 of 1990, the processing and marketing of fishery products as one of the fisheries business fields is all individual businesses or legal entities to process, store, cool, preserve, market their fish and processed products for commercial purposes. Fishery products processing business is one of the important components in commercial utilization fish resources.

This research is very important because the results of this study can be used to empower coastal communities especially traditional fish processing. This research was conducted to find out the role of each institution, namely institutions of higher education, government and the private sector in empowering traditional fish processors. This because the fishery products processing business is the main driver of fish resource management, therefore the fish resources can be utilized for food needs human life welfare. Based on the description above, the aim of this study is how to support extension institutions and stakeholders in supporting sustainable fisheries business in Lampung Province.

## 2. Research Method

The method used in this research is survey method. In the survey method, retrieving data on a number of representative individuals represents the population to obtain certain values on a number of variables. The population studied in this study was 570 traditional fisheries processors including salting of fish, fumigation of fish, scanning of fish and fermentation of fish. Determination of the number of samples using the Slovin formula with an error rate of 5 percent, then obtained the number of samples 235 traditional processors. Determination of the number of samples from each region using proportional techniques.

The study was conducted in three regions in Lampung Province, namely East Lampung Sub-District, Pringsewu Sub-District, and Tanggamus Sub-District. That region is the center of traditional fisheries processed products, such as fish salting, fish smoking, *pemindangan*, and fish fermentation. The determination of research location was determined on the basis that the area had a population made living as a traditional fish processor. Traditional processing businesses in East Lampung District in Pasir Sakti Sub-District and Labuhan Maringgai Sub-District, while in Tanggamus District was concentrated in the Central Kota Agung Sub-District, Kota West Agung, Limau Sub-District, and in Pringsewu District was carried on in Adiluwih Sub-District (Pekon Bandung Baru). The study was conducted in July-August 2018.

The instruments used for data collection in this study are:

- (1) The questionnaire was prepared and compiled before the research was carried out, and tested for its validity and reliability
- (2) The question guide is a number of key questions to record qualitative phenomena both for respondents and other related parties that are in accordance with the problems and research

objectives as supporting data. In addition to conducting interviews with respondents, several activities carried out were:

- (a) Direct observation of traditional fisheries business. The things observed were: individual and business characteristics, external support from the processing group, fisheries and maritime service, universities, and support from business partners (fishermen, fish farmers, processors)
- (b) In-depth interviews with selected respondents and other sources of information, fisheries extension agents, Head Division of Capture Fisheries, Aquaculture, and P2HP to obtain supporting information.
- (c) Interviews with fishermen and fish farmers related to activities or programs that have been received, such as ship aid, the aid of shrimp seeds, freshwater fish, icebox aid, fish grillers, training in making meatb<sup>13</sup> crabs, catfish smoking.

The type of data collected is primary data and secondary data. Prim<sup>2</sup> information is obtained from fisheries business actors conduct processing business, such as fish salting, fish smoking, *pemindangan*, and fish fermentation. Information to support primary data is obtained from recording data that has been available in offices and a number of agencies related to the research objectives. Questionnaires are made in several forms, both those with the choi<sup>2</sup> of answers showing the answer rating, or in the form of statements with Likert scale [14,15] <sup>2</sup> in the questionnaire with Likert Scale, in each statement item in the questionnaire provided several alternative answers that can be chosen by the respondent in accordance with the understanding and experience they had obtained (Scale 1, 2, 3 and 4), then carried out descriptive and qualitative analysis [14, 16].

### 3. Discussion

#### 3.1. Sustainable Fisheries Business

Sustainable fisheries business consists of three aspects, namely economic, social and environmental. Overall, fisheries business actors consider that this business will continue to grow thus it can increase income, welfare and continue to improve the environment.

#### 3.2. Economic Aspect

Economic sustainability consists of processing costs, product prices and profits from traditional fisheries processing businesses viewed based on current conditions and future forecasts. Current production costs are high due to currently material production prices are increasing. However, in the future production costs can increase or decrease. The product price produced will increase because the raw material begins experiencing scarcity, thus it will affect the profit received by traditional fisheries processors.

