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Research Paper

The Empowerment Model of Skipjack Tuna Fish (Cakalang Fufu) Processing Small Industry in Bitung City

Siti Suhaeni[1], Soemarno[2], Nuddin Harahap[3], S. Berhimpon[4]
[1]*PhD Student, Management of Natural Resources and the Environmental, Faculty of Agriculture, University of Brawijaya, Indonesia*
[1]*Lecturer, Sosio-economic Fisheries, Faculty of Fisheries and Marine Sciences, University of Samratulangi, Indonesia*
[2]*Lecturer, Soil Science, Faculty of Agriculture, University of Brawijaya, Indonesia*
[3]*Lecturer, Sosio-economic Fisheries, Faculty of Fisheries and Marine Sciences, University of Brawijaya, Indonesia*
[4]*Lecturer, Fishery Processing Technology, Faculty of Fisheries and Marine Sciences, University of Samratulangi, Indonesia*

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ABSTRACT:- Minapolitan is a concept of regional economic management maritime and fishery development with the maritime and fishery sectors as the main sectors. This program which has been implemented of the Government of the Republic of Indonesia (RI) since 2009 is an effort to revitalize the production center of fishery and maritime with the emphasis on people income improvement. Bitung City is one of model city in capture/wild fishery minapolitan area of 9 areas in Indonesia. The Ocean Fishery Port in Bitung as the Main Zone of Minapolitan has strategic location because it is in Lembeh Strait waters, that is opposite to Sulawesi Sea and Pacific Ocean so that they become Outer Ring Fishing Port of Indonesia. The purpose of this research is to formulate the appropriate empowerment model for skipjack tuna fish processing small industry in Bitung City that can improve competitive power, advantage, and sustainable business development. The importance of this research is to protect the small industry existing in Bitung City and guarantee the sustainability of local excellent product of Bitung City that is the basic frame of Minapolitan. This research uses quantitative approach, qualitative approach, and mixed between both. This research learns all activities of skipjack tuna fish processing, starting from the procedure to get the raw materials, production process and products marketing. Thus, it is expected that the influence of the productions factors used toward the production of skipjack tuna fish can be found out. Besides, the efficiency in the use of production factors can be known, so that later after it is combined with the collected data and then processed, empowerment of skipjack tuna fish empowerment in Bitung City is known. Having known the efficiency and empowerment of fish processing small industry in Bitung, it is expected to get appropriate empowerment model through FGD and appropriate policy of the local government. The results of analysis show that 1) Cobb-Douglas analysis production function, it is found that fish fresh production factor as the raw material is the most influential factor toward the production of skipjack tuna. The influence of skipjack tuna is by 0.52% toward the result of production of skipjack tuna if it is added by 1% of fresh skipjack tuna. It is also shown by dominance test with the most standardized coefficient for fresh fish by 0.539. 2) Based on the result of Cobb-Douglas analysis, it is found that almost all of the production factors have not been efficient in use. It is shown by elasticity of production by more than 1, meaning that fish processing small industry in increasing returns to scale condition or inefficient.

Keywords:- Empowering, Skipjack Tuna Fish, Small Industry, Bitung City

I. INTRODUCTION

Minapolitan is a concept of regional economic management maritime and fishery development with the maritime and fishery sectors as the main sectors. This program which has been implemented of the Government of the Republic of Indonesia (RI) since 2009 is an effort to revitalize the production center of fishery and maritime with the emphasis on people income improvement. This minapolitan is one of realizations from blue revolution program implemented by Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia

*Corresponding Author: Siti Suhaeni
University of Brawijaya, Indonesia

which is one of the pillars is to change thinking pattern from land to maritime (Syahbana, A. 2011). According to Zulham and Punomo (2010), the indicator of Minapolitan development is to strengthen institutions, people empowerment and business, rationalisation of resources and space utilization, integrity policy and governance management, infrastructure development as well as technology utilization.

