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## Analysis of Opportunity Cost Land Utilization of Soybean and Corn Farming in Watubangga Sub-district, District of Kolaka

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### Abstract

This study aimed to analyze the utilization of agricultural land and income difference between soybean (*Glycine max L Merril*) farming and corn (*Zea mays L*) farming in Watubangga sub-District, District of Kolaka. Data were collected by survey and interview and analyzed using an income approach and mean difference test for 65 samples of heads of households (KK). The results of data analysis showed that the opportunity cost of land utilization was Rp 5.481.651/ Ha which caused by choosing soybean farming. The result also showed a significant difference in land utilized for soybean and corn farming. The Result of study suggested the farmers cultivate corn.

**Keywords:** Land utilization, income.

### A. Background

The agricultural sector is one of the sectors that can still be relied upon due to its ability to generate income in overcoming the current crisis. This situation indicates that the agricultural sector is one of the reliable sectors that has a great potential to play a role in triggering the national economic recovery. The agricultural sector is one source of foreign exchange for the Republic of Indonesia. Thus, the development of this sector should continue to be improved. It is in line with the main goal of national development that is to improve the standard of living, intelligence, and welfare of all society. Along with the development of agriculture, the livelihood of farmers should receive a great attention. One of the efforts to improve farmer's livelihood is by increasing income through an appropriate utilization of land (Husodo, et al, 2004).

Soybean (*Glycine max L Merril*) is one of the important crops in Indonesia that plays an important role in the lives of millions of soybean farmers, about 160 thousand small craftsmen of tofu and tempe industries as well as millions of people as consumers. Since 1975 Indonesia became a soybean importer country because local soybean production is poor to meet soybean demands. The current data showed that the production of soybean in 1998 reached 1.306 million tons, but decreased by 1,357 million tons in 1997, otherways, soybean consumption reached 2,040 million tons in 1998 and 2,020 million tons in 1997 which lead to causing Indonesia to regularly import soybeans (Ahmad, 2000). On the other hand, the effort of self-sufficiency of corn continues to be programmed, because corn is the second carbohydrate-

producing food after rice. In addition to direct consumption, corn is also used as fodder for animal to produce milk and meat and also as used widely in industrial raw materials. Therefore, corn is a commodity that has strategic value as well as rice (Anonymous, 2002).

Agribusiness system is a unity of commercial business in agriculture by optimal utilization of all resources to obtain maximum benefits for all actors involved in whole agribusiness subsystems, such as subsystems of procurement of production facilities, subsystem of primary production and subsystem of management and marketing (Soeharjo, 1996). On the other hand, farming activities can not be separated from the economic principle that is efficient and effective. Where the meaning of economic principles is the smallest sacrifice to get maximum results. Efficient in economic activity emphasized on the aspect of sacrifice by minimizing costs without reducing the targeted profits. Effectively focused on the goal (goal or outcome), that is how to gain maximum results without an additional cost. In simple word, farming (business) is all the activities carried out by one or more people in order to gain a profit through the provision of products needed by society (Francis, 2009).

A farmer who chooses a type of investment means releasing the opportunity to invest in other investments. All farmers seek the highest-yielding investment with low risk, while others are looking for that can provide long-term yield guarantees although with little results. Opportunity cost also relates to the principle of substitution and particularly significant in estimating the return rate of investments necessary to attract the capital inflows. By analyzing and comparing the return rate on investment offered by various investment instruments, farmers can assess which one is best to cultivate. Opportunity cost is described as the net cost of the other opportunity to get investments that are not selected or the choices that are passed, rejected or left to disappear (Prawoto, 2004). Business is all the activities carried out by one or more people in order to gain a profit through the provision of products needed by society (Francis, 2009).

Farming conducted by the community in Watubangga Sub-District aimed to earn income and give a significant contribution to the life of farmers, in which the income of farmer is the ultimate goal of a production process by utilizing the land, capital and labor. However, the best utilization of land from types of farming needs to be determined. Thus, this study aimed to determine the amount of income (opportunity cost) between soybean and corn farming on land utilization by farmers in Watubangga District Subdistrict, District of Kolaka. The problems of the study ; How much the opportunity cost of land utilization between farming and corn farming in Watubangga Sub-District, Kolaka District; and Is there any income differs from the utilization of soybean and corn farming in Watubangga Sub-District, Kolaka District.

## **B. Method**

### **1. Research site**

The research site is located in the village of Gunung Sari and Sumber Rejeki Watubangga Subdistrict, Kolaka District. The location was chosen because both of the areas are the center production of soybean and corn in Watubangga District. Moreover, the distance of the location was close and have the same land contours so that the soil fertility was also the same.

### **2. Population and sample of research**

The samples of the study consisted of 30 Head of households (KK) of corn farmers in Gunung Sari Village, and 35 Head of households (KK) of Soybean farmer n Sumber Rejeki Village, then the number of the samples was 65 head of households (KK). The determination of the sample taken by the census of the entire population was used as the research samples. Thus, all members of the population were respondents in order to reduce the error mean (Sugiyono, 2009).

### **3. Data Analysis**

To know the amount of opportunity cost, it is analyzed by using a descriptive analysis which based on income analysis, (Soekartawi, 2002);

$$\pi = TR - TC.$$

Where:

$$\pi = \text{Income (Rp).}$$

$$TR = \text{Total revenues (Rp).}$$

$$TC = \text{Total cost (Rp).}$$

The difference of income was analyzed using SPSS 20 software *Paired Sampel t\_test* (Wiratna, 2015). *The test of t-paired* is used to determine the average difference of two independent samples.

Criteria of test:

Ho : There is no difference of income between soybean and corn farming.

Ha : There is a difference of income between soybean and corn farming.

Decision:

If Sig > 0.05, Ho is accepted.

If Sig < 0.05, Ho is rejected.

Sampling technique used was the census or saturated sampling method that is 37 respondents consisting of 16 fishermen, 7 collectors, 3 merchants and 11 retailers. In this research, the sampling technique was combined with Snowball Sampling. This method was used because the number and existence of the sample were not very clear. The researcher only knew some samples and wanted more samples used in the research. Therefore, the researchers looked for one of the fishermen (Mr. H. Kidung, 61 years) in the location of the study to be questioned more clearly and showed to other fishermen and marketing practitioners who can be sampled for the purposes of this study.

#### 4. Data Analysis

In this study, the marketing margin is calculated as the difference between the selling price of sea fish at the fisherman level and the selling price of the sea fish at the retailer level. In order to know the value of marketing margin on every marketing practitioner, it will be tested by using cost analysis tool and marketing margin (cost margin analysis) by calculating the amount of marketing margin, marketing cost and profit as well as fisherman's share. Calculation of marketing margin value uses the following formula:

a. Marketing Margin Analysis, used to measure the profit of each practitioner involved in the fish distribution process.

Formula:  $MP = Pr - Pf$  .....(3.2)

Where:

MP = Marketing margin (Rp/kg)

Pr = Price of consumers (Rp/kg)

Pf = Price of Producers (Rp/kg)

b. Share price received by fishermen, which is the percentage of profits received by fishermen.

$SPf = Pf / Pr$ .....(3.3)

Where:

SPf = Share price at fishermen level

Pf = Price at fishermen level

Pr = Price at consumers level

a. Marketing costs and profit sharing.

$Sbi = (bi / Pr) \times 100\%$  .....(3.4)

$Ski = (ki / Pr) \times 100\%$  .....(3.5)

Where :

Ski = Share the profit of marketing institution of i

Sbi = Share marketing cost of i

Marketing margin distribution

$DM = (Mi / Mtot) \times 100\%$  .....(3.6)

Where:

DM = Margin distribution

Mi = Marketing margib of marketing agency groups

i = 1 (collectors)

i = 2 (merchants)

I = 3 (trailers)

$Mtot = Mi + M2 + M3$ .....(3.7)

## C. Results and Discussion

### 1. Land Utilization for Soybean and Corn farming

The results of the field observation suggested that there is a difference of the use of inputs and outputs, both in terms of production, price, and costs for soybean and corn farming. The differences can be seen in Table 1.

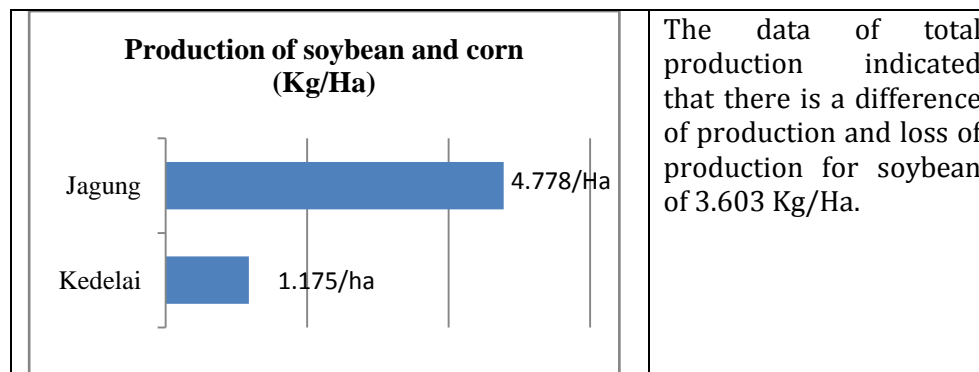
**Table 1. Soybean and corn farming**

Description	Value per hectare	
	Soybean	Corn
Production (Kg/Ha)	1.175	4.778
Price (Rp/Kg)	7.000	3.000
Revenue (Rp/Ha)	8.225.000	14.334.000
Production cost (Rp/Ha)	4.247.651	4.875.000
Income (Rp/Ha)	3.977.349	9.459.000
Opportunity Cost(Rp/Ha)	(5.481.651)	

Source: A Primary data, analyzed in 2016.

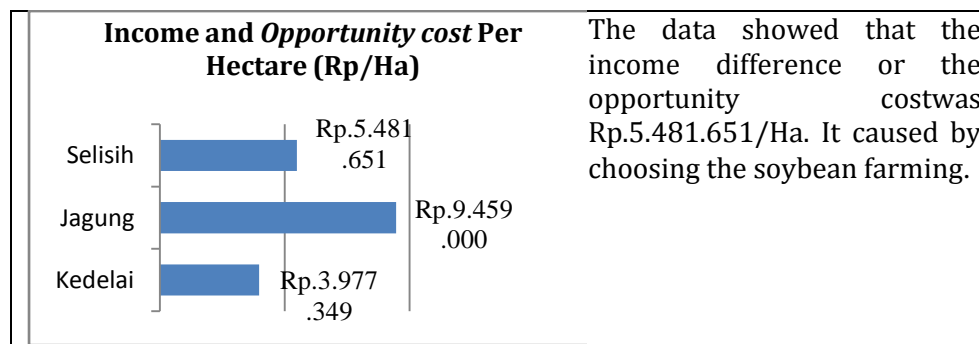
Table 1 indicates some differences which seen in several components ;

- Production; The production of soybean and corn in table showed that the total production of soybean and corn were 1.175 Kg/Ha 4.778 Kg/Ha, respectively. The more detailed data is shown in figure 1.



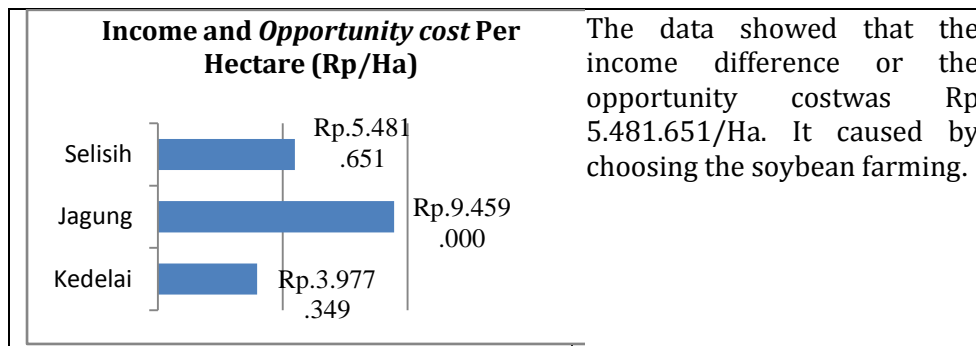
Source: Table 1, analyzed in 2016.

- Price; The selling price of soybean per kilogram (*Glycine max* L Merrill) based on Table 1 was Rp.7.000 / kg, while the selling price of corn was Rp.3.000 / Kg, it showed a big enough difference of Rp 4.000 / Kg.
- Production cost; The production cost of soybean and corn based on Table 1 showed the difference, in which the production costs of soybean and corn were Rp 4.247.651 /Ha and Rp 4.875.000/Ha, respectively. The detail of production cost is shown in figure 2.



Source: Table 1, analyzed in 2016.

- Income and Opportunity Cost; the difference of income based on table 1 showed that the income of soybean and corn farming were Rp 3.977.349./Ha and Rp 9.459.000./Ha, respectively. The detail of data is shown in figure 3.



Source: Table 1, d analyzed in 2016.

**2. Difference test analisis of the income of soybean and corn farming**

Difference test analysis of soybean and corn farming incomes was concluded based on the average of the total land (1 Ha). The data then used to analyze the difference level to be used in the analysis of opportunity cost of utilized land. The result of the difference level was obtained using SPSS 20 software to know the significance different.

**Paired Samples Statistics**

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	K_soybean	4018500,03	30	647845,478	118279,861
	corn	9550000,00	30	2172665,215	396672,583

**Paired Samples Correlations**

		N	Correlation	Sig.
Pair 1	K_soybean and corn	30	,141	,758

**Paired Samples Test**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 soybean - corn	-5531499,967	2178087,677	397662,584	-6344811,272	-4718188,662	-13,910	29	,000

Hipotesys :

Ho : There is no difference of income between soybean and corn farming.

Ha : There is a difference of income between soybean and corn farming.

Decision:

If Sig > 0.05 ,Ho is accepted.

If Sig < 0.05, Ho is rejected.

The test result which showed Sig. 0,000 < 0.05 suggested that Ho was rejected (there is no difference in income between soybean and corn farming) and Ha id accepted (There is a difference in income between soybean and corn farming).

**D. Conclusion**

Based on the results and discussion, it can be concluded as follows:

1. The Opportunity Cost due to the land utilization of soybean was Rp.5.481.651/Ha.
2. There is a significant difference of land utilization of soybean and corn farming.

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## Analysis of Processing of Clove Essential Oil In Lawulo Village Samaturu Sub-District Kolaka District

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### Abstract

The objectives of the study were to train clove farmers group about the post-harvest handling system in order to produce essential oils with export quality, to train clove farmers group in terms of essential oil processing system as well as to encourage clove farmers group to apply appropriate technology for processing of clove essential oil with export quality. In general, the main and most common problems faced by clove farmers are inadequate system of clove essential oil processing system, the handling system and equipment used are not up to standard, moreover, the technology used in handling, durability, and package of clove essential oils still very limited. The approaches offered and agreed by the clove farmer group are as follow: (1) General approach, (2) Determination of training participants, (3) Types and procedures of training (training strategy), and (4) Scale of the program. The expected targets and outcomes of this community service program are: Farmer groups are able to apply appropriate technology in the production of clove essential oil, both to post-harvest handling, processing and storage of clove essential oils to obtain added value. In fact, knowledge of farmers about post-harvest handling and processing technology of clove essential oil to increase farmer's income is still very poor. The results of analysis of essential oil clove processing showed that the clove leaves utilization as an effort to create an added value of farmer's income by Rp. 13,000,000 per production unit. The difference in selling price between the dried clove leaves and processed clove leaves into essential oil was Rp. 10,765,000. Comparative test (t-test) showed that t-count value for selling dried clove leaves was 16,068 while clove leaves processed into essential oil was 35,108. The t-table value of 1,675 indicated that  $t \text{ count} > t \text{ table}$  where  $H_0$  is rejected and  $H_1$  is accepted. It concludes that there is a comparative income of farmer who sells dried clove leaves and farmers who sell clove leaves in the form of essential oils.