Processors consider that processed businesses run economically are still quite profitable, the processors predict that the processing business costs will increase in the future. Increased production costs will also increase product prices, in addition to increasing product prices, the profits will be received by the processor will also increase. The high assessment of fisheries business level is economically sustainable, it indicates that traditional fisheries processing business is sustainable.

#### 3.3. Social Aspects

Processor's assessment of social aspects in Pringsewu District is higher than social sustainability in Tanggamus District and East Lampung District. Social sustainability of traditional fisheries processing includes aspects of harmony, their children education and processing family welfare at this time and future forecast. The high level of sustainability of processing businesses can affect processors desire to provide a better education for their family members.

Social sustainability in traditional fishery processing businesses is generally in the high category, as much as 60 percent of traditional fisheries processors estimate that harmony between fishermen processing and marketing of fishery products in the future will increase. Education of family members of traditional fisheries processors will also increase alongside the welfare of traditional fisheries processing families.

Harmony between processors is well established. There is a processing group, *posyandu* (community-based preventative and promotive care) group, and *pengajian* (Al-Qur'an recitation) group become a place to collaborate in social life. Education in processing families in three districts is still low, but processors already have an understanding that education is important, meaning that processors have begun to provide education to the high school level.

### 3.4. Environmental Aspects

Environmental aspects related to the availability of clean water, water and air pollution due to the existence of traditional fisheries processing activities. Waste from the processing business is managed to not disturb the surrounding environment, thus in the future, it will not become a problem for the environment.

**Table 1** Assessment of Respondents toward Sustainable Fisheries

Sustainable Aspect	Current Assesment	Future Assesment	Difference Test ( <i>T-Test</i> )
1. Economic aspect			0.02*
Business cost	6.2	6.9	
Product price	6.3	7.2	
Profit	6.0	7.1	
2. Social aspect			0.01**
Neighborhood harmony	6.6	7.5	
Family education	5.8	6.9	
Family welfare	6.0	7.1	
3. Environmental aspect			0.00**
Clear water availability	6.0	7.0	
Business waste	6.0	6.9	
Household waste	6.0	6.8	
Air pollution	6.3	7.2	

### 3.5. Fisheries Extension Effectiveness

Traditional processors' assessment of extension implementation needs to be improved, because the method, media, and material are perceived to be unsuitable (Table 2).

**Table 2** Assessment of processors on fisheries extension implementation

No	Variable	TGM(n=59)		PRS (n=55)		LTM (n=121)		Total (n)
		(Resp)	%	(Resp)	%	(Resp)	%	
1.	Extension methods suitability							
	Very low (0-25)	4	6.8	1	1.8	1	0.8	6
	Low (25.1-50)	55	93.2	54	98.2	120	99.2	229
	High (50.1-75)	0	0.0	0	0.0	0	0.0	0
	Very high (75.1-100)	0	0.0	0	0.0	0	0.0	0
	Mean (36.5)							
	Deviation Std. (7.5)							
2.	Extension media suitability							
	Very low (0-25)	16	27.1	8	14.5	33	27.3	57
	Low (25.1-50)	43	72.9	47	85.5	88	72.7	178
	High (50.1-75)	0	0.0	0	0.0	0	0.0	0
	Very high (75.1-100)							
	Very low (0-25)	0	0.0	0	0.0	0	0.0	0
	Mean (33.6)							
	Deviation Std. (12.2)							
3.	Extension material suitability							
	Very low (0-25)	0	0.0	0	0.0	1	0.8	1

No	Variable	TGM(n=59)		PRS (n=55)		LTM (n=121)		Total (n)
		(Resp)	%	(Resp)	%	(Resp)	%	
6	Low (25.1-50)	47	79.7	55	100.0	85	70.2	187
	High (50.1-75)	12	20.3	0	0.0	35	28.9	47
	Very high (75.1-100)	0	0.0	0	0.0	0	0.0	0
	Mean (44.9)							
	Deviation Std. (10.2)							
4.	Extension agents ability							
	Very low (0-25)	5	8.5	0	0.0	0.0	0.0	5
	Low (25.1-50)	12	20.3	0	0.0	1.0	0.8	13
	High (50.1-75)	24	40.7	49	89.1	26.0	21.5	99
	Very high (75.1-100)	18	30.5	6	10.9	94.0	77.7	118
	Mean (73.7)							
	Deviation Std. (18.5)							

Description: TGM = Tanggamus, PRS = Pringsewu, LTM = East Lampung/Lampung Timur

Processor assessment of extension activities is still very low. There are differences in the assessment of extension services in three districts, East Lampung District, in part assessing that extension services implementation is suitable, while the other two districts rate 60 percent of education as unsuitable. Facts in the field show that fish processing processors in Pringsewu District rarely receive any extension or training for the last five years only once, and not all processors participate in the activity. Processors in East Lampung District are more often educated compared to processors in Tanggamus District, this is due to the fact that East Lampung District is center of processed products, particularly in the field of fish salting in Lampung Province.