Bitung City is one of model city in capture/wild fishery minapolitan area of 9 areas in Indonesia. The Ocean Fishery Port in Bitung as the Main Zone of Minapolitan has strategic location because it is in Lembeh Strait waters, that is opposite to Sulawesi Sea and Pacific Ocean so that they become Outer Ring Fishing Port of Indonesia. The location in Asia and Pacific coasts enable the development of Bitung to be one of regional economic activity centers in Eastern Indonesia. The low empowerment of fish processing is actually rooted in the minimum human resources in mastering maritime and fishery source processing technology. Around 90% of the implementers of small-scale fishery business activity have low educational background, i.e. elementary school (Supriharyono, 2002) and they only rely on physical and infrastructure. As a result, there is no income increase. Meanwhile, Indonesian processed product commodities which meet international quality standards are less. The implication is that the Indonesian product commodity market can be improved if the quality is improved. Quality improvement is not other than improvement in technology of fish processing and handling (Martasuganda, etc, 2003).

Based on the background above, the purpose of this research is to formulate the appropriate empowerment model for skipjack tuna fish processing small industry in Bitung City that can improve competitive power, advantage, and sustainable business development. The importance of this research is to protect the small industry existing in Bitung City and guarantee the sustainability of local excellent product of Bitung City that is the basic frame of Minapolitan.

II. THEORETICAL BACKGROUND

Humans always use model unconsciously. In daily conversation, model means something that is good to be "an example" or "a model". However, in science a model is an abstraction or simplification of a system (Jorgensen,1988; Hall and Day, 1997; Grant et al., 1997). Model in general definition is a description of some realities. Models of ecosystem are far simpler than the real ecosystems. A model must have important functional attributes which contain in the real system. Of course, a model cannot have all attributes; because if that occur, the result is not a model but a real system. The model production is done to assist conceptualization and measuring toward a complex system, and sometimes to predict consequences from an action that may be high price, difficult, or destructive toward the real system.

This research refers to Minapolitan concept. This concept is regional-based fishery and maritime economic development concept through approach and regional management system whose principles such as integration, efficient, quality, and high acceleration. Conceptually, Minapolitan is divided into two. First, development in regional-based maritime and fishery sectors and second, excellent economic region with the main commodity of maritime and fishery. Some purposes of Minapolitan concept have three targets. These main targets of Minapolitan concept are: first, economic strengthening in maritime and fishery small industry; second, middle up maritime business; third, maritime-fishery sectors become national economic motor.

Referring to the minapolitan concept above, this research takes household economic object of small-scale maritime and fishery society with the purpose of improving production, productivity, and quality. The small-scale Maritime and fishery society in Bitung is the small industry of skipjack tuna fish processing industry. In the efforts of improving production, productivity and quality, the production factors influencing the production of skipjack tuna fish processing must be known first. By knowing the influence of these factors, we will know how to achieve the optimum production. Thereby, whether the application of those production factors has been efficient will be known. If not, the efforts to improve efficiency and then how to develop this must be further consideration.

III. RESEARCH METHOD

This research uses quantitative approach, qualitative approach, and mixed between both. This research learns all activities of skipjack tuna fish processing, starting from the procedure to get the raw materials, production process and products marketing. Thus, it is expected that the influence of the productions factors used toward the production of skipjack tuna fish can be found out. Besides, the efficiency in the use of production factors can be known, so that later after it is combined with the collected data and then processed, empowerment of skipjack tuna fish empowerment in Bitung City is known. Having known the efficiency and empowerment of fish processing small industry in Bitung, it is expected to get appropriate empowerment model through FGD and appropriate policy of the local government.

This research applies qualitative descriptive statistical analysis to describe skipjack tuna fish processing in the research location. The analyses order in this research is Cobb-Douglas analysis, to find out the effect of production factors and their efficiency.

IV. RESULT AND DISCUSSION

a. Process of Skipjack Tuna Fish Processing in Bitung

In the process of skipjack tuna fish smoking, there some factors of production, i.e.: first and primarily, raw materials in the form of fresh skipjack tuna fish, although in fact, not only this kind of fish which is smoked, but also baby tuna (figure 1). Another production factors in skipjack tuna production is bamboo as the clamper of fish flesh in order to form a shape and not smashed when getting smoked (figure 2). Another production factor is woka leaf or nipa palm which functions as the bamboo binding material or as the bamboo holder in order to be loose easily (figure 3). Another important thing is the production factor to produce smoke, i.e. coconut fiber or usually known in Bitung language as Gonofu (figure 4).