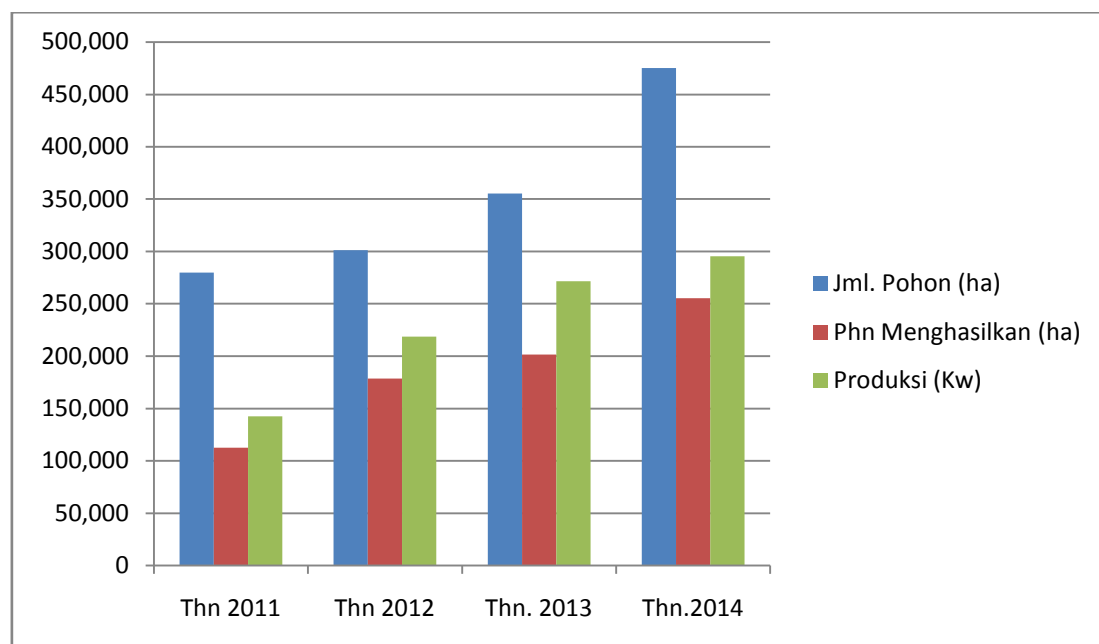
**Keywords:** Clove Farming, Essential Oil and Comparative

### A. Background

Agribusiness is a comprehensive concept, that is the unity of business include the production chain, processing, and marketing of the product relate to agriculture in a broad sense. The economic crisis that has plagued Indonesia since July 1997 has made many non-agricultural industry businesses bankrupt, while agricultural products remain dependable as it contributes

substantially to the country's foreign exchange, thereby achieving an acceptable progress level, particularly in non-oil and gas commodity exports that are very important for industry sector processing. Agroindustry is an alternative to balance the economic growth as well as to create employment through an export-oriented economy which simultaneously providing millions of new jobs, particularly in rural areas (Soekartawi, 2013).

Agroindustry is an option because the agricultural sector is still the main source of livelihood of the population and the largest contributor in Gross Domestic Product (GDP). Agroindustry activities are an integral part of the agricultural development. The agroindustry effect is capable of transforming the primary product to the processed product as well as transforming the culture of low added value into a modern industrial work culture with a high added value (Mujrin, 2016). In Kolaka District, clove is a commodity of plantation crop that is able to contribute the largest in gross domestic product (GDP). From the data of Central Bureau of Statistics (BPS) of Kolaka District in 2015, it shows that the production of clove leaves is 159,225 quintal which is one of the districts with the largest production in Southeast Sulawesi province.



**Figure 1.1 Clove leaves production in Bombana District**

Source: BPS of Kolaka District, 2015.

The problems generally faced by clove farming group, are ; Inadequate system of clove essential oil processing, handling systems and tools used are not up to standard, limited technology of Clove essential oil handling, durability and packaging of cloves essential oils is still poor, and the abundance of clove leaves production which can have added value to the clove farmers.

## B. Method

### 1. *Procedur of the Program*

Procedures for training and mentoring program to be provided to the partner groups of Lawulo Village Samaturu Sub-district Kolaka District includes four main activities, (1) General approach, (2) Determination of training participants, (3) Types and training procedures (training strategies) and (4) The scale of the program.

- General approach. This program is an activity of education and training, in addition to provide knowledge to trainees, it also trains with focus group discussion method as well as practice in class.
- Determination of training participants. Determination of training participants and assistance will be done by Purposive Sampling method by directly selecting the members of farmer group in Lawulo village who have clove land as well as clove leaf seller. The number of trainees planned is 15 people.,
- Data Collection. The data used is secondary data obtained from related institutions.
- The Scale of the program. This community service program will be carried out in Lawulo Village, Samaturu Sub-District, Kolaka District.

## **2. Training Method**

The methods used in the training and mentoring include: (1) Practice and exercise in the class, (2) Description of constraints faced in business development, (3) Practice of Cost and Revenue Analysis of the processed resource of clove essential oil processing.

## **3. Scope and Design of The Program**

The implementation of the training is divided into four steps: (1) Preparation of socialization to the partner group, (2) Determination of the participants based on business group, (3) Training and Mentoring, and (4) Partner group Participation.

- Preparation. At this step, the preparation starts from the socialization to the target group partners, Program introduction to community figures and government officials about the plan of community service program, determining the location of the implementation of community service program.
- Determination of the participant and group. The results of socialization obtained the data of the number of clove farmer group members. Participants are divided into 2 groups.
- Training/Mentoring. Training and mentoring are conducted in 3 (three) stages: (1) Lecture at the class, (2) Practice and exercise in class as well as discussion and simulation, (3) Practice in the business field of each participant (teorical study based on the facts in the field). Mentoring activities to the partners group, the production/processing of clove oil, even though this program has finish but still under supervision and coaching until the farmer are really considered professional and independent for managing the business. In addition, analysis of productivity and income is conducted to know how much production and income obtained by the clove oil processing group in a month production period.
- The responsibility for partner participations in this program are. To participate directly in program activities, to assist in determining which group members will be invited as participants, division of the group of clove essential oil processing, coaching/group mentoring.

The ingredients for clove essential oil can be made from dried clove leaves, the feasibility depends on market demand; the purpose and the next process. Some essential oils which are popular raw materials in the community are clove essential oil and patchouli essential oil. Production of clove essential oil is divided into two processes that are the process of clove leaves cooking and distillation of clove essential oil.

## **4. Tools and Materials**

Tools in manufacturing of clove essential oil :

- Stove
- Mixer
- Distillers
- Container/Drum
- Bucket
- Pipe
- Jerrican
- Weightscale

Materials used are as follow :

- 500 Kg dry clove leaves
- 2 Cubic of firewood
- 5 Liter Fuel oil (BBM)
- ½ cubic of clean water
- Plastic drom
- Basin
- Matches

## **5. Tools and Materials**

Clove essential oil processing begun by collecting firewood under the stove which is then watered with kerosene and burned with matches, dried clove leaves then put into the stove, after cooking process lasts about 1-2 hours cramping cheek from the stove is opened, then the distillation process began. The essential oil of the distillation process is added to the plastic

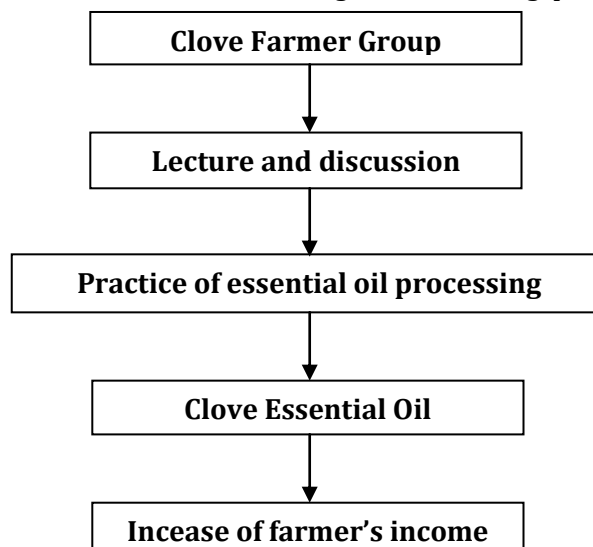
drum for the cooling process, subsequently, after cooling for less than 10 hours, the essential oil is spilled on the basin to separate the essential oils and water. Furthermore, essential oil is inserted at 20 liters of jerrican and then weighed and packaged for export purpose.



Figure 1.2 Tools and materials used for processing dried clove leaves into clove essential oil

### Outlook of Study of Clove Essential Oil Processing Which Transfers to the Farmers Joining in the Farmers Group

- The training of essential oil has not been implemented maximally where clove farming groups have not utilized and doing the processing of essential oil of clove proportionally with post harvest handling still be traditional. It caused the quality of the resulting product is still low which then affects the pricing. Thus, farmer groups Mamminasae need to be trained and mentored as well as packaging methods training using approach technology.
- After receiving training and mentoring, it is expected that clove farmers group will conduct essential oil processing which can be a high selling product and create employment for farmers and their families. The flow of training and mentoring program are as follows:



### C. Discussion

The results of the study of clove leaf processing to clove essential oil products during the held of community service. Based on the result of the survey in the field, it can be seen that the location of farmer group Mamminasae with clove plants that potentially get clove leaves as a raw material of essential oil processing. Prior to the training, the socialization is attended by community figures and government officials about community service with the theme of "clove leaf processing into essential oil with economic value". The results of socialization on the target group (partners), community figures and government officials concluded that most of the farmers in Lawulo Village, Samatuuru Sub-district of Kolaka District agreed to this program.

Clove plant on the farmer's land is intensively cultivated, during the harvest season leaves miscarriages along with the leaves falling from the clove fruit. Clove plants that produce clove leaves are marketed in large quantities but in very low price. The price of clove leaves is unstable, thus, dried clove leaves are sometimes left scattered under clove trees.

The problems faced by clove farming communities can be overcome by:

1. Conducting training on post-harvest handling system well, in order to get a high quality essential oil to gain added value.
2. Conducting practice and mentoring to the community about the processing of dried clove leaves into clove essential oil. Encourage clove farming groups to apply appropriate technology in processing and packaging essential oils to improve quality.

Implementation of community service program is held on October 7 to October 17, 2016, in Lawulo Village, Samaturu Sub-District, which is attended by 10 participants. Program include the delivery of materials by lecture method and discussion. The lecture method is conducted to convey a variety of general information about how to processing the clove leaves into essential oils, market opportunities by trying to diversify food, post-harvest handling of cloves. On this occasion, it is conveyed that the clove plant is a very useful plant for medicinal, cosmetic, and spices purposes.

The driving factors of this program are:

1. Technology of post-harvest handling of clove leaves to produce quality clove essential oil and in order to extend the durability of the storage.
2. The raw material of clove essential oil is abundant and easy to found.
3. The technique of processing and packaging of clove essential oil very easy to do.
4. Great curiosity of the trainees about how to extend the storage durability and to gain an added value from clove essential oil.

While the inhibiting factors in this program are:

1. Most of the farmers in this area are farmers who cultivate clove without using the technology of post-harvest handling.
2. Lack of farmers knowledge about essential oils.
3. Marketing scheme.
4. The technology of essential oil packaging is still very limited.

An effort of diversification of clove leaves products is one of the opportunities to increase the economic value of not utilized raw materials into a product with an economic value. Business profit/income are analyzed using Soekartawi's (2002) formula, as follow:

$$Pd = TR - TC$$

Whereas:

$$Pd = \text{Profit/income (Rp)}$$

$$TR = \text{Total Revenue (Rp)}$$

$$TC = \text{Total Cost (Rp)}$$

### ***Result of Analysis of Clove Essential Oil Processing Per Production Unit:***

1. The cost of clove essential oil processing
 

- Clove leaves	500 Kg	Rp. 1,500,000
- Firewood	1 cubic	Rp. 320,000
- Food	3 people	Rp. 150,000
- Fuel	2 ltrs	Rp. 20,000
- Manpower	3 people	Rp. 225,000
- Jerycan20 Liter	1	Rp. 20,000
<b>Total</b>		<b>Rp. 2,235,000 (TC)</b>
2. Resulted Product
 

- 20 Kgs Clove Essential Oils	
- Price/kg	Rp. 650,000
- 20 Kg X Rp. 650.000	= Rp. 13,000,000 (TR)
3. Profit/income per production unit (Pd)
 

Profit/income per production unit = production revenue - production cost  
 Rp. 13,000,000 - Rp. 2,235,000 = Rp. 10,765,000,-
4. The difference profit/income of dried clove leaves and processed clove leaves into essential oil is Rp. 10,385,000,-

### ***Comparison of farmers revenue of selling clove leaves in the form of dried clove leaves and clove essential oils***

The result of mean different test analysis of farmer's income who sells clove leaves in the form of dried clove leaves and clove essential oil can be seen in the following table:

**Tabel 1.1 Results of comparative analysis for revenue of clove farmers who sell dried clove leaves and essential oil by using t-test**

Detail	Selling of Dried Clove Leaves	Selling of Clove Essential Oil
Revenue	Rp.1,950,000	Rp.10,765,000,-
$t_{count}$	16.068	35.108
$t_{table}(\alpha = 0,05)$	1.675	1.675
Explanation	$t_{count} > t_{table}$ $H_0$ rejected $H_1$ Accepted	

Source: primary data, analyzed in 2016.

The results show that the income of farmers selling dried clove leaves is Rp.1,950,000 / ha and that of the form of essential oils of Rp. 10,765,000/ha. The comparative test (t-test) suggests the t-count value for those farmers who sell dried clove leaves of 16.068 and 35,108 of essential oil.  $t_{table}$  of 1.675 means  $t_{count} > t_{table}$  then  $H_0$  is rejected and  $H_1$  is accepted, which concluded that the hypothesis of comparison of farmers income who sell dried clove leaves and farmers who sell essential oils is accepted.

#### D. Conclusion and Recommendation

Based on the study of clove essential oil processing, it can be concluded that:

1. Knowledge of farmers about post-harvest handling and clove essential oil processing technology in an effort to increase farmer's income is not adequate.
2. The analysis of clove essential processing suggests the earned income of Rp. 13,000,000
3. The difference of price of clove leaves in the form of dried clove leaves than clove leaves processed into essential oil is Rp. 10,765,000,-
4. Comparative test (t-test) suggests  $t_{count}$  for dried clove leaves selling of 16,068 and essential oil selling of 35,108,  $t_{table}$  of 1,675 indicates that  $t_{count} > t_{table}$  then  $H_0$  is rejected and  $H_1$  is accepted, so it concluded that the hypothesis of comparison of farmers income who sell dried clove leaves and farmers who sell essential oils is accepted.

Based on results of the study, it suggested that more intensive counseling is needed to increase the farmer knowledge on technology, marketing information, post-harvest handling. It is also necessary to motivate the farmers to increase their income.

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## Financial Feasibility of Cocoa Farming in Andomesinggo Village Besulutu Sub-District of Konawe District

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### Abstract

This study aimed to determine the financial feasibility of cocoa farming in Andomesinggo Village Besulutu Sub-district Konawe District. Sampling method was Stratified Random Sampling. The financial analysis criteria used were Net Present Value, Net Benefit Cost Ratio, Internal Rate of Return, Pay Back Period, and Sensitivity Analysis. The results showed that cocoa farming in Andomesinggo village was financially feasible to be cultivated. Based on the result of the investment feasibility assessment at 18% DF, it was obtained that NPV was Rp 20,500,335, NBCR of 3.59%, IRR of 55.42% and PBP value of 4.54 which identified that the cocoa farming in Andomesinggo village returned the investment in the early of fifth year. Based on sensitivity analysis, the condition of cocoa farming is still feasible to be cultivated even though fertilizer price was up to 15%, cocoa price decreased to 10%, cocoa production decreased to 20%.