The method in extension activities that have been received is lecturing. The instructor has a good ability in transferring knowledge and convincing because the instructor has good communication skills. Processors assess the material is poorly understood if the lecture method is used in extension activities.

The extension method used in extension activities is lecture, while practice or demonstration is rarely carried out, so the processors give a low score. Traditional fisheries processors consider that practical methods or demonstrations are important, therefore knowledge received during training is easier to understand. Processors assess the method that has been used so far is still low (Likert scale score of 1.04), this can be seen from the mean score.

### 3.6. Strengthening Fisheries Extension

Extension as an extension activity in the learning process, extension methods and extension material oriented as well as determined according to needs, problems, potencies of processors and involving processors in fisheries programs activities. An extension that has been going on is still employing top-down pattern, this is also one of the causes of extension has not been able to develop a sustainable fisheries business in conducting business, therefore it has not been able to improve processor performance [17].

Extension needs to be specifically designed, and carried out using a method, media, and material approach that is in line with the educational objectives. Every party involved in extension activities needs to understand the extension philosophy, that extension activities philosophy includes: (1) the philosophy of educating, particularly education for adult; (2) the importance of individuals, namely processors who have needs; (3) democracy, mutual opinion and alignment; (4) collaboration, between farmers/business actors and extension agents as partners; (5) aiding farmers/businessmen to be able to support themselves; and (6) sustainable.

The extension process is conducted based on the education paradigm that emphasizes the participatory aspects of all parties involved in extension activities. This can be seen from the role of processor and instructor, the education learning process to help processors in making the best decisions for themselves and solving the problems they encounter. The learning process organized is oriented toward participants (participant learning center). Logical and convergent communication is the right thing to do because the communication source does not have to be one party, for example

only the instructor but both parties act as communicators as well as communicants. Learning orientation in participants are learning resources not necessarily from instructors, knowledge can be obtained from participants as adults who have had many experiences that can be exchanged and discussed [18].

Methods of visiting homes and businesses, it was conducted because most of the processors did business at home, especially in Tanggamus and Pringsewu Districts, while in East Lampung District there were several processors separating businesses and residences. Telephone calls are also made considering that most processors already have a handheld telephone and this makes it easier for extension agents and processors to coordinate, this is carried out if the individual targets are the processor. While the group approach method used group discussions, demonstrations, and lectures. Facts in the field show that processors are more interested in the demonstration method is conducted, for example making smoked catfish, meatballs, nugget, and crabs.

Extension media is an important factor in extension activities. Through media assistance, extension material can be more easily accepted and understood by processors. During this time the media used was only face to face so that often caused boredom, thus a lot of material was poorly understood. Considering that extension activities are only conducted once a month, an appropriate strategy is needed to utilize other media that can reach many parties.

The extension is not just about transferring knowledge and technology but also bridging processors with resources, such as capital sources or markets. Extension support is very important to reduce these limitations because extension agents can also function as motivators and facilitators. Extension agents as motivators, namely through extension activities can be grown in the heart of processors with the borderline of processed products can be a solution to improve their living standard. The extension is also able to connect farmers with other parties who can help farmers solve their problems, such as bringing together processors with capital institutions or with markets. This facilitation can help processors solve the problems they often encounter, namely the problem of capital and markets.

The extension materials related to sustainable business aspects, with the development of market-oriented products so as providing more from the economic aspects of traditional fisheries processing business to provide more benefits, providing extension related to the society dynamics in order to materialize harmony, in addition to build awareness of the importance of education to processors and their families, due to the fact in the field of education processors family only capable to access education till elementary or junior high school level, it is expected is if the awareness of education importance increases, the life of the processor and family will be more prosperous. Extension related to environmental sustainability is also an important matter, for example not disposing of household garbage or business waste into the sea or any place to avoid pollution because it will affect the business.