Figure 1: Skipjack tuna fish as the main material.

Figure 2: Bamboo Frame as the clamper.

Figure 3: Woka leaf or Nipa palm leaf as the bonding material. Figure 4: Coconut fiber to produce smoke

The production process of skipjack tuna fish is easy, although it needs patience and perseverance because of handling thing that is easily rotten and depraved. The first step in the production process is preparing fresh skipjack tuna fish (figure 5). The fish should be cleaned first by cleaving the abdomen and the pull the fish gills and abdomen's content simultaneously (figure 6). After that, cleave the fish back starting from the tail so it is divided into two parts (figure 7). The next step is taking the middle bone out of one of the parts, then clean the fish (figure 8). Cut the middle part of the cloven fish but do not make it broken in the tail or the head (figure 9). After it is chopped in the middle, start to clamp the fish by bamboo. The bamboo is then entered into eyes' holes and clamped in the tail part. Before being clamped, the fish is shaped into O shape, then the ends of the tail and head are bonded by woka leaf or nipa palm leaf (figure 10). The next step is stabbing by the smaller bamboo in the middle part of the fish to have more perfect O (figure 11). After that, the clamped skipjack is put in order above canopy and ready to be smoked (figure 12 and figure 13). To get good and interesting color, the producer smears the flesh with food additives. Food additives are used to cover uninteresting color due to non-fresh raw materials. If the raw materials are still fresh, the color of the fish will be golden yellow and the flesh will be compact and not easily to be depraved (figure 14).

Figure 5: Cleaving the abdomen.

Figure 6: Pulling the content of abdomen and fish gills out.

Figure 7: Cleaving fish back.

Figure 8: Taking the middle bone out.

Figure 9: Cutting middle part.

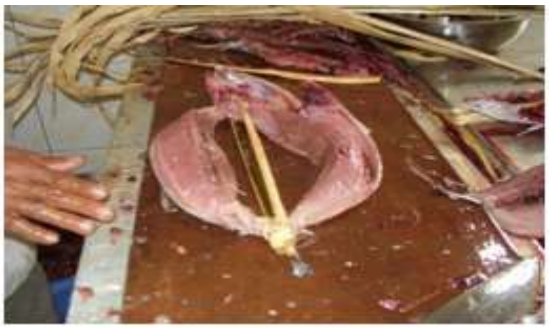

Figure 10: Clamping and Forming O shape.

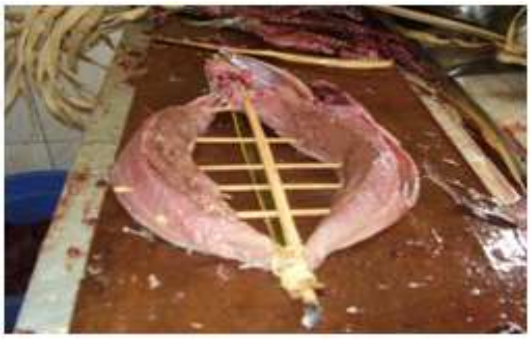

Figure 11: Stabbing small bamboo.

Figure 12: Traditional Smoking Procedure.

Figure 13: Other Traditional Smoking

Figure 14: Skipjack Tuna Fish Products

b. Effects of Production Factors

Based on the results of Cobb-Douglas production function that is used, the regression coefficient of each independent variable i.e. X_1 (Fresh Skipjack Tuna); X_2 (Bamboo); X_3 (Woka Leaf); X_4 (Gonofu); X_5 (Oil); X_6 (Additive) and X_7 (Employee). To be detail, the results of Cobb-Douglas function analysis can be seen in Table 1.

Table 1: Results of Cobb-Douglas Production Function Analysis.

