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The Effect of Agro Industry, Infrastructure, and Natural Resources to Farmers Income in Shallots