**Keywords:** Financial Feasibility, NPV, NBCR, IRR, PBP, Sensitivity Analysis, Cocoa

### A. Background

Indonesia's agricultural economy policy stipulated in the National Development Program states that agricultural activities including food crops, plantation crops, fisheries, livestock and forestry are directed to the development of advanced agriculture, efficiency and resilience. Agricultural development aims to improve yields and quality of production, to increase income and livelihood of farmers, to expand employment and business opportunities, to support industrial activities and increase export commodities.

One of the export commodities developed by the government is cocoa commodity. This plant is an export commodity that is widely needed by the industrial countries that perform processing of cocoa products such as cocoa powder and chocolate ready for consumption. In Southeast Sulawesi, the plantation sub-sector is one of the sources of farmers' livelihoods in order to increase income and meet family welfare and provide sufficient input to state and local revenue. Cocoa plant is one of the prima donna (prime) plants in Southeast Sulawesi other than coconut, pepper, cotton, coffee, and cloves.

Konawe District has a plantation crop area of 56,416 ha consists of several types of plant. Development of cocoa production is increasing during the last five years. Besulutu Sub-district is one of the potential areas for the development of plantation sub-sector, particularly cocoa. This is supported by climate factor and its human resources, where the area of planting of cocoa plant is 2.175 ha with production reaches 308.2 ton with the number of farmer is 1.344 head of family from 7.732 residents (BPS, 2015). Based on the description above, cocoa commodity is placed as the most cultivated plantation in Besulutu Sub-district, with contribution of planting area of 13.77% and 4.97% for production sector.

The cocoa plant which is developed in Besulutu Sub-district, particularly in Andomesinggo Village belongs to smallholder plantation, which is one of the important sources of farmers' income in their efforts to improve their livelihoods, in which the farming is a long-term business that requires large capital or investment in its exploitation and operational costs in its management. Therefore, farmers are required to have sufficient knowledge and skills on cocoa farming. The problems faced by farmers are no less important is the issue of capital, pests and plant diseases that affect the decline in production and quality of cocoa, thus affecting the income level of farmers. If it is prolonged, it will affect the financial feasibility of cocoa farming.

Based on the previous description, the objective to be achieved in the research is to know the financial feasibility of cocoa farming in Andomesinggo Village Besulutu Sub-district Konawe District.

## B. Method

### 1. Sample Determination Technique

Based on the survey, the number of farmers in Andomesinggo village were 238 cocoa farmers, divided into 13 stratum based on age of plantation. Each respondent representing the age stratum of the plant was chosen randomly as many as four respondents, thus the total respondents in this study were 52 respondents.

### 2. Data Analysis

Financial feasibility in cocoa farming can be determined by using this following method:

- a. Net Present Method (NPV) is used to determine the present value of net revenue obtained from an investment activity, formulated as follows:

$$NPV = \sum_{t=0}^n \frac{Bt - Ct}{(1+i)^t}$$

Where:

Bt = Total of income measured in rupiah per year.

Ct = Total cost measured in rupiah per year.

I = Discount factor from interest rate (%)

n = Age of cocoa

t = Year of Investment

Criteria:

- If NPV is positive (+), then cocoa farming is profitable and feasible to be developed
- If NPV is negative (-), then cocoa farming is unprofitable and unfeasible to be developed

- b. The NBCR (Net Benefit Cost Ratio) method is the ratio between positive NPV and negative NPV, formulated as follows:

$$NBCR = \frac{\sum_{t=0}^n \frac{Bt - Ct}{(1-i)^t} \text{ [for } Bt - Ct > 0 \text{] positive}}{\sum_{t=0}^n \frac{Bt - Ct}{(1-i)^t} \text{ [for } Bt - Ct < 0 \text{] negative}}$$

Or NBCR is :

$$NBCR = \frac{NPV^+}{NPV^-}$$

Where:

NBCR = Net Benefit Cost Ratio (Rp)

NPV<sup>+</sup> = Positive NPV (Rp)

NPV<sup>-</sup> = Negative NPV (Rp)

Criteria:

NBCR > 1: Cocoa farming is feasible to be developed  
 NBCR = 1: Cocoa farming is not profitable and not harmful  
 NBCR < 1: Cocoa farming is not feasible to be developed

- c. The Internal Rate of Return (IRR) method, which is used to determine the interest rate to be the present value of net revenue is equal to the present value of capital expenditure or  $NPV = 0$ , formulated as:

$$IRR = Df^+ + \frac{NPV^+}{NPV^+ - NPV^-} (Df^- - Df^+)$$

Where:

Df = Discount factor (%)  
 Df<sup>-</sup> = Discount factor which results NPV<sup>-</sup> (%)  
 Df<sup>+</sup> = Discount factor which results NPV<sup>+</sup> (%)  
 IRR = Internal rate of Return of Farming Cacao (%)

Criteria:

- If the IRR is greater than the prevailing interest rate, then the cocoa farming is able to return the services of a number of invested capital and gain the profit
- If the IRR is equal to the applicable interest rate that the cocoa farming is able to return the services of a certain amount of invested capital but no profit
- If the IRR is less than the prevailing interest rate, the cocoa can not afford to return the services of a certain amount of invested capital and incur losses

- d. Pay Back Period (PBP)

Payback Period (PBP) is used to find out how long cocoa farming that is cultivated can return the invested capital. It is formulated as follows:

$$PBP = T_{p-1} + \frac{\sum_{i=1} I_i - \sum_{i=1} B_{icp-1}}{B_p}$$

Where:

PBP = Pay Back Period (year)  
 T<sub>p-1</sub> = Previous year before PBP (year)  
 I<sub>i</sub> = Amount of investment that has been discounted (Rp)  
 B<sub>p</sub> = Amount of benefit at the Pay Back Period (Rp)  
 B<sub>icp-1</sub> = Amount of benefit that has been discounted before the Pay Back Period (Rp)

- e. Sensitivity Analysis

Sensitivity analysis is used to determine the sensitivity of cocoa farming to the variable changes. The observed variables are the changes in the price of urea fertilizer, cocoa price, and cocoa production. If the three conditions occur simultaneously, it can be formulated as follows:

- Fertilizer price increases by 15% obtained based on facts the field that it has increased by 15% or even exceed of 15%.
- Cocoa price decreases by 10% obtained based in the field that it tends to decrease at level of 10%.
- Cocoa production decreases by 20% obtained based on facts in the field that it is caused by pests and plant diseases.
- If the three conditions above occur simultaneously.

## C. Results and Discussion

### 1. Analisis of Net Present Value (NPV)

The NVP data of cocoa farming used were the data about benefit and cost in year of 0 to year of 12. Based on the calculation of NPV, it showed that the present net value (NPV) at discount factor (Df) of 18% was Rp 20,500,335 until the cocoa farming runs for 12 years. This figure shows that cocoa farming is financially feasible, because the NPV obtained is positive or greater than zero.

The production result is relatively variable from year of 0 to year of 12. In marketing the production results, farmers generally sell the dried cocoa beans to merchants. This is due to the lack of adequate infrastructure in Andomesinggo Village for direct sale to interinsuler traders or exporters at the provincial level.

## 2. Analysis of Net Benefit Cost Ratio (NBCR)

NBCR is the ratio between positive NPV and negative NPV. Net Benefit Cost Ratio is used to find out the comparison between current benefit value and current cost value at the prevailing interest rate of 18%. Based on the analysis result at the discount factor of 18%, it was obtained NBCR = 3.59 which means that cocoa farming is feasible to be developed because the value obtained is bigger than 1. The NBCR values showed that cost incurred of Rp. 1 will result in net profit of Rp 3.59.

## 3. Analysis of Internal Rate of Return (IRR)

The result of analysis obtained by Internal Rate of Return (IRR) value that was 55,42%. This shows that cocoa farming will be able to survive until the interest rate is valid until 55.42%. Thus, based on the criteria of IRR, cacao farming in Andomesinggo village is feasible to be developed because the rate of return on capital obtained is higher than the prevailing interest rate of 18%. By looking at the value of IRR obtained, the banks can consider the distribution of agricultural credit to cocoa farmers in Andomesinggo Village Besulutu Sub-district Konawe District.

## 4. Analysis of Pay Back Period (PBP)

PBP is used to find out how long this cocoa farm can return the investment. In the PBP analysis, the value obtained was 4.54. This indicates investment in the early of the fifth year. According to Ibrahim (2003), a rapid return of investment costs will affect to the more smoothly turnover of capital and more easily in the replacement of new assets.

## 5. Sensitivity Analysis

The most important thing in the sensitivity analysis is to know the principal parameters and select the fair values as the boundary value in the sensitivity analysis (Gray, *et al.*, 1997). The sensitivity analysis used in this study was to increase the price of fertilizer by 15%, to reduce the price of cocoa by 10% with other assumptions fixed and the decrease of production as much as 20% with other assumptions fixed as well as if three conditions occur simultaneously (fertilizer price increased by 15%, Cocoa price decreased by 10% and production decreased by 20%). Figures of 15% of sensitivity analysis showed that the price of urea fertilizer increased and even exceed 15%.

The figure of 10% of the sensitivity analysis showed that if cocoa price decreased by 10%. Based on the fact in the field, it is known that the cocoa price has decreased by 10%, however, the cocoa price decreased from Rp. 20,800 to Rp. 19,500 to Rp. 18,000. The figure of 20% of the sensitivity analysis showed that production of cocoa decreased y 20%. This may be caused by disease attack. Result of analysis showed that urea fertilizer price increased by 15% as presented in Table 1.

**Table 1. Result of Sensitivity Analysis of Cocoa Farming in Andomesinggo Village by Increasing Fertilizer Price of 15% can be seen in the Table 1.**

Investment Criteria	Value	Predicate
NPV	Rp 20,297,923	Feasible
NBCR	3,50	Feasible
IRR	5,79 %	Feasible

Table 1 shows that at a discount factor of 18%, it was obtained NPV of Rp. 20,297,923. This means that cocoa farming is profitable and financially feasible because the NPV value is more than 0. The value of NBCR obtained was 3.50 and it shows that the cost incurred of Rp. 1 will result in net revenue of Rp. 3.50 as well as it is to be developed because the value of NBCR is more than 1. The value of IRR obtained was 55.79%, this means that the rate of return on capital invested in cocoa farming is very large although the cost of production is increased to 15% of the prevailing interest rate by 18%. Sensitivity analysis on cocoa farming by reducing the price of cocoa by 10% can be seen in Table 2.

**Table 2. Result of Sensitivity Analysis of Cocoa Farming in Andomesinggo Village by Decreasing Cocoa Production of 15% can be seen in the Table 2.**

Investment Criteria	Value	Predicate
NPV	Rp. 17,659,505	Feasible
NBCR	3.23	Feasible
IRR	57.09 %	Feasible

Table 2 shows that at a discount factor of 18%, it was obtained NPV of Rp. 17,659,505. This means that cocoa farming is feasible to be developed because the value is  $NPV > 0$ . The NBCR value obtained was 3,23 which indicates that cost incurred of Rp. 1 will result in net revenue of Rp. 3.23 and IRR value obtained was 57,09%. This means that cocoa farming is feasible to be developed because the IRR value  $>$  prevailing interest rate that was 18%. Sensitivity analysis on cocoa farming by reducing cocoa production of 20% can be seen in Table 3.

**Table 3. Result of Sensitivity Analysis of Cocoa Farming in Andomesinggo Village by Decreasing Cocoa Production of 20% can be seen in the Table 3.**

Investment Criteria	Value	Predicate
NPV	Rp. 14,818.675	Feasible
NBCR	2.87	Feasible
IRR	59.41 %	Feasible

Table 3 shows that at a discount factor of 18%, it was obtained NPV value of Rp 14,818,675. This means that cocoa farming is feasible to be developed because NPV value is  $> 0$ . The NBCR value obtained was 2.87 which suggested that IRR value is greater than prevailing interest rate that was 18%. Sensitivity analysis on cocoa farming by increasing fertilizer price of 15%, reducing the cocoa price of 10%, and decreasing cocoa production by 20%. The details can be seen in Table 4.

**Table 4. Result of Sensitivity Analysis of Farming Farming in Andomesinggo Village by Increasing the Price of Urea Fertilizer of 15% can be seen in the Table 4.**

Investment Criteria	Value	Predicate
NPV	Rp. 12,343,601	Feasible
NBCR	2.52	Feasible
IRR	62.74 %	Feasible

Table 4 shows that cocoa farming is still financially feasible if there is an increase of 15% in urea fertilizer price, a decrease of 10% in cocoa price and a decrease of 20% in cocoa production. This is because the NPV value obtained was Rp. 12,343,601, in which this value is greater than 0 ( $NPV > 0$ ). The NBCR value obtained was 2.52 which suggested that NBCR value is greater 1. This indicates that a cost incurred of Rp. 1 by farmers will result in net income of Rp 2.52, thus, the farmers gain a profit of Rp 1.52.

The IRR value obtained was 62.74%, which indicates that the IRR value obtained is greater than the prevailing bank interest rate ( $IRR > 18\%$ ), thus, with the increase of 15% in production cost that occurs in the price increase of urea fertilizer and followed by the decrease of cocoa price by 10% and the production decrease by 20%, then the farmers can still return the capital invested at the prevailing bank interest rate that was 18%. Thus, cocoa farming gains profit.

#### D. Conclusion

Based on the result analysis of financial feasibility of cocoa farming, it can be concluded that:

1. Financially, cocoa farming in Andomesinggo Village Besulutu Sub-district of Konawe District is feasible.
2. Amount of Investment of cocoa farming in Andomesinggo Village Besulutu Sub-district of Konawe District is approximately Rp. 4,645,000, in which the return rate of investment occurs in the early of the fifth year.
3. The increase of the price of urea fertilizer is 15%, the decrease of cocoa price is 10%, the decrease of cocoa production of 10% and simultaneously, urea fertilizer price decreases by 15%, cocoa price decreases by 10%, and cocoa production decreases by 20%, this indicates that cocoa farming is feasible to be developed because it is influenced by high production and price.

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## Analysis of Skipjack Distribution (*Katsuwonus Pelamis*) in The Urban Village of West Boepinang Poleang Sub-District Bombana District

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### Abstract

This study aimed to identify marketing channels of skipjack; and to know the amount of margin received on each marketing channel of skipjack in the Urban Village of West Boepinang. The research was conducted from May 5 - August 27, 2016 in The Urban Village of West Boepinang, Poleang Sub-District Bombana District. The sample in this research was 37 respondents. Sampling used census method. Data were analyzed using descriptive analysis and marketing margin analysis. The results showed that distribution pattern which is often used by the traders of skipjack commodity in the Urban Village of West Boepinang is the first distribution channel, in which skipjack is distributed from fishermen to merchants to wholesalers to retailers to consumers. Based on profit margin value, wholesalers earned a net profit margin of Rp. 6,972/kg. Similarly, retailers earned a profit margin of Rp. 3,545/kg as well as Rp. 2,793/kg for merchants.

**Keywords:** Skipjack, Descriptive, Marketing margin

### A. Background

Indonesia is the largest archipelagic state in the world with 17,504 islands and long coastline of 104,000 km. Total sea area of Indonesia approximately 3.544 million km<sup>2</sup> or about 70% of Indonesian total land area (Bakosurtanal in Kelautandan Perikanan dalamangka, 2011). The situation should place fishery sector into one of the real potential sectors in Indonesia. In a global context, Indonesia's strategic geographical condition at the cross point of world trade, in which large marine potential should make Indonesia as the world's largest supplier of fishery products and can be a highly prospective market for fishery products. Based on the above conditions, it is very feasible if Indonesia is known as a center of supply and demand for fishery products.