Dependent Variables	Independent Variables	Regression coefficients	Coef *Std (β)*	t_{calc}	*Significant*	Explanation
Ln Production	Ln Constants	1,663				
	Ln Fresh fish	0,521	0,539	10,920	0,000	Significant
	Ln Bamboo	0,063	0,097	2,200	0,029	Significant
	Ln Woka Leaf	0,214	0,218	3,740	0,000	Significant
	Ln Firewood	0,016	0,016	0,349	0,728	Not Significant
	Ln Oil	0,079	0,071	1,749	0,082	Not Significant
	Ln Additive	-0,080	-0,028	-1,385	0,168	Not Significant
	Ln Employee	0,108	0,092	2,630	0,009	Significant
α = 0,050 **R = 0,972** **The coefficient of determination (Adj.R^2) = 0,941** **F- calc = 340,783** **significance = 0,00**						

Source: Primary data is processed, 2014

Table 1 shows that all (of independent variable), it is known that elasticity of production almost reaches 1, i.e. 0.921, it can be concluded that small industry fish processing in constant return to scale. It shows that if the production factors in skipjack tuna processing are improved proportionally, it will increase the result of production in the form of skipjack tuna proportionally

Coefficient of regression of the raw material of X_1 (fresh fish) is 0.521, meaning that if the use of input of raw material in the form of fresh skipjack tuna of 1%, it will cause an increase of 0.52% of production output. The raw material of fresh skipjack tuna is the main component in skipjack tuna processing small industry, so that if the supply of the fresh fish is restricted it will get stuck, the fish processing process will stop. So, it can be concluded that the addition of 1% X_1 will influence an increase of 0.52% of the production result.

The regression coefficient of the X_2 production factor (bamboo) is 0.063, meaning that if the use of bamboo as the production factor is added by 1%, it will cause an increase in output production in the form of 0.06 % skipjack tuna. Bamboo, although it is not the main component in the small industry of skipjack tuna processing, if the bamboo supply is limited, it will disturb the production process. Therefore, it can be concluded that the 1% addition of X_2 will make an increase of 0.06% of production result.

The Regression Coefficient of the X_3 production factor (woka leaf) is 0.214, meaning that if the use of woka leaf as the production factor is added by 1%, it causes an increase of 0.21% of skipjack tuna production output. The woka leaf as the production factor is not the main component as well in small industry of skipjack tuna processing. However, if the supply of bamboo is restricted, it will disturb the process of production. So, it can be concluded that 1% addition of X_3 will cause an increase of 0.21% of the production results.

The regression coefficient of the X_4 production factor (gonofu) is 0.016, meaning that if the use of fuel production factor of gonofu or coconut fiber is added by 1%, there will be an increase of production output in the form of skipjack tuna of 0.02 %. Gonofu as the fuel and the production factor is not the main component in skipjack tuna processing small industry, but if the bamboo supply is hampered, it will disturb the production process. So, it can be concluded that if there is 1% addition X_4 of 1% will make an increase of 0.02% of the production. Although it is small, but it has positive effect.

The regression coefficient of X_5 production factor (oil) is 0.079; it means that if the use of X_5 production factor in the form of oil and added by 1%, it will raise 0.08% of the production output in the form of skipjack tuna. The production factor of oil is actually the main component of the small industry of skipjack tuna processing, because the function is only as the fuel to firing coconut fiber up in order to be easier to flare, although without oil it can flare as well, but slower. So, it can be concluded that the addition of X_5 by 1% will influence the increase of the production result of 0.08%. Although small, but it has positive influence.

The regression coefficient of the X_6 production factor (additive) is -0.080; meaning that the use of X_5 production factor in the form oil is added by 1% akan causes output production in the form of skipjack tuna amounting to 0.08%. The additive is not the main component in small industry. Additives are not only food additives that function to make the fish more interesting and fresh and to attract the consumers. So, it can be concluded that the addition of X_6 by 1% will decrease 0.08% of the production result.

The regression coefficient of X_7 production factor (employee) is 0.108; meaning that if the use of X_7 production factor, employee, is added by 1%, it will increase the production output by 0.11%. Employee production factor is the main factor in skipjack tuna processing small industry, because without employee the production process cannot be done. In the process of any production, employee is very important, even it uses modern machine, it still needs employee. Moreover, the traditional production process which almost all of its stages depend on employee. So, it can be concluded that the addition of X_7 by 1% will increase the result of production by 0.11%.

In Table 1, it can be seen that R^2 determination coefficient is 0.941. the determination coefficient is appropriateness measurement or accuracy of regression line. R^2 is also used to measure the proportion size of total diversity that can be explained by regression line. The R^2 value explains that the influences of independent variables which are used simultaneously is by 94.1%. Meanwhile, 5.9% is influenced by other independent variables which cannot be used in equation.