### *3.7. Improved Institutional Support*

The availability of capital and the ease of obtaining capital are important factors in the development of sustainable fisheries processing businesses in business management. The capital used by processors for business comes from themselves. The limitation of capital owned by processors prevent them to invest much in the business, therefore the development of traditional processed businesses is still far from expectations. The government has provided unsecured loan program, but the program has not to be felt by the processors yet because in reality bank is still asking for collateral to anticipate bad credit. Crediting should be created as simple as possible, thus small business actors can easily utilize it. A simple procedure will shorten the time to disburse funds, therefore processors can immediately use the funds. Loan scheme meets several principles which include:

- (1) Simplicity, namely lending, supervision, and return procedures must be made as simple as possible without eliminating the precautionary aspects.
- (2) Affordability, namely the loan manager location must be easily accessed by the public.
- (3) Conformity, namely the loan scheme in accordance with the ability to repay loans and community needs.
- (4) Feasibility, that is, the business to be funded must be worth the effort so as to avoid farmers from debt bondage.

- (5) Sustainability, that is, the management organization must be able to ensure that the loan will return, be able to generate profits and be able to bring in sufficient funds so that the program can be sustainable.
- (6) Openness, namely the existence of transparency that can increase the trust of funders and farmers.
- (7) Insight, namely program management officers must be able to supervise and improve loan use performance.
- (8) Assistance, namely farmers who generally do not have the ability to manage loans need to receive assistance from program management officers.

It is expected that after the business can develop optimally and is capable to provide optimal economic benefits, it can attract the attention of financial institutions to provide community forest business capital, therefore the government can shift its role into a guarantor institution.

In general, fish processing is highly dependent on availability, marine fish are seasonal while freshwater fish are sufficiently available. In Tanggamus District and East Lampung coastal areas, fish processed are mostly marine fish, thus outside the season's processors reduce production, particularly the mackerel scouts, and it makes them need other activities. If the raw fish material is unavailable in Lampung, the supplier will bring in fish from Jakarta, while raw freshwater fish material availability in Lampung Province is quite good. Pringsewu, East Lampung/Lampung Timur and Central Lampung/Lampung Tengah Districts are central areas of freshwater fish, namely catfish, tilapia and gourami.

The problem of raw materials can be overcome by the distribution of raw materials from areas that are abundant in fish to deficient areas, besides that the government can support fishermen and fish farmers through policies. The government as facilitator provides equipment, capital, and licensing services to influence processors ability to run fisheries business.

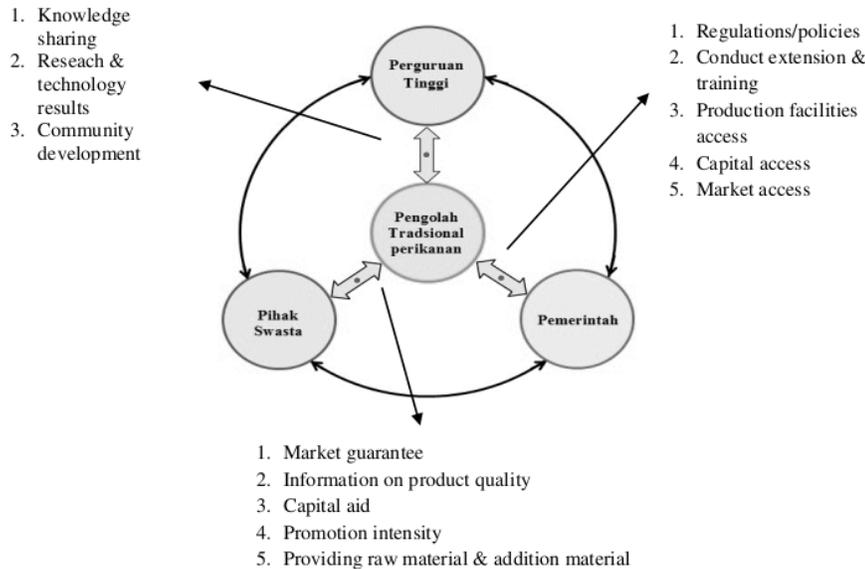
In general, the raw materials used for salting/boiling, *pemindangan*, and fermentation are fresh fish and salt. Facts in the field show that processors get fresh fish from fishermen and fish farmers, while salt is bought from shops/kiosks around the business location. The provision of raw material facilities for processors is very much determined by the availability and convenience aspects but the trust aspect is also an important aspect. Trust arises because of the excellent interaction at the Fish Auction Place (TPI), warehouses, stalls, and markets. This interaction pattern which then guarantees the continuity of raw materials supply with relatively cheap price levels.