According to The Decree of Minister of Fisheries No. 01/2009, the territorial waters of Southeast Sulawesi are divided into two categories of Fisheries Management Areas (WPP), namely 713 and 714 territorial. In this regard, Southeast Sulawesi fishery belongs to areas with abundant marine wealth in both small pelagic and large pelagic categories such as Tuna and Skipjack. The potential of catching fishery for Tuna and Skipjack in Southeast Sulawesi is 1.5 million metric tons per year. Bombana District is estimated to have an area of sea water about ± 11,837.31 km<sup>2</sup>. Bombana District is one of the regencies located on the coast directly opposite

to Gulf of Bone, thus, some people work as fishermen to support the welfare of their families, particularly the people who inhabit the coastal areas. The production of skipjack in Bombana District reaches  $\pm 2534.81$  tons per year (Bombana Dalam Angka, 2014). Poleang Sub-District is one of the oldest Sub-districts in Bombana District. The coastal area in Poleang Sub-District extends from the border of West Poleang Sub-District precisely in Pabbiring village to the urban village of East Poleang. Poleang Sub-District is known of having the wealth of agriculture as well as the wealth of the sea. The Urban Village of West Boepinang Sub-district is inhabited by most of Bajo tribe who has livelihood as fishermen. The Bajo tribe has various kinds of marine product which can have an economic value in market, such as skipjack which is a type of fish that has a high economic value.

Furthermore, distribution of fish is carried out by merchants to wholesalers. The wholesalers usually come to merchants in TPI and buy large quantities of fish. Fish purchased by wholesalers from merchants will then be sold to retailers. Subsequently, retailers who buy fish from wholesalers sell their fish directly to consumers in traditional markets. The Urban Village of West Boepinang is one of the coastal areas with the average livelihood as fishermen. According to the fishermen, fish are generally distributed by involving the merchants. However, the bargaining process often makes the price fall at the lowest price as set by the merchants, thus, in this case the fishermen only act as the recipient of the price. Based on the description above, the purpose of this study was to know the analysis of the distribution of Skipjack (*Katsuwonus pelamis*) in the Urban Village of West Boepinang, Poleang Sub-District, Bombana District.

## B. Method

### 1. Materials

Sampling technique used was the census or saturated sampling method that is 37 respondents consisting of 16 fishermen, 7 collectors, 3 merchants and 11 retailers. In this research, the sampling technique was combined with Snowball Sampling. This method was used because the number and existence of the sample were not very clear. The researcher only knew some samples and wanted more samples used in the research. Therefore, the researchers looked for one of the fishermen (Mr. H. Kidung, 61 years) in the location of the study to be questioned more clearly and showed to other fishermen and marketing practitioners who can be sampled for the purposes of this study.

### 2. Data Analysis

In this study, the marketing margin is calculated as the difference between the selling price of sea fish at the fisherman level and the selling price of the sea fish at the retailer level. In order to know the value of marketing margin on every marketing practitioner, it will be tested by using cost analysis tool and marketing margin (cost margin analysis) by calculating the amount of marketing margin, marketing cost and profit as well as fisherman's share. Calculation of marketing margin value uses the following formula:

- a. Marketing Margin Analysis, used to measure the profit of each practitioner involved in the fish distribution process.

$$\text{Formula: } MP = Pr - Pf \dots\dots\dots(3.2)$$

Where:

MP = Marketing margin (Rp/kg)  
Pr = Price of consumers (Rp/kg)  
Pf = Price of Producers (Rp/kg)

- b. Share price received by fishermen, which is the percentage of profits received by fishermen.

$$SPf = Pf / Pr \dots\dots\dots(3.3)$$

Where:

SPf = Share price at fishermen level  
Pf = Price at fishermen level  
Pr = Price at consumers level

- a. Marketing costs and profit sharing.

$$Sbi = (bi / Pr) \times 100\% \dots\dots\dots(3.4)$$

$$Ski = (ki / Pr) \times 100\% \dots\dots\dots(3.5)$$

Where :

Ski = Share the profit of marketing institution of i

Sbi = Share marketing cost of i

Marketing margin distribution

$$DM = (Mi / Mtot) \times 100\% \dots\dots\dots(3.6)$$

Where:

DM = Margin distribution

Mi = Marketing margib of marketing agency groups

i = 1 (collectors)

i = 2 (merchants)

I = 3 (trailers)

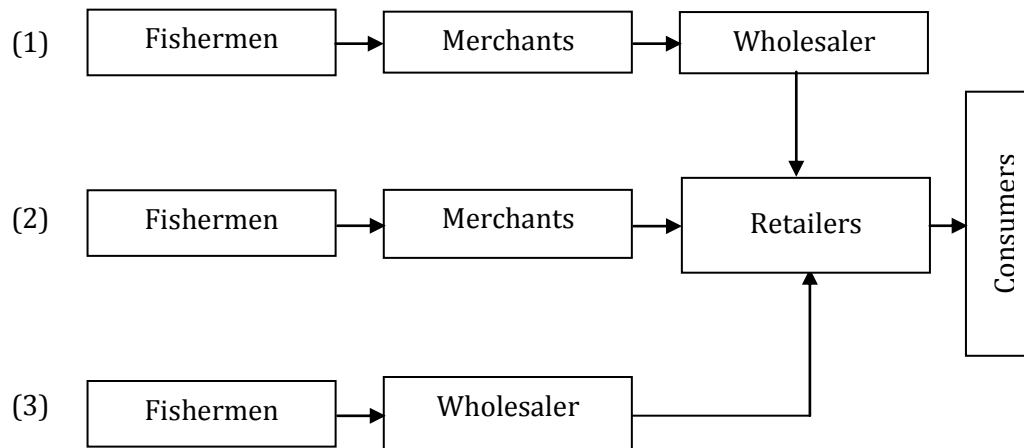
$$Mtot = M1 + M2 + M3 \dots\dots\dots(3.7)$$

**C. Results and Discussion**

**1. Distribution Pattern of Fish Commodity in The Urban Village of West Boepinang**

Basically, marketing activities are carried out to deliver products from producers to consumers. However, the delivery of agricultural (fishery) products such as fish, in general, cannot be directly distributed to consumers. According to Mubyarto (1989), the marketing of agricultural products requires a longer process when compared to the marketing of non-agricultural products. This occurs as agricultural products (fish) require special treatments after caught from the sea. Therefore, the marketing of agricultural products requires the marketing institutions in which the institution will carry out its marketing functions.

The distribution pattern of caught fish commodities in the Urban Village of West Boepinang showed three commercial channels, namely: first marketing channel, from fishermen to merchants to wholesalers to retailers to consumers; Second, from fisherman to merchants to retailer to consumers; Third, from fishermen to wholesalers to retailers to consumers. For more details, the structure of the caught fish trade flow can be seen in Figure 1.



**Figure 1. Distribution Pattern of Skipjack Commodity In the Urban Village of West Boepinang**

In the first marketing channel, fishermen sell fish to merchants through fish auction system. Caught fish are then distributed to wholesalers who come directly to meet merchants in the auction place to buy fish. Furthermore, the fish are distributed to retailers in markets that sell fresh fish.

The second channel is approximately the same as the first channel, that is the fishermen still sell the fish to the merchants. However, what distinguishes this second channel is that merchants directly distribute the fish to the retailers in the market because of this to reduce the transportation costs. Usually, retailers come to find the merchants to buy the fish even though in a small number.

In the third channel, the fishermen do not sell their caught fish through the auction system because the fishermen already have a habit of selling their caught fish directly to the wholesalers. In general, this occurs because between the fishermen and the wholesalers have a relationship. This condition provides an advantage to fishermen, in which fishermen are not complicated anymore with the issue of uncertain prices because wholesalers usually buy based

on current or prevailing prices at that time. Sometimes there are also fishermen who sell their caught fish directly to wholesalers without going through the auction system, even though they have no relationship. This is due to the number of caught fish of the fishermen is in below average.

In the field, it is also found some fishermen who sell the caught fish directly to consumers, this is due to the caught fish of fishermen is very little unlike the caught fish in general, thus, some of their caught fish will be sold to consumers who deliberately come directly to the fish auction. Fish sold to consumers are usually a certain type of fish in a small number or if the fish in the auction place, the price will be low because of its capacity does not meet the standard weight/kg like an auction in general so it is not feasible to be sold at auction place. This is often faced by the fishermen when they only get fish in small number, they prefer to sell their caught fish to consumers. Therefore in this study, it not included in the dominant fishery distribution pattern category in the Urban Village of West Boepinang.

The majority (68.75%) of fishermen sell their caught fish to merchants by using auction system. Auction sales system is a non-transparent purchase, in which fishermen auction off their caught fish without knowing the price of fish in the market. Commonly, the average selling price of freshfish received by fishermen using auction system is approximately Rp. 16,000/kg, while selling in the markets/consumers can reach approximately Rp. 35,000/kg. In general, fishermen auction off the caught fish due to the ease in selling it, no more costs for distribution as well as reducing the risk of the decrease of freshfish quality. As a note, the condition above excludes the price below the market price and payment system from merchants who sometimes do not make payments directly.

In general, fishermen sell their catch directly in the form of fresh fish, both to merchants and wholesalers. Actually, if the fresh fish are sold directly to consumers, the price received by fishermen will be relatively higher than having through the auction system. Direct selling is difficult to avoid because in addition to the fishermen have urgent needs they also do not have leisure time. Moreover, fishermen also need rest because they are already tired of fishing and prefer to prepare and repair the fishing equipment if there is a damage to maintain the stability of their catch.

From various distribution channels, fishermen face several problems in marketing their catch. The common problem encountered among fishermen is the limited price of fish when they sell the catch. Lack of market information will cause fishermen not to know to whom the catch will be sold to gain the best profit. Price information received by fishermen, particularly from merchants, is often different from market prices. Fishermen do not know exactly about information of the price fluctuations, while merchants get information faster than other marketing agencies. The limitation of this market information relates to the location of their livelihood in the coastal areas. In addition, the formal education of fishermen is still very low causing the ability to digest or analyze information sources is very limited. These conditions cause fisherman fishing without careful planning.

In addition to the above-mentioned problems, installment payments made by merchants are still encountered in the region. Such conditions will make the fisherman increasingly difficult in fulfilling the necessities of life. In addition, the next fishing also requires the cost. Meanwhile, the average income they receive from the caught fish is small, that is Rp. 1.963,239/month which is not worth the risk they must accept. This will trigger fishermen to make loans for the fulfillment of daily needs and for the cost of the next fishing.

## **2. Marketing Margin Analysis**

In this study, the marketing margin is calculated as the difference between the selling price of caught fish at the fisherman level and the selling price of the fish at the retailer level. This analytical procedure is performed by selecting and following the marketing channels of the specific commodity, comparing prices at different marketing levels, and collecting the data of gross sales and purchases of each type of trader. The following is the result of marketing margin analysis which consists of the cost required by marketing practitioners to perform marketing functions and profit received by marketing practitioners in every marketing channel of most dominant Skipjack commodity in the Urban Village of West Boepinang. More details can be seen in Table 1.

**Table 1. Marketing Margin Analysis of Skipjack Commodity In the Urban Village of West Boepinang 2016**

Detail	Unit (Rp/kg)
1. Fishermen	
a. Selling price	16,000,-
2. Merchant	
a. Purchase price	16,000,-
b. Selling price	20,000,-
c. Marketing margin	4,000,-
d. Marketing cost	1.207,-
e. Profit margin	2.793,-
3. Wholesaler	
f. Purchase price	20,000,-
g. Selling price	30,000,-
h. Marketing margin	10,000,-
i. Marketing cost	3.028,-
a. Profit margin	6.972,-
4. Retailer	
a. Purchase price	30,000,-
b. Selling price	35,000,-
c. Marketing margin	5,000,-
d. Marketing cost	1.455,-
e. Profit margin	3.545,-

Source: Primary Data Analysis, 2016

Table 1 shows that the main type of merchants financing include marketing cost, namely the preservation of fresh fish is Rp. 1,207/kg. The marketing cost of wholesalers amounted to Rp. 3,208/kg. The total marketing cost of retailers is Rp. 1,455/kg. The highest marketing cost was obtained by wholesalers, which amounted to Rp. 3,208/kg. The amount of financing is due to wholesalers spend more cost for skipjack trading process, such as the cost of skipjack preservation such as ice cubes, transportation costs are quite high because due to the long distance for traders to find where to buy fish.

Based on the profit margin (net benefit margin), merchants who buy fish directly from fishermen earn a profit margin of Rp. 2,793/kg. The wholesaler who is dealers to existing retailers in the markets earns a profit margin of Rp. 6,972/kg, whereas the retailers who are performing the direct transaction to the consumers earn a profit margin of Rp. 3,545/kg. In the outline, marketing practitioners of Skipjack in the Urban Village of West Boepinang mostly use distribution channel that is from fishermen to merchants to wholesalers to retailers to consumers.

The long channels of Skipjack distribution ranging from fishermen to consumers trigger a high disparity between fish prices at fishermen and consumer levels. This is evidenced by the difference in the price from fishermen to the final price at the consumer level, that is Rp. 19,000/kg. The number of practitioners in the trading system will lead to high marketing margin, thus, there is a part that must be excluded as the profit of the trader. This situation tends to minimize the share that should be accepted by the fishermen and increase the cost to be incurred by consumers.

Based on the calculation of margins on each practitioner, It can be seen that the practitioner who gains greater profits is a wholesaler. This is because wholesalers buy large quantities of fish from merchants and/or fishermen, which sell the fish to consumers in small quantities to retailers. From the sales result, wholesalers earn a greater profit compared to the other marketing practitioners.

#### **D. Conclusion**

Based on the results and discussion, it can be concluded as follows:

1. The distribution chain of Skipjack commodity in the Urban Village of West Boepinang presents at least three channels, namely: First channel, from fishermen to merchants to wholesalers to retailers to consumers; Second channel, from fishermen to merchants to retailers to consumers; Third channel, from fishermen to wholesalers to retailers to consumers.

2. In general, distribution pattern often used by marketing practitioners of Skipjack commodity in the Urban Village of West Boepinangis the first channel that is from fishermen to merchants to wholesalers to retailers to consumers. Based on profit margin, wholesalers earn a net profit of Rp. 6,972/kg. Similarly, retailers earn profit margin of Rp. 3,545/kg for merchants Rp. 2,793/kg.

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## Preference of Grouper Fish Marketing Institution In Tanggetada Sub-District Kolaka District

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### Abstract

The objectives of the study were to train clove farmers group about the post-harvest handling system in order to produce essential oils with export quality, to train clove farmers group in terms of essential oil processing system as well as to encourage clove farmers group to apply appropriate technology for processing of clove essential oil with export quality. In general, the main and most common problems faced by clove farmers are inadequate system of clove essential oil processing system, the handling system and equipment used are not up to standard, moreover, the technology used in handling, durability, and package of clove essential oils still very limited. The approaches offered and agreed by the clove farmer group are as follow: (1) General approach, (2) Determination of training participants, (3) Types and procedures of training (training strategy), and (4) Scale of the program. The expected targets and outcomes of this community service program are: Farmer groups are able to apply appropriate technology in the production of clove essential oil, both to post-harvest handling, processing and storage of clove essential oils to obtain added value. In fact, knowledge of farmers about post-harvest handling and processing technology of clove essential oil to increase farmer's income is still very poor. The results of analysis of essential oil clove processing showed that the clove leaves utilization as an effort to create an added value of farmer's income by Rp. 13,000,000 per production unit. The difference in selling price between the dried clove leaves and processed clove leaves into essential oil was Rp. 10,765,000. Comparative test (t-test) showed that t-count value for selling dried clove leaves was 16,068 while clove leaves processed into essential oil was 35,108. The t-table value of 1,675 indicated that  $t \text{ count} > t \text{ table}$  where  $H_0$  is rejected and  $H_1$  is accepted. It concludes that there is a comparative income of farmer who sells dried clove leaves and farmers who sell clove leaves in the form of essential oils.

**Keywords:** Clove Farming, Essential Oil and Comparative

### A. Background

Indonesia is a country with wider territorial water than the terrestrial. As an archipelagic country, Indonesia has great fishery potential that can be utilized for the welfare of Indonesian society. One of the potential utilization in the field of the fishery is marine aquaculture including in the grouper culture. Grouper is a commodity that has a high economic value with a quite good

prospect of development. Moreover, Grouper in Kolaka District with potential area of approximately 50 ha, and newly developed about 4.75 ha yielded grouper productions of 2.93 tons/year (Anonymous, 2010).