Table 1 shows that X_1 (fresh fish) is a variable whose the most standardized regression coefficient. It means that Y (skipjack tuna production) is more influenced by X_1 variable (fresh fish) than other variables. Thereby, it can be concluded that variable of fresh fish is the most dominant variable in the process of skipjack tuna production.

c. Efficiency

Efficiency is the effort of using least input to get the most output. The situation will occur if the businessmen can make effort to reach Marginal Product (MP) value of an input equal to input (P). So, the value of marginal product per price of the production factor must be equal to 1. The closer the efficiency value to 1 means that the use of production factor is getting more efficient. The efficiency can only be done in independent variables whose real or significant effect, in this case they are X_1, X_2, X_3 and X_7. The result of efficiency estimation of each variable whose significant or real effects can be seen in Table 2.

Table 2: Results of Efficiency Calculation

Independent Variables (X)	X1 (Fresh Fish)	X2 (Bamboo)	X3 (Woka Leaf)	X7 (Employee)
Means X	**83,267**	**0,935**	**3,533**	**1,360**
Production(Gepe) (Y)	**65,773**	**65,773**	**65,773**	**65,773**

Mean Produc (AP)	**0.79**	**70,36**	**18,62**	**48.36**
Production Rates (Y/ gepe) (P_y)	**35000**	**35000**	**35000**	**35000**
Price X (P_x)	**13500**	**10000**	**2500**	**75000**
Regression Coefficient X (bi)	**0,539**	**0,063**	**0,214**	**0,108**
PM_{Xi}	**0,426**	**4,416**	**3,975**	**5,235**
NPM_{Xi}	**14894,352**	**154565,182**	**139137,154**	**183236,859**
NPM/P_{Xi}	**1,103**	**15,457**	**55,655**	**2,443**
Mean Xi optimal	**91,867**	**14,450**	**196,647**	**3,323**

Source: Primary data is processed, 2014

Table 2 shows that the technical efficiency of X_1 (fresh fish) production factor by 0.79 and economical efficiency by 1.103 with the total optimum production is by 91.867. The efficiency value indicates that to reach optimum result, it is necessary to add fresh fish as the raw material from 83.267 to 91.867.

The technical efficiency of X_2 (Bamboo) production factor is by 70.36 and economical efficiency by 15.457 with total production of 14.450 at maximum. The efficiency value indicates that to reach the optimum result, it is necessary to add bamboo production factor from 0.935 to 14.450 in order to get the optimum result. The technical efficiency of X_3 (Woka leaf) production factor is by 18.62 and the most economical efficiency is by 55.655 with total production of 196.647 at maximum. The total efficiency indicates that to reach optimum results, it needs to add total production factor of woka leaf from 3.533 to 196.647 in order to reach optimum results. Based on the results of technical efficiency, the X_7 (employee) production factor is by 48.36 and the most economical efficiency is 2.443 with total production 3.323 at maximum. The efficiency value indicates that to reach optimum result, it needs to add employee production factor from 1.360 to close to 3.323.

V. CONCLUSION AND SUGGESTION

Based on the results of analysis, it can be concluded that 1) *Cobb-Douglas* analysis production function, it is found that fish fresh production factor as the raw material is the most influential factor toward the production of skipjack tuna. The influence of skipjack tuna is by 0.52% toward the result of production of skipjack tuna if it is added by 1% of fresh skipjack tuna. It is also shown by dominance test with the most standardized coefficient for fresh fish by 0.539. 2) Based on the result of *Cobb-Douglas* analysis, it is found that almost all of the production factors have not been efficient in use. It is shown by elasticity of production by more than 1, meaning that fish processing small industry in *increasing returns to scale* condition or inefficient.

Some recommendations are: for Fish Processing Small Industry in Minapolitan region, it is expected to improve the use of production factors, mainly the fresh raw material/fresh fish in order to be more efficient. It is also expected that the Stakeholders strengthen their role toward the existence of fish processing small industry in Bitung City, so that the fish processors feel close, safe and protected. The formulation of empowerment model has not been tested and implemented directly.

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