Business partners of fisheries business actors are fishermen/fish farmers, processors, and traders called business partners. The condition of the raw fish material is the main factor to produce qualified products, therefore processors must be able to establish good communication with fishermen/fish farmers so that they are able to provide good material. So far, most processors have obtained business knowledge from generation to generation, therefore it is necessary to develop a processing group, thus they are not stuck/vacuum, with the existence of processing group, it will become a forum for learning in the context of business development.

In traditional salting/boiling business, processors usually not only act as processors, but also as fishermen, and as traders. In the salting/boiling business, fish fermentation, the processor has role as fisherman as well, while in the *pemindangan* business and smoking, the processors act as traders, meaning the knowledge needed not only as a processor, but knowledge as fisherman or trader, this can be done through training and intense assistance toward processors, therefore processors have skills in carrying out their roles as processors, traders, and fishermen.

### 3.8. Support of the Fisheries and Marine Service Program

Support of official programs in the field of processing related to sustainable fisheries processing business to run business, in seeking the development of traditional fish processing in improving quality and technology, alternative potential markets, continuous coaching/assistance is required [19] [20]. Interview results and FGDs showed that to improve sustainable fisheries business owned by processors, it is required the support of learning processes from the government, particularly the fisheries service related to training, internships, seminars, thus processors were fulfilled of knowledge needed for innovation.



**Figure 1** Triple helix role of stakeholders in sustainable fisheries

Figure 1 explains the interrelationships between institutions in enhancing the empowerment of traditional processors. The government (fisheries and maritime service) has a role in regulating policies and regulations, organizing counseling and training, access to production facilities, access to capital, and market access. The role of tertiary institutions in empowering traditional processors is sharing knowledge, research, and technology, assisting the community, while the private sector plays a role in market guarantees, information on product quality, capital assistance, the intensity of promotion, and provision of raw materials and supplementary materials.

The government should reduce marketing dependence on large traders, especially on salted anchovy salting products, so that processors have bargaining power against their products. So far the processors have only been price recipients, and those who negotiate are traders with exporters, which has resulted in relatively low-profit margins[21]. The government facilitates the formation of marketing institutions through cooperatives, SMEs that have the potency to absorb fish processed products and protect against harmful monopolistic practices [22].

Sustainable fisheries business development activities tailored to the needs derived from button-up patterns not based on the project, the government budget allocation (Fisheries Agency) is more biased for learning process activities, including training, apprenticeship, comparative studies, and setting regulations related to sustainable development patterns for processors fisheries as a business actor.

**4. Conclusion**

The synergy of the role of the Central, Regional, Higher Education and Private Government. The central and regional governments should coordinate in developing a package for the development of traditional processors' competencies, and the regional government assists fisheries extension programs managed by the center. Colleges coordinate with agencies, extension agents to jointly transfer knowledge, technology, and empowerment that can improve competence. Central and regional government policies in facilitating business needs through the assistance of equipment and business capital, provision of raw materials, and cooperating with the private sector in coordinating extension agents with universities in the formation of groups that are not yet grouped, such as traditional fish processing mills in Pringsewu District, and dynamics counseling. group or group benefits. The central

and regional governments, the private sector, universities are increasing product marketing support, namely market guarantees, the intensity of the promotion of traditional preparations by utilizing the potential of tourism charm and cross-sectoral cooperation, support through the provision of superior products, facilitating halal labeling, and the supply of packaging houses. as well as a place to sell souvenirs, promotions, food fairs. Fisheries extension officers can coordinate with the Directorate General of Increased Maritime and Fishery Product Competitiveness of the KKP, the Ministry of Tourism, the Ministry of Industry, the Ministry of Trade, and collaborate with private hotel parties, culinary companies, and retail gift companies in Lampung.

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