The development of grouper is found in three sub-districts in Kolaka, namely Wundulako sub-district with floating net cage cultivation method located in Lambasina Island, Pomala Sub-district and Tanggetada Sub-district with the cultivation method of pen culture (*keranda tancap*) located in Tanggetada and Plaewali Villages, as well as Anaiwoi Villages. Particularly in Palewai Village, the potential area of grouper cultivation approximately 15 ha, while newly developed approximately 0.25 ha managed by 20 families of fishermen communities with the production of about 11,000 kg/year (Anonymous, 2010).

The demand of groupers currently shows a very high increase. It is in line with the fishing and fish breeding business which continue to be encouraged by new methods introduced to the fishing community in fishing a live grouper. Tanggetada Sub-district is one of the grouper centers as it is located in the western coastal area of Tanggetada District. Tanggetada District has a coral reef area with an area of approximately 587 Ha which is quite potential for grouper cultivation with penculture (*kerambatan cap*) method because its coastal areas are protected from storms and waves.

The results of grouper culture have been marketed through marketing institutions that are merchants and retailers. The marketing institutions have a preference in the form of choice/criteria of selected groupers to be marketed. This research is essential to understand how the marketing institution of the merchants and retailers preference on purchasing grouper. This research is expected to obtain an important information in formulating the marketing strategy, that is to know the characteristics (based on attribute inherent to the product/grouper) product which might be accepted by the market of which the preference also indicate the market demand for a product. Individual preferences of purchasing using the concept of utility, defined as pleasure, satisfaction or fulfillment a person based on the economic activities (Nicholson, 2002). The process of product purchasing by a consumer was based on a study finding by Syahrir (2013) and Muzdalifah (2012) that stated the demand begins when it is beginning to be felt and recognized. The objective of the study was to know how the preference of marketing institution to grouper in District Tanggetada Kolaka.

## **B. Method**

### **1. Research Site**

This research was carried out in Tanggetada Sub-district, Kolaka District, from October 2016 to January 2017. The area is selected as the research site as it is one of the center producers of grouper.

### **2. Object of the Research**

The populations of the research were collector and retailer traders of grouper in Tanggeda Subdistrict, Kolaka District, which is consisted of 9 collectors and 16 retailers. The determination of the research samples was conducted by census (sample saturated) in which it was included all population of the research, which is 25 people.

### **3. Method of Data Analysis**

Preferences of grouper marketing institutions (collectors and retailer traders) on various grouper attributes (criteria) used conjoint analysis. Santoso (2012) suggested that the stages of the Conjoint analysis are as follows:

#### **a. Identification of product attributes**

Product attributes and its levels are identified to create stimuli as follow:

- Color of gill, normal gill color, (maroon red) and abnormal gill color (brownish red/pale).
- Price (extensive, medium, cheap).

#### **b. Stimuli construction**

The combination of factors and levels is called as stimuli. The Combination is based on product attributes that have been defined by multiplication of each sub attribute. Since there are two parts of attributes (colors and prices) and five sub-attributes (two for color and three for price), then the possible combination is  $2 \times 3 = 6$  stimulus (combination of attributes). The construction of stimuli list (combination of attributes) that are created automatically using SPSS software. The list of stimulus obtained was 6 (Appendix 2 and 3).

## c. Data quantification

The quantification of data used metric data, where respondents are asked to rate each stimuli using a Likert scale from 1 to 5. The most preferred stimuli are rated with 5, while the least favorable stimuli were rated with 1.

## d. Procedure of Conjoint Analysis

Conjoint analysis used SPSS 16 software. The basic model of Conjoint analysis formula is as follows:

$$U(X) = \sum_{i=1}^m \sum_{j=1}^{k_1} \beta_{ij} x_{ij}$$

Where :

- U (X) = All of utility values of an alternative  
 $\beta_{ij}$  = Part worth / the utility value of j attribute at the j level  
 $k_1$  = j level of I attribute  
 m = Number of attributes  
 $x_{ij}$  = dummyvariable I attribute at j level (rated 1 if the involved level appear and 0 if not appear)

Where:

- ROI : The ability to return capital  
 Operating profit : Profit (net income)earned(Rp)  
 Venture capital : Total costs (fixed cost and variable costs)(Rp)

Criteria:

- ROI >1: able to return capital (a company said to be successful)  
 ROI <1: unable to return the capital (a company said to not/do not work)

- b. The success of the technical terms, namely in term of productivity resulting company with in a certain time. Analyzed descriptively and attach financial statements that have been corrected by the researchers in the form of an income statement is based on a simple financial accounting made by the company.  
 c. Success in terms of the allocation of the company's revenue. It is analyzed descriptively.

## C. Results and Discussion

### 1. Measurement of the Preference of the Grouper Marketing Institution

Measurement of the preference of grouper marketing institutions (collectors and retailer traders) was done to answer the purpose of this research, that is how the preference of marketing institution to various attribute (characteristic) of grouper. The measurement of this preference is to identify the attribute level of grouper that are most preferred by the marketing institution (collector and retailer trader). The preferences of the marketing institution were measured using Conjoint Analysis which is able to explain the importance level of the attribute as well as the importance value of each attribute.

### 2. Identification of Grouper Attribute Levels and Stimuli Construction

There are two grouper attributes that were tested to 25 respondents that are gill color and price level. After the stages of the determination of the attributes were done the level of attributes then also determined. Santoso (2012) stated that the factors are specific attributes while the levels are parts of an object's factor. The attribute and attribute level determination is shown in Table 4.11 which presents 2 grouper attributes with 5 level attribute of which 1 attribute has 2 levels and another one has 3 levels.

**Table 4.11 Attribute and Attribute Level of grouper**

No	Attribute of grouper	AttributLevel		
		1	2	3
1	Gill color	Normal	Abnormal	-
2	Price	High	medium	low

The process of grouper stimuli construction using orthoplast process resulted in 6 attributes combinations. All 6 combinations were further tested to 25 respondents by scoring each combination of stimuli based on their favorite level; 5 as a highly preferred combination and 1 as a very unlikely combination.

### 3. Result Interpretation

The result of conjoint analysis showed that the importance value (NKT) and relative importance value (NRP) or importance value of the attribute. NRP shows the importance value of two attributes exist for marketing institutions, whereas NKT indicate which level of attribute is preferred by marketing institutions. In addition, it also obtained the average preference of marketing institution for 6 combinations of grouper attributes tested to the marketing institutions. The average preference of the marketing institution indicated a constant number in the utility table on the result of conjoint analysis in Table 4:15 that is equal to 3,277. The figure can be classified with the notation of "quite like", it refers to the Likert scales made in the process of preference measurement that are; 1 for very dislikes, 2 for dislikes, 3 for quite like, 4 for like, and 5 for very like. This indicated that the average combination of attributes in the stimuli process is quite favored by the marketing institution.

The complete average value of consumer preferences, as well as NKT and NRP value is shown in Table 4.12, or separately the value also shown in Appendix 7 which is the result of conjoint analysis.

**Table 4.12 Estimation of utility and relative importance value**

No	Factor (Attribute)	Level	Estimasion of Utility	relative importance value (%)
1	Warna	Normal (MerahMaron)	0,573	42.093
		Tidak Normal (merahkecoklatan/puct)	-0,573	
3	Harga	Mahal	-0,707	57.907
		Sedang	-0,247	
		Murah	0,953	
(Constant) : 3.227				

Table 4.12 shows the importance value (estimated value of utility) and NRP (Relative importance value) is as follows:

1. Color factor. The color attribute is the second important attribute for the respondents in groupers preference. The relative importance level of the color attribute was 42.093%. The color attribute has two levels, normal with NKT of 0.573 and abnormal with NKT of -0.573. The positive and negative value indicated that those normal colors are preferred by respondents rather than abnormal colors. Factors that have only two levels have the same estimated utility value. This is because the respondent must choose one of only two choices so that when the respondent chooses a normal color the respondent automatically does not choose an abnormal color. This preference also revealed that the marketing institutions categorized grouper with a normal color as a good quality, while the grouper with abnormal color as a low quality.
2. Price factor. The price attribute is the second most important attribute for the respondents in grouper preference, in which the price attribute has a relative importance value of 57.907%. The price attribute has three levels that are high with NKT of -0.707, while with NKT of -0.247 and cheap with NKT of 0.953. This suggested that the price of cheap grouper is preferred by the respondent rather than the high or moderate price. This preference indicated that the marketing institution prefer to the low prices but while considering the grouper quality.

The explanation of the relative importance of each attribute and the utility estimate of each grouper level in Tanggetada Sub-district Kolaka district concluded that the grouper marketing institution prefer a grouper with normal color with a cheap price.

### 4. Calculation of Predictive Accuracy and Significance Test

Santoso (2012) stated that the analysis of conjoint also aimed to estimate the respondents' opinion patterns. The estimation results will be compared with the actual respondent's opinion. The estimation results should be not much different with the respondent's opinion.

The process of comparison between estimates and actual opinion is called predictive accuracy, which measures the accuracy of predictions. The test of the prediction accuracy was done by measuring the correlation.

The accuracy of prediction rates is known through correlation measurements either using Pearson or Kendall method. The correlation number greater than 0.5 indicates a strong relationship between estimated and Actual or the predictive accuracy of the conjoint process is high. The significance of the correlation can also be seen by its significance value of which categorized significant once the significant number is smaller than 0.05. Table 4.13 shows the correlation value of the conjoint analysis.

**Table 4.13 Correlation value of the Conjoint analysis.**

Correlations <sup>a</sup>		
	<b>Value</b>	<b>Sig.</b>
Pearson's R	0,971	0,001
Kendall's tau	0,867	0,007

Table 4:16 shows that the value of Pearson and Kendall correlation values reveal the value greater than 0.5, that are 0.971 and 0.867 respectively, with significance values below 0.05, that are 0.001 (Pearson) And 0.007 (Kendall). These indicated that the two attributes of grouper could precisely predict the preferences of the marketing institution (collectors and retailer).

#### **D. Conclusion**

Based on the results of the study analysis, it can be concluded that the grouper marketing institution are preferred to fish with normal gill color (red maroon) with a cheap price.

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## Income Analysis of Seaweed Cultivation with Long Line Method

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### Abstract

Seaweed cultivation activities have provided business opportunities to increase income and welfare at family and community level in coastal areas. This is indicated by the number seaweed farmers that continue to increase from year to year. Whereas the livelihood of the community was basically dominated by fishermen, but in fact, nowadays many fishermen are turning the profession into seaweed farmers due to the more promising income and an easy production process of seaweed. This study aimed to determine the costs incurred in seaweed cultivation and income level earned by seaweed farmers. The results of this study were expected to provide additional knowledge and information for the community as well as become a reference for seaweed farmers in improving seaweed cultivation. The study purpose for the government is a recommendation for stakeholders, the private sector, and entrepreneurs in order to develop seaweed cultivation to empower and improve the standard of living of the community. The method of data collection of the study was conducted by observation and questionnaire interview. The results showed that income/profit of seaweed farmers in a raft was Rp. 2.610.000, - with average revenue of Rp 6.232.500 and the average cost of Rp. 3,622,500. Thus cultivation of seaweed in Tanggetada village showed that the R/C ratio of a rift obtained was 1.72, which is greater than 1. It is concluded that seaweed cultivation conducted by farmer respondents in Tanggetada village is worth to be developed.

**Keywords:** Income Analysis, Long Line Method, Seaweed

### A. Background

Seaweed in the world of science is known as algae, which is very popular in the world of economics. Seaweed is one of the marine commodities that have a long history of its utilization and export process. More than a century ago, seaweed has been exported to several countries and traditionally, some types of seaweed have been utilized by the community, particularly in coastal areas where seaweed was processed into several types of food products.

In Indonesia, seaweed is developed in coastal areas. Seaweed is grown in nature by attaching itself to corals, mud, sand, rocks and other hard objects. Various types of seaweed potentially and relatively easy to cultivate as its technology is quite simple and relatively easy to operate, it also does not require the beach seed and feeds during the cultivation, it just needs the condition of water fertility and photosynthesis process.

Tanggetada Sub-district is one of the sub-districts in Kolaka District located near to the beach. Of the 12 villages and 1 sub-district in Tanggetada sub-district, there are 6 villages and 1 urban village located in the coastal area. This location is a potential area for the development of seaweed cultivation. One of the most well-known coastal villages with developed seaweed cultivation is Tanggetada village. Based on the result of observation, the total area of seaweed cultivation in Tanggetada village is 230.000 m<sup>2</sup>, with production center located in kampong I Tanggetada, kampong II Sogae, and kampong III Nona.

Based on the facts in the field, it shows that the villagers of Tanggetada who cultivate seaweed have provided business opportunities to increase the income and welfare of families and communities in the coastal areas. It is indicated by the number of seaweed farmers that increased over the year. Community in Tanggetada village is basically dominant in their livelihood as fishermen, but currently, there are many fishermen have slipped to the seaweed farmers due to the more promising income with the easy production process. On the other hand, it is assumed that the involvement of the family member in production activities is more normally distributed than when it relies only on their work as fishermen who are dominated only by heads of households as income contributor. Thus, it is necessary to conduct research on the income analysis of seaweed cultivation using long line method in Tanggetada village, Tanggetada sub-district. Based on the explanation in the background, then the main object of the study was to calculate the income level obtained by seaweed farmers of applying seaweed cultivation using long-line method in Tanggetada village.

## B. Method

### 1. Population and Samples

The population of this study included the entire population of seaweed farmers in the village of Tanggetada that were 44 farmers. Based on the number, the sampling method was carried out with the census on all seaweed farmers.

### 2. Method of Data Collection

The data collection was performed by observation and interview questionnaire.

### 3. Method of Data Analysis

Data obtained from the study were analyzed using descriptive analysis and quantitative analysis to determine net income with the following formula:

$$\pi = TR - TC \quad (\text{Soekartawi, 1985})$$

Where:

$\pi$  = income(Profit)

TR = Total Revenue

TC = Total Cost

## C. Results and Discussion

### 1. Cost Analysis of Seaweed Cultivation in Tangketada Village

#### a. Fixed Cost

Fixed costs are unchangeable (constant) costs or expenses that are not spent in a single production period of 2 years. Fixed costs for a raft can be seen in the following table.

**Table 1 : Fixed costs of seaweed cultivation for a raft seaweed**

No.	Details	Volume (unit)	Price (unit) (Rp)	Total Price (Rp)	Depreciation (2 years)	Total
1.	Main rope	9 kg	35,000,-	315,000,-	50 %	157,500,-
2.	Strap rope	40 kg	35,000,-	1,400,000,-	50%	700,000,-
3.	Rope binding seeds	3 bales	50,000,-	150,000,-	50 %	75,000,-
4.	Anchor	12 unit	25,000,-	300,000,-	50 %	150,000,-
5.	Main float	8 pieces	25,000,-	200,000,-	50 %	100,000,-
6.	Small float	1.050 pieces	200,-	210,000,-	50 %	105,000,-
7.	Pile	12	2,500,-	30,000,-	50 %	15,000,-
8.	boat	1 unit	1,500,000,-	1,500,000,-	50 %	750,000,-
Total						<b>2,052,500,-</b>

Source: Primary data, analyzed in 2011

### b. Variable cost

Variable costs are costs that are used up in one production period or one harvest. The use of variable costs or not fixed costs on seaweed cultivation can be seen in the following table.

**Table 2 : Variable costs of seaweed cultivation for a raft seaweed**

No.	Details	Volume (Unit)	Price (Unit)	Total (Rp)	Percentage %
1.	Seaweed seeds	400 kg	2,500,-	1,000,000,-	64
2.	Planting cost	100ropes for planting	1,500,-	150,000,-	09
3.	Cleaning	8 time	15,000,-	120.00,-	08
4.	Harvesting/post harvesting	10 hari	300,000,-	300,000,-	19
Total				<b>1,570,000,-</b>	100

Source: Primary data, analyzed in 2011

Based on Tables 1 and 2, it can be determined that the cost incurred for seaweed cultivation for 1 raft is:

$$\begin{aligned} \text{Cost} &= \text{Fixed cost} + \text{Variable Cost} \\ &= \text{Rp. 2,052,500} + \text{Rp. 1,570,000} \\ &= \text{Rp. 3,622,500} \end{aligned}$$

### c. Production and Production Price

Harvest of seaweed in Tangketada village can be carried out during planting period between 40-45 days. The average seaweed produced in one raft was 6,232.50 kg of wet seaweed and 623.25 kg of dried seaweed. The price of dried seaweed at the time of data collection was Rp. 10,000/kg, so that the average revenue of seaweed farmers in seaweed cultivation of one raft is: 623.25 kg X Rp. 10,000 = Rp. 6,232,500. Respondents of seaweed farmers in Tangketada village on average have seaweed farming business of 2 (two) rafts.

Seaweed production is classified based on the number of rafts owned by the respondent farmers. Thus, for every 2 rafts, it can produce dried seaweed of 1,100 kg-1,500 kg, and for 3 rafts, it reaches 1,800 kg - 2,000 kg. The result of interviews with respondents suggested that the difference of seaweed production is caused by the number of stretches cultivated by each seaweed farmer. The number of stretches is the number of strap rope used to bind/plant the seaweed seeds so the strap is one of the factors which affect the increased production.

### d. Analysis of income of Seaweed cultivation in Tanggetada Village

Income/Profit is the amount of seaweed production multiplied by the prevailing price at the time of the research minus the costs incurred in the process of seaweed cultivation. To know the income of seaweed farmer in Tanggetada village for 1 (one) raft, it used the formula as follows:

$$\begin{aligned} \text{Farmer's income} &= \text{Revenue} - \text{Cost} \\ &= \text{Rp 6,232,500} - \text{Rp 3,622,500} \\ &= \text{Rp. 2,610,000} \end{aligned}$$

So the income of seaweed farmer respondents for 1 raft is Rp. 2,610,000,-.

To know whether seaweed cultivation business in Tanggetada village is profitable or not, it uses the formula of R/C Ratio, as follows:

$$\begin{aligned} \text{R/C Ratio} &= \text{TR/ TC} \\ &= \frac{\text{Rp 6,232,500}}{\text{Rp. 3,622,500}} \\ &= \text{Rp. 1.72} \end{aligned}$$

The average R/C ratio obtained in a raft of seaweed was 1.72 of which greater than 1. It suggested that the seaweed cultivation conducted by respondent farmers in Tanggetada village is worth to be developed.

#### **D. Conclusion**

Based on the study of the income analysis of seaweed cultivation using long line method in Tanggetada village, it can be concluded that:

1. The net income obtained by seaweed farmers in one cycle harvesting time of 40-45 days with 1 raft is Rp. 2,610,000,-
2. Seaweed cultivation by respondent farmers in Tanggetada village is worth to be developed.

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## External Financing of Azerbaijani Agriculture

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### Abstract

The article investigates formation and normal activity of human capital which performs main resource of modern economic development and influence of external financing in the field of food security, which acts as the main part of economy of Azerbaijan that newly got independence. Roles of subsidy, microfinancing and loans were examined. It is confirmed National Fund for Entrepreneurship Support (NFES) of the Republic that allocated the agricultural sector production and processing of loans, provision of bank loans to the agricultural sector. Under the influence of the economic performance of the agricultural sector development trends of the loan were based on the economic and mathematical models and charts were drawn. By the time forecasts were prepared it became clear that loans, especially state finance support depend on oil sphere.

**Keywords:** Subsidy, microfinancing, loans, JEL Classification: Q14, Q18, D29

### A. Background

Agriculture the first and most prosperous activity of mankind (Nnamocha and Charles, 2015). All industrial developed countries have agricultural background 200 years ago most part of the population lived thanks to agriculture (Eswaran and Kotwal, 2005). Agriculture is experiencing profound, rapid changes in developing countries. Globalisation accelerated the transition from traditional, low-productivity agriculture to modern, highly productive agriculture moving more quickly in some countries than in others (Soundarrajan and Vivek, 2015).

In developed countries loans to agriculture are the object of attention and support from the state, as it provides a stimulating investment, innovation and dealing activity in the industry, which is the guarantor of food and economic security. System of supporting institutions, which was a high level of governmental involvement, especially in the initial stages of their formation was created in every country. Agricultural credit system which established and functioning with the participation of the state, is the most important mechanism of state regulation, the development and improvement of elements of which are the main tasks of the agrarian reform and policy of Azerbaijan. It is implemented in the framework of the State Program on social and economic development of regions (2004 - 2008th year, 2009 - 2013th year and 2014 - 2018th year).

The need for active state regulation of the financial and credit system is determined by the characteristics of the organizational and economic relations in agriculture: by the duration of the production cycle, seasonality, high manufacturing risk of natural-biological nature, the monopoly situation of suppliers and consumers of products industry that dictates unilaterally the conditions of economic interaction. Elements of market's self-regulation mechanism are not able to provide not only expanded, but also a simple reproduction of the industry. In addition, the need for state support of agriculture in Azerbaijan today is much higher than in developed countries. This is determined by climatic, material and technical, economic, social, and historical conditions. Production in agriculture is more risky, as well as one of the most capital-intensive and power-consuming. In this regard, the industry is less attractive for lenders and investors. As it is hindered the inflow of private capital from other industries and sectors of the economy. Lack of resources associated with the sale of agricultural products, involves a high dependence of the industry on the recurrent funding.

Reformation of the agricultural sector has revealed the problems associated with the formation of a specialized system of financial and credit support industry, ensuring access of agricultural goods producers to external sources of financing fixed capital formation and interaction of elements of this system. Current forms and methods of state regulation of agricultural credit system did not lead to a significant increase in the rate of agricultural production. This branch is still low-profitable. Agriculture need money to work normally like any other business. This is an important element for carrying out of the daily tasks, making the payment of salaries of employees and achieving equipment. Due to a change in the chargeable income of the farmers from the previous year, the profit is not enough simply to save. Farmers need money to access assets, stop cash flow, maintain a consistent work and for expansion. Simply to maintain its presence in some areas of agriculture loans in need, while others prosper and expand the use of agricultural loans (Culp, 2013).

Now, it was revealed that in both developed and developing countries the demand for agricultural credit in the special funds, sources cannot be paid. (Khan 1963). In its internal financial resources of economic entities in the agricultural sector and non-institutional forms of foreign financial resources (loans to non-financial institutions); financial institutions (banks), financial resources (loans); large companies and financial institutions "unnecessary" financial resources in the form of money; financial resources in the form of state support and assistance is available (Szeles, et al., 2014). Either small farmers, or large farmers and non-rural population of agriculture are faced with a shortage of capital. Requirement to credit increased after green revolution and technological changes. (Ahmad 2011). The expansion of the use of fertilizers, biocides, mechanisms and improvement of seeds in the past few decades in agrarian sector increased the demand for loans (Muhammad, et al., 2003).

Marketing of agricultural production timing, and the product is characterized by the fact that a few months of time. Access to working capital and, consequently, to the credit market, thus playing an important role in the decisions of the farmer's production; distribution of access to credit, in turn, tends to be an important determinant of income distribution (Eswaran and Kotwal, 1986). Agriculture is particularly sensitive to interest rates, because it is one of the most capital-intensive industries in the economy. Interest rates are key determinant of land values, the basis of wealth in agriculture on farmland prices depend on the relationship between expected return and interest rates. For agriculture financial constraints lead to a progressive reduction of farm support programs (Niles and Orden, 2003). The sentences above leads to the conclusion that the agricultural sector is quite specific to a market economy, self parking enforcement mechanisms to ensure the functioning of the credit system, manufacturer and rural population and, consequently, of innovative development of industry.

## **B. Method**

We also fixed production factors of other loans that will adopt the methodology of the study. Indeed, Ammani has three simple regression models. The analytical framework of this study based on the following assumptions: (i) a loan is the only form of variable capital, provided for agricultural production, all the other factors of production remains constant; (ii) a loan for the acquisition and use relate to the agricultural production of the same year; (iii) there is no change in the price level; (iv) no change in technology; (v) the output of each sub-sector of agriculture GDP is equal to the sub-sector (Ammani 2012).

For the purposes of this article at the time of the writing of the article economic and mathematical methods were used. In this case, the support of the agrarian sector during the first research fund for

more specificity in the processing of agricultural products and agricultural products separately for agriculture and processing of bank loans and preferential loans for agriculture, forestry and fishing GDP agricultural enterprises in the amount of profit and loss, balance income (damage), the cash proceeds from the sale, the income derived from the sale (damage), income derived from the sale of the crop as a whole (damage), income derived from the sale of livestock as a whole (damage), gross income, investigated the effects of agricultural products. In this case, the absolute and relative performance indicators adopted in 2005, indexes have turned 100. However, when performing a look at the statistics in the fund for the production of agricultural products and agricultural products in the amount of loans to separately identify significant changes and differences, all of them connected to a variable, as it was regarded as an influential factor in the next stage according to the quadratic, cubic, logarithmic, S equations built, estimates and projections of results have been taken.

Other scientists Heijman and Koch (2011) used from Kobb-Duglas function for sharing of financial resources and their forecasting during 2007-2013 years: (i)  $-A_i = \alpha + \beta P_i + \gamma l_i$ ; (ii)  $-A_i = \alpha P_i^\beta l_i^\gamma$ . Its important to emphasize that Asiedu and Fosu in own articles mentioned line of agriculture credit influence  $S_i = E(Y) = 1/X_i = \beta_0 + \beta_1 X_i$  and logistic  $S_i = E(1/X_i) = 1/(1 + e^{\beta_0 + \beta_1 X_i})$  model formation. At the same time Széles et al. (2014) analysed credit tendencies to agriculture in Hungary during 1995-2012 by the using of line and exponential functions:  $Y = a + bx$ , model equation  $y = 25.585x + 70.718$  ( $R^2 = 0.918$ ) və  $Y = ab^x$ , model equation  $y = 0.1027e^{-0.056x}$  ( $R^2 = 0.858$ ).

Bashir and other scientists mentioned the main role of agriculture credits to agriculture transformation and influence of increasing participation of farmers in production process by the use of complex regression analysis (was appealed to Kobb-Duglas production function). Kumar et al. (2010) in own research article, the loan is dependent on the agricultural sector, households borrowed model mentioned 15 factors –so, household age, sex, composition, soil area, 3 type of social groups. 2 type of education level, secondary education, being of higher diploma specialist, household type-agriculture labor, household type-other labor household type-own labor and other employment.

Thomaj (2014) in own model accepted 5 main changes: (i) price index of agriculture products; (ii) loan to agriculture; (iii) inflation; (iv) GVP at agriculture; (v) import of goods included to “food, drink and tobacco” category. Model shows that bank sector finance agriculture as giving season short-term loans. In this way, internal production is stimulated, import is decreased, agriculture prices become low. This means that selling and income for it will increase and payments will be carried out. Data shortages and short-term will be accepted as shortage.

### ***Statistic information for investigation***

Information for researches were used from publishes of Azerbaijan State Statistic Committee, annual report of Ministry of Economy and Industry and monthly and annual reports of Central Banks, quarterly and annual reports of NFES. In this situation, indications were turned into indexes and accounts were carried out.

**Table 1. Agricultural enterprises, the main economic indicators (thousand AZN)**

	NFES credits for processing of agriculture products	NFES credits for production of agriculture products	Bank credit to processing and agriculture	GIP.Agriculture. forestry and fishing	Profit	Loss	Balance income	Money income from selling	Income from total selling (-loss)	Income from total selling (-loss in plant)	Income from total selling (-loss in Livestock)	Total income (with actual prices)	General agricultural products (with actual prices of proper years)
	X1	X2	X3	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
2005	7053.4	12987.8	97.6	1145.5	7098	1207	5891	70882	5886	2769	3117	14757	79683
2006	12576.5	23484	136.49	1329.3	15798	1132	14666	113561	10333	3572	6761	27908	98903
2007	13940.6	24130.4	197.24	1854.8	21890	1057	20833	157826	17369	5639	11730	39076	136783
2008	8442.5	28759.7	261.47	2236	28013	980	27033	197079	25346	6775	18571	50101	160464
2009	19643.5	22573.3	394.76	2179.5	36605	2209	34396	190167	28769	4708	24061	67149	175461
2010	10350	55651.9	441.35	2344.9	32385	4728	27657	188635	21876	8855	13021	71604	187694
2011	16853	70358.5	466.72	2643.5	41912	4992	36920	207904	34021	8980	25041	71623	198806
2012	27860	99968.5	546.23	2783.1	52250	4050	48200	294726	43645	14609	29036	86045	263180
2013	32679	149511	733.25	3057.8	56340	4057	52283	333604	45067	17534	27533	91903	304766
2014	22204.5	164191	847.28	3111	67331	3367	63964	402402	42076	16234	25842	102723	359315
2000=100													
2005	100	100	100	100	100	100	100	100	100	100	100	100	100
2006	178.3	180.8	139.8	116.0	222.6	93.8	249.0	160.2	175.6	129.0	216.9	189.1	124.1
2007	197.6	185.8	202.1	161.9	308.4	87.6	353.6	222.7	295.1	203.6	376.3	264.8	171.7
2008	119.7	221.4	267.9	195.2	394.7	81.2	458.9	278.0	430.6	244.7	595.8	339.5	201.4
2009	278.5	173.8	404.5	190.3	515.7	183.0	583.9	268.3	488.8	170.0	771.9	455.0	220.2
2010	146.7	428.5	452.2	204.7	456.3	391.7	469.5	266.1	371.7	319.8	417.7	485.2	235.6
2011	238.9	541.7	478.2	230.8	590.5	413.6	626.7	293.3	578.0	324.3	803.4	485.3	249.5
2012	395.0	769.7	559.7	243.0	736.1	335.5	818.2	415.8	741.5	527.6	931.5	583.1	330.3
2013	463.3	1151.2	751.3	266.9	793.7	336.1	887.5	470.6	765.7	633.2	883.3	622.8	382.5
2014	314.8	1264.2	868.1	271.6	948.6	279.0	1085.8	567.7	714.8	586.3	829.1	696.1	450.9

Source: authors' calculations

## C. Results and Discussion

### 1. Econometric Results

We used a method of multifactor correlation and regression analysis. which was carried out using SPT "PASW Statistic 18".

Y1=	94.769	+0.039x <sub>1</sub>	- 0.050x <sub>2</sub>	+0.281x <sub>3</sub>
<b>Sig.</b>	(0.004***)	(0.719)	(0.430)	(0.027**)
<b>Correlations</b>		(0.751)	(0.863)	(0.942)
<b>t-statistic</b>	(4.559)	(0.377)	(-0.846)	(2.897)
<b>Std. Error</b>	(20.789)	(0.104)	(0.059)	(0.097)
F=17.89663; R <sup>2</sup> =0.89948; DW=1.659				

Y2 =	27.596	+0.333x <sub>1</sub>	-0.110x <sub>2</sub>	+1.073x <sub>3</sub>
<b>Sig.</b>	(0.630)	(0.267)	(0.499)	(0.005***)
<b>Correlations</b>		(0.815)	(0.919)	(0.978)
<b>t-statistic</b>	(0.508)	(1.223)	(-0.720)	(4.235)
<b>Std. Error</b>	(54.350)	(0.272)	(0.153)	(0.253)
F=57.909; R <sup>2</sup> =0.967; DW=2.270				

Y3=	48.143	-0.026x <sub>1</sub>	- 0.145x <sub>2</sub>	+0.619x <sub>3</sub>
<b>Sig.</b>	(0.658)	(0.962)	(0.636)	(0.237)
<b>Correlations</b>		(0.529)	(0.633)	(0.714)
<b>t-statistic</b>	(0.463)	(-0.050)	(-0.499)	(1.282)
<b>Std. Error</b>	(103.480)	(0.519)	(0.292)	(0.482)
F=2.267815; R <sup>2</sup> =0.531376; DW=0.983				

Y4=	23.386	+0.407x <sub>1</sub>	- 0.103x <sub>2</sub>	+1.166x <sub>3</sub>
<b>Sig.</b>	(0.759)	(0.307)	(0.633)	(0.014*)
<b>Correlations</b>		(0.786)	(0.781)	(0.815)
<b>t-statistic</b>	(0.322)	(1.116)	(-0.503)	(3.440)
<b>Std. Error</b>	(72.734)	(0.365)	(0.205)	(0.339)
F=41.24149; R <sup>2</sup> =0.953748; DW=2.139				

Y5 =	86.443	+0.063x <sub>1</sub>	+0.087x <sub>2</sub>	+0.376x <sub>3</sub>
<b>Sig.</b>	(0.073)	(0.764)	(0.466)	(0.089)
<b>Correlations</b>		(0.785)	(0.043)	(0.964)
<b>t-statistic</b>	(2.175)	(0.315)	(0.778)	(2.030)
<b>Std. Error</b>	(9.737)	(0.199)	(0.112)	(0.185)
F=30.01182; R <sup>2</sup> =0.937523; DW=1.654				

Y6 =	3.317	+ 0.825x <sub>1</sub>	- 0.205x <sub>2</sub>	+ 0.864x <sub>3</sub>
<b>Sig.</b>	(0.969)	(0.092)	(0.411)	(0.065)
<b>Correlations</b>		(0.861)	(0.850)	(0.913)
<b>t-statistic</b>	(0.040)	(2.001)	(-0.883)	(2.255)
<b>Std. Error</b>	(82.225)	(0.412)	(0.232)	(0.383)
F=18.44826; R <sup>2</sup> =0.902192; DW=1.992				

Y7 =	59.423	+ 0.267x <sub>1</sub>	+ 0.348x <sub>2</sub>	+ 0.059 x <sub>3</sub>
<b>Sig.</b>	(0.277)	(0.326)	(0.048*)	(0.806)
<b>Correlations</b>		(0.826)	(0.786)	(0.781)
<b>t-statistic</b>	(1.195)	(1.070)	(2.480)	(0.257)
<b>Std. Error</b>	(49.716)	(0.249)	(0.140)	(0.232)
F=35.9975; R <sup>2</sup> =0.947365; DW=2.414				

Y8 =	- 46.527	+ 1.320x <sub>1</sub>	- 0.696x <sub>2</sub>	+ 1.579x <sub>3</sub>
<b>Sig.</b>	(0.735)	(0.092)	(0.109)	(0.042*)
<b>Correlations</b>		(0.809)	(0.786)	(0.781)
<b>t-statistic</b>	(-0.354)	(2.005)	(-1.879)	(2.579)
<b>Std. Error</b>	(131.39)	(0.658)	(0.370)	(0.612)
F=10.75322; R <sup>2</sup> =0.843177; DW=2.187				

Y9 =	51.764	+0.167x <sub>1</sub>	- 0.263x <sub>2</sub>	+1.093x <sub>3</sub>
<b>Sig.</b>	(0.227)	(0.420)	(0.051**)	(0.001***)
<b>Correlations</b>		(0.771)	(0.786)	(0.781)
<b>t-statistic</b>	(1.345)	(0.865)	(-2.525)	(6.093)
<b>Std. Error</b>	(38.492)	(0.193)	(0.109)	(0.179)
F=61.64113; R <sup>2</sup> =0.968574; DW=2.050				

Y10 =	71.541	+ 0.027x <sub>1</sub>	- 0.057x <sub>2</sub>	+ 0.330x <sub>3</sub>
<b>Sig.</b>	(0.008***)	(0.776)	(0.313)	(0.008***)
<b>Correlations</b>		(0.791)	(0.786)	(0.781)
<b>t-statistic</b>	(3.883)	(0.297)	(-1.100)	(3.851)
<b>Std. Error</b>	(18.423)	(0.092)	(0.052)	(0.086)
F=89.69836; R <sup>2</sup> =0.978189; DW=2.041				

Note:\*\*\* p<0.01; \*\*p<0.05; \* p<0.1.

It can be said accordance with the indications of calculations that increase of NFSE credits for agriculture products processing and production and allocated bank credits for agriculture products processing and production resulted with both either microeconomic or finance indications of agrarian field. Ahmad (2011) thought that agriculture credits actual indirect influence to agriculture products.

<b>Cubic</b>	y <sub>1</sub> =	8.096	+1.118x	- 0.002x <sup>2</sup>	+9.840E-7x <sup>3</sup>
	<b>Sig.</b>	(0.885)	(0.050*)	(0.195)	(0.133)
	<b>Standardized Coefficients Beta</b>		(5.905)	(-10.266)	(5.299)
	<b>t-statistic</b>	(0.150)	(2.446)	(-1.736)	(1.458)
	<b>Std. Error</b>	(53.826)	(0.457)	(0.001)	(0.000)
F=16.738; R <sup>2</sup> =0.893					

<b>Logarithmic</b>	y <sub>2</sub> =	-1425.515	+335.426lnx
	<b>Sig.</b>	(0.000**)	(0.000**)
	<b>Standardized Coefficients Beta</b>		(0.959)
	<b>t-statistic</b>	(-7.040)	(9.616)
	<b>Std. Error</b>	(202.497)	(34.880)
F=92,476; R <sup>2</sup> =0,920			

<b>Cubic</b>	$y_2 =$	-190.803	+3.714x	- 0.006x <sup>2</sup>	+3.112E-6x <sup>3</sup>
	<b>Sig.</b>	(0.404)	(0.085)	(0.220)	(0.287)
	<b>Standardized Coefficients Beta</b>		(4.323)	(-7.039)	(3.694)
	<b>t-statistic</b>	(-0.898)	(2.057)	(-1.367)	(1.168)
	<b>Std. Error</b>	(212.510)	(1.805)	(0.004)	(0.000)
F=22.741; R <sup>2</sup> =0.919					

<b>S</b>	$\ln(y_2) =$	6.996	-233.967(1/x)
	<b>Sig.</b>	(0.000**)	(0.000**)
	<b>Standardized Coefficients Beta</b>		(-0.960)
	<b>t-statistic</b>	(60.709)	(-9.719)
	<b>Std. Error</b>	(0.115)	(24.073)
F = 94.463; R <sup>2</sup> = 0.922			

<b>Quadratic</b>	$y_3 =$	-129.859	1.734x	- 0.001x <sup>2</sup>
	<b>Sig.</b>	(0.141)	(0.004***)	(0.009***)
	<b>Standardized Coefficients Beta</b>		(3.972)	(-3.395)
	<b>t-statistic</b>	(-1.657)	(4.207)	(-3.596)
	<b>Std. Error</b>	(78.358)	(0.412)	(0.000)
F=13,204; R <sup>2</sup> =0,790				

<b>Cubic</b>	$y_3 =$	-195.913	+2.347x	- 0.003x <sup>2</sup>	+9.480E-7x <sup>3</sup>
	<b>Sig.</b>	(0.296)	(0.158)	(0.425)	(0.674)
	<b>Standardized Coefficients Beta</b>		(5.375)	(-6.972)	(2.214)
	<b>t-statistic</b>	(-1.145)	(1.615)	(-0.855)	(0.442)
	<b>Std. Error</b>	(171.102)	(1.454)	(0.003)	(0.000)
F=7,856; R <sup>2</sup> =0,797					

<b>Logarithmic</b>	$y_4 =$	-1606.139	376.617Lnx
	<b>Sig.</b>	(0.000***)	(0.000***)
	<b>Standardized Coefficients Beta</b>		(0.947)
	<b>t-statistic</b>	(-6.152)	(8.375)
	<b>Std. Error</b>	(261.058)	(44.968)
F=70,146; R <sup>2</sup> =0,898			

<b>Cubic</b>	$y_4 =$	-189.756	+3.994x	- 0.006x <sup>2</sup>	+3.556E-6x <sup>3</sup>
	<b>Sig.</b>	(0.509)	(0.133)	(0.281)	(0.335)
	<b>Standardized Coefficients Beta</b>		(4.089)	(-6.821)	(3.712)
	<b>t-statistic</b>	(-0.701)	(1.738)	(-0.855)	(1.048)
	<b>Std. Error</b>	(270.532)	(2.298)	(0.005)	(0.000)
F=17.734; R <sup>2</sup> =0.899					

<b>S</b>	$\ln y_4 =$	7.119	-240.609(1/x)
	<b>Sig.</b>	(0.000***)	(0.000***)
	<b>Standardized Coefficients Beta</b>		(-0.952)
	<b>t-statistic</b>	(54.087)	(-8.751)
	<b>Std. Error</b>	(0.132)	(27.495)
F=76.582; R <sup>2</sup> =0.905			

<b>Cubic</b>	$y_5 =$	-2.774	+1.553x	-0.002x <sup>2</sup>	+1.528E-6x <sup>3</sup>
	<b>Sig.</b>	(0.982)	(0.171)	(0.320)	(0.340)
	<b>Standardized Coefficients Beta</b>		(3.382)	(-5.773)	(3.394)
	<b>t-statistic</b>	(-0.024)	(1.554)	(0.002)	(1.037)
	<b>Std. Error</b>	(117.581)	(0.999)	(0.002)	(0.000)
F=21.083; R <sup>2</sup> =0.913					

<b>Logarithmic</b>	$y_6 =$	-1180.274	+285.824 ln x
	<b>Sig.</b>	(0.001***)	(0.000***)
	<b>Standardized Coefficients Beta</b>		(0.925)
	<b>t-statistic</b>	(-4.895)	(6.882)
	<b>Std. Error</b>	(241.127)	(41.535)
F=47.357; R <sup>2</sup> =0.855			

<b>Cubic</b>	$y_6=$	-43.773	+2.167x	-0.002x <sup>2</sup>	+ 4.159E-7x <sup>3</sup>
	<b>Sig.</b>	(0.868)	(0.350)	(0.724)	(0.899)
	<b>Standardized Coefficients Beta</b>		(2.853)	(-2.556)	(0.558)
	<b>t-statistic</b>	(-0.174)	(1.013)	(-0.371)	(0.132)
	<b>Std. Error</b>	(251.764)	(2.139)	(0.005)	(0.000)
F=11.770; R <sup>2</sup> =0.855					

<b>Quadratic</b>	$y_7=$	4.101	+1.021x	+0.000x <sup>2</sup>
	<b>Sig.</b>	(0.935)	(0.005***)	(0.143)
	<b>Standardized Coefficients Beta</b>		(1.631)	(-0.670)
	<b>t-statistic</b>	(0.085)	(4.022)	(-1.652)
	<b>Std. Error</b>	(48.266)	(0.254)	(0.000)
F=86.976; R <sup>2</sup> =0.961				

<b>Cubic</b>	$y_7=$	51.777	+ 0.579x	+ 0.001x <sup>2</sup>	-6.843E-7x <sup>3</sup>
	<b>Sig.</b>	(0.639)	(0.539)	(0.756)	(0.621)
	<b>Standardized Coefficients Beta</b>		(.925)	(1.131)	(-1.115)
	<b>t-statistic</b>	(0.494)	(0.651)	(0.325)	(-0.521)
	<b>Std. Error</b>	(104.750)	(0.890)	(0.002)	(0.000)
F=52.040; R <sup>2</sup> =0.963					

<b>S</b>	$\ln(y_8)=$	7.129	-231.901(1/x)
	<b>Sig.</b>	(0.000***)	(0.001***)
	<b>Standardized Coefficients Beta</b>		(-0.879)
	<b>t-statistic</b>	(33.547)	(-5.224)
	<b>Std. Error</b>	(0.213)	(44.394)
F=27.287; R <sup>2</sup> =0.773			

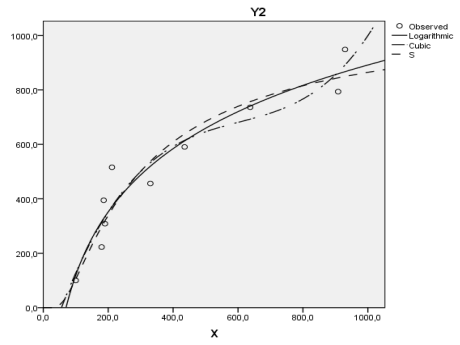
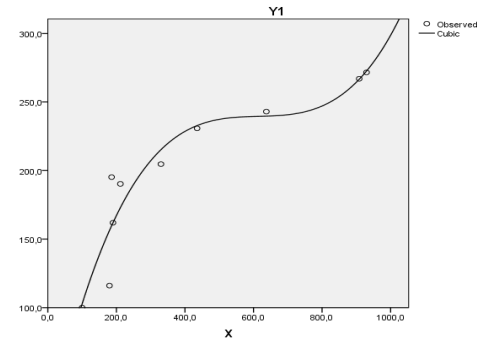
<b>Cubic</b>	$y_9=$	-228.035	+3.895x	- 0.006x <sup>2</sup>	+3.571E-6x <sup>3</sup>
	<b>Sig.</b>	(0.212)	(0.031)	(0.087)	(0.131)
	<b>Standardized Coefficients Beta</b>		(6.211)	(11.064)	(5.807)
	<b>t-statistic</b>	(-1.398)	(2.810)	(-2.044)	(1.746)
	<b>Std. Error</b>	(163.155)	(1.386)	(0.003)	(0.000)
F=20.365; R <sup>2</sup> =0.911					

<b>S</b>	$\ln(y_9)=$	6.747	-209.326(1/x)
	<b>Sig.</b>	(0.000***)	(0.000***)
	<b>Standardized Coefficients Beta</b>		(-0.951)
	<b>t-statistic</b>	(58.793)	(-8.733)
	<b>Std. Error</b>	(0.115)	(23.970)
F=76.262; R <sup>2</sup> =0.905			

<b>Quadratic</b>	$y_{10}=$	79.481	+0.493x	- 0.000x <sup>2</sup>
	<b>Sig.</b>	(0.071)	(0.040)	(0.471)
	<b>Standardized Coefficients Beta</b>		(1.369)	(-0.415)
	<b>t-statistic</b>	(2.130)	(2.513)	(-0.761)
	<b>Std. Error</b>	(37.322)	(0.196)	(0.000)
F=46.645; R <sup>2</sup> =0.930				

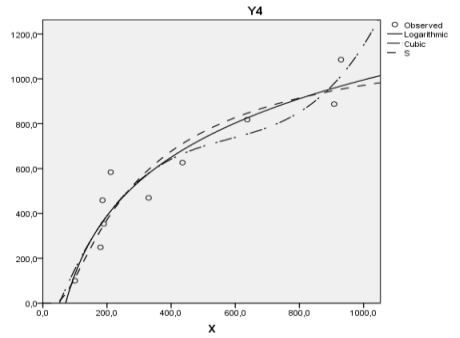
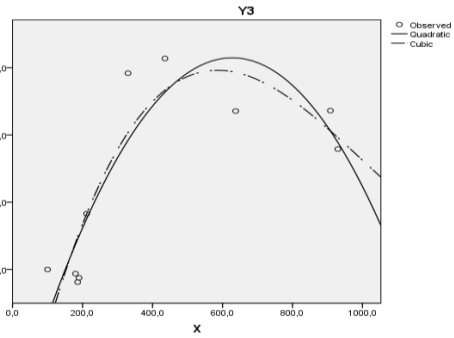
<b>Cubic</b>	$y_{10}=$	0.729	+ 1.224x	-0.002x <sup>2</sup>	+ 1.130E-6x <sup>3</sup>
	<b>Sig.</b>	(0.992)	(0.100)	(0.240)	(0.270)
	<b>Standardized Coefficients Beta</b>		(3.396)	(-5.582)	(3.199)
	<b>t-statistic</b>	(0.010)	(1.942)	(-1.303)	(1.215)
	<b>Std. Error</b>	(74.183)	(0.630)	(0.001)	(0.000)
F=33.708; R <sup>2</sup> =0.944; DW=2.041					

Note:\*\*\* p<0.01;\*\*p<0.05;\* p<0.1.



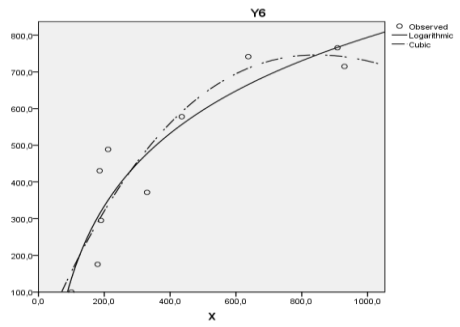
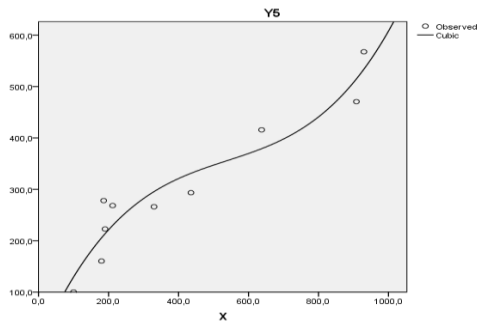
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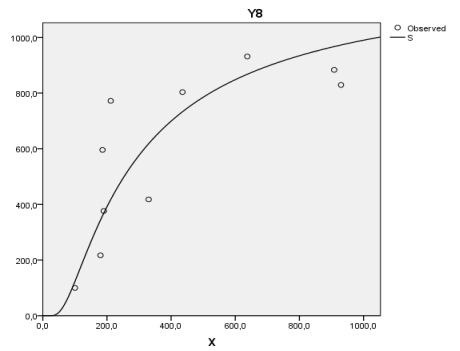
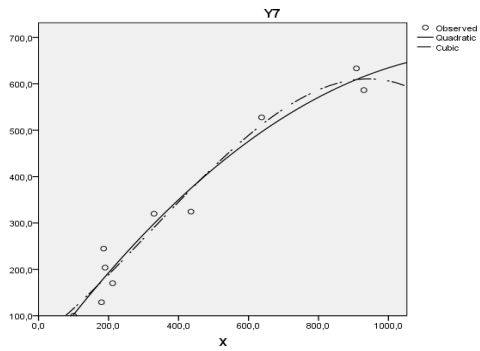
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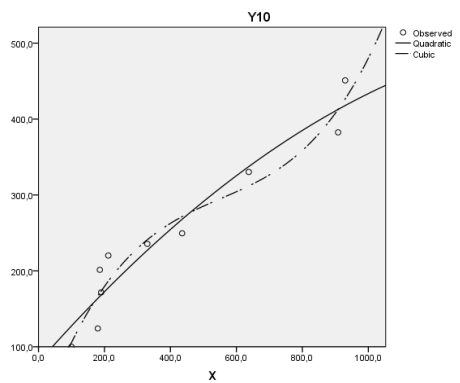
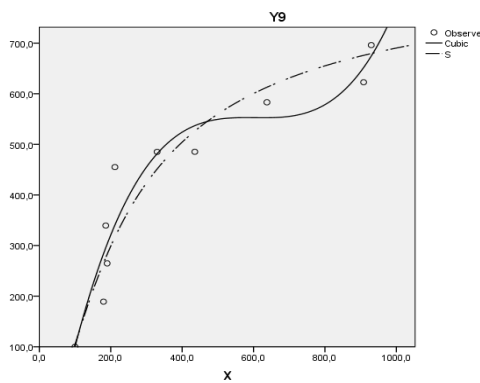
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h)

i)



j)

k)

Figure. 1. The selected function

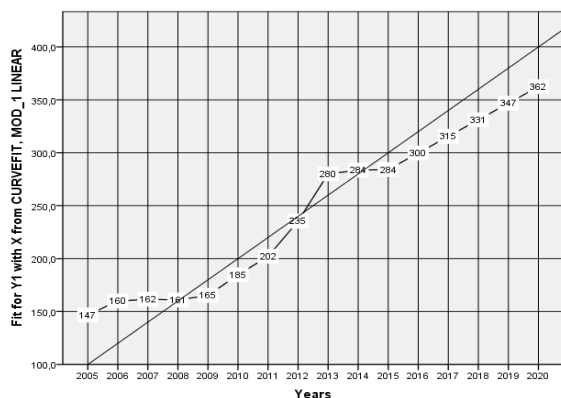
To express both either macroeconomic or finance indications influence of NFES and bank credits to agrarian field the following functions were selected: (a) cubic for GIP in Agriculture. Forestry and fishing; (b) profit logarithmic, cubic and S; (v) quadratic and cubic for loss; (q) logarithmic, cubic and S for balance income (loss); (d) cubic for money income from selling; (e) logarithmic and cubic for income from total selling (loss); (f) quadratic, cubic for income for total selling (-loss in plant); (g) S for income from total selling (-loss in Livestock); (h) cubic and S for general income; (i) quadratic and cubic for agriculture total products.

**2. Difficulties and Discussions**

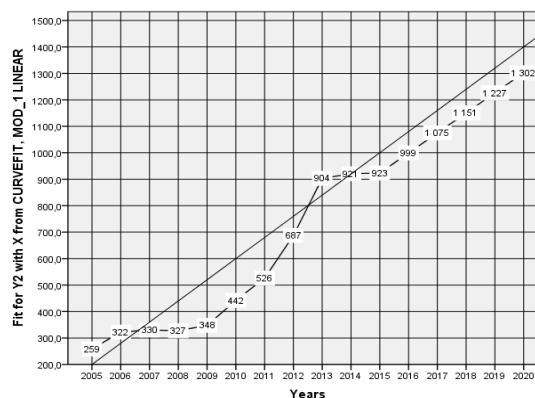
Difficulties during article preparation were connected with the having of Azerbaijan Republic to independent policy and independent economy as former soviet republic and some aspects related with it. So, notwithstanding some signs of market policy in Eastern Europe countries are available now, but access to market policy of present CIS countries has been started from 1991-1992 years and first full collective and state farms cancelled and lands were issued to local population and property of village laborers. And it resulted with difficulties because liberalization works of economy carried out and state support minimized. However, with the launch of the full power of oil contracts for oil exporters and oil prices in the world market due to a favorable level of support for the agricultural sector have been restored, we started to give grants and soft loans.

Increase in soft loans for agriculture products processing by NFES during 2006-2007 years, decrease in 2008 year and rapid increases during 2009 year, 47.3% decrease in 2010 year and relatively stable growth of next years and 21.5% decrease on credits allocated for agriculture production by NFES, 2.5 increase for next year and relatively stable growth of next years and at the same time reality of forecasting could raise doubts. However, commercial banks are focusing on production and processing of agricultural products has not been sharp fluctuations in the volume of loans. That's why we tried to make simple models using from complex correlation-regression model for determination influence of soft loans by NFES to agriculture products processing and production and credits by commerce banks for agriculture products processing and production to main macroeconomic and finance indications.

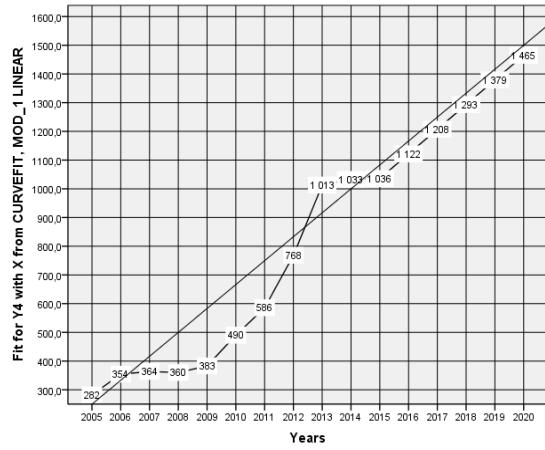
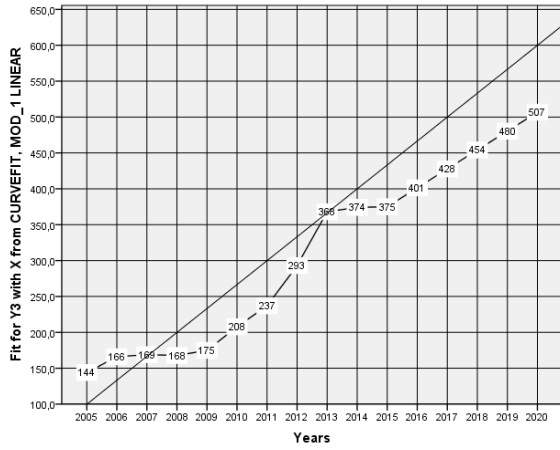
Then a bit of research to the deep agrarian sector loans allocated by combining these three as an influential factor agreed. As part of the active factor in the development of the agricultural sector waking up, to analyze the impact of macroeconomic and financial indicators and forecasts and models were selected to provide the appropriate curves, curves to be visual graphics model was given. In particular, it is necessary that the dependent and independent variables, though in different ways, are built using curves RASW Statistics18 program, but they will have to apply to functions through the provision of forecasts. These forecasts are provided in Figure 2.



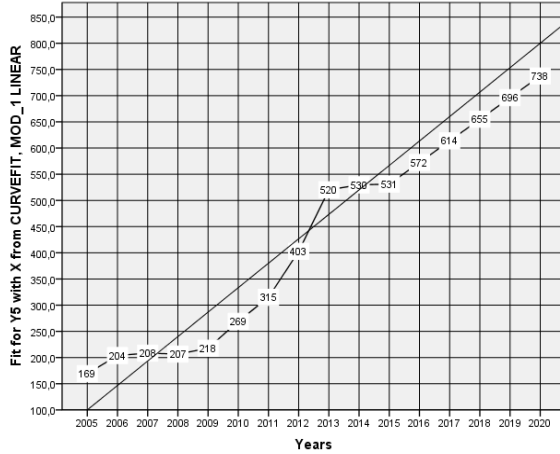
a)



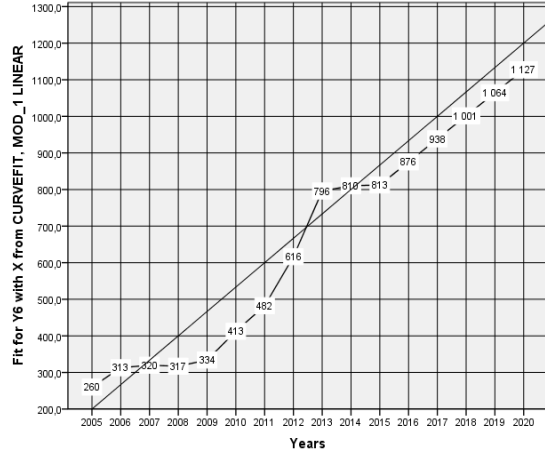
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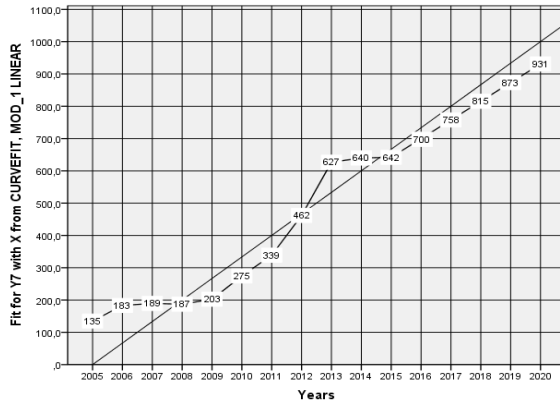
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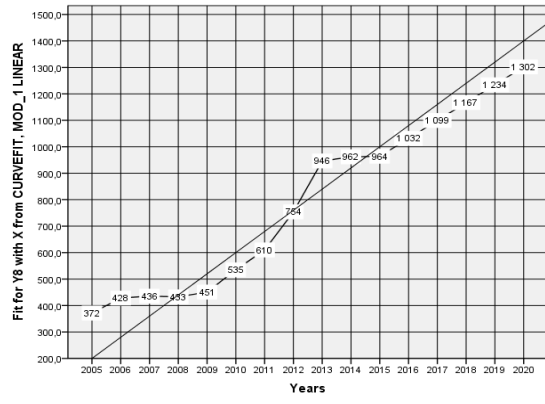
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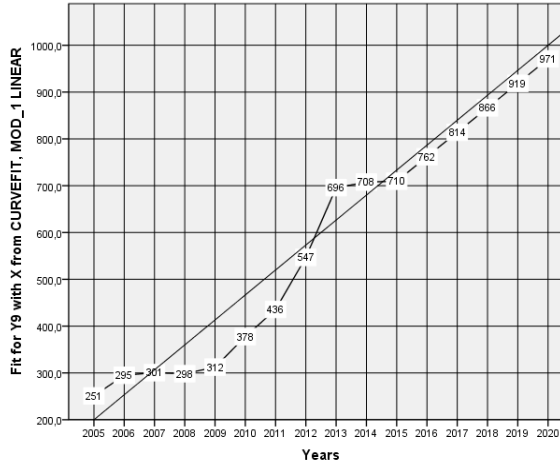
e)



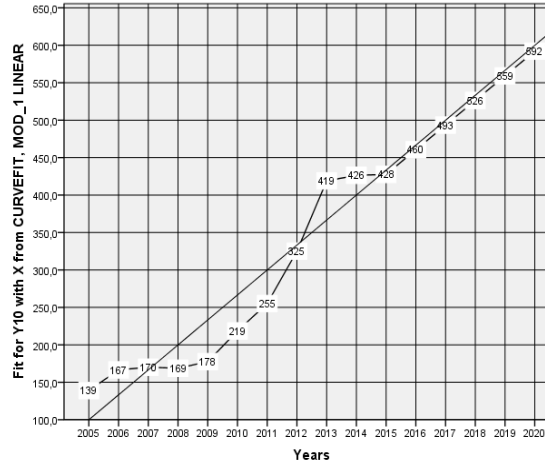
f)



g)



h)



i)

Figure. 2. Forecasts

j)

#### D. Conclusion

Azerbaijan is agrarian-industrial state based on natural resources. This state met with first profit of oil contracts with Western Companies concluded in 1994 during 2005-2006 years. Baku-Tbilisi-Jeyhan main export oil pipeline began pumping oil in the world market and the favorable conjuncture increase of oil exports, namely the Republic of high oil prices has enough oil in dollars. The socio-economic development of these funds and special state programs were sufficient funds. One of these fields was agrarian field. In this situation NFES started to direct its main resources to agrarian field. But fluctuations in the market price of the agricultural sector funding and as a result, have caused a lot of change in the macroeconomic and financial indicators in 2008-2010 years. General statistics and data analysis as well as a visual look at the table prepared for the fluctuations were observed in all indicators except for bank loans.

So, descent and rise sharply of credits by NFES to agriculture products processing and production during 2008-2010 years were resulted with the decreasing in GIP of kənd təsərrüfatı, meşə təsərrüfatı və balıqçılıqda during 2009, decrease of profit in 2010 year, increase of loss during 2009, decrease of mone income from total balance income selling (lost), decrease of income from total selling (loss), decrease of income from total selling of plant in 2009 and cattle-breeding in 2010 year. Generally, general income, general agricultural products increased. Available of such situations raised difficulties during calculations. And being of some doubts are inevitable. But of course, we can substantiate with we have seen in the last two years, the visual indicators of lower oil prices and other economic uncertainties.

In other words, the financial resources allocated to the agricultural sector through the forecast for the years specified in the loan, then the analysis of macroeconomic and financial performance of the agricultural sector forecasts were dependent on loans from the free factor. Such an option may be the difficulty in forecasting the probability of selection on the basis of their primary functions is associated with forecasting of 2015-2010 years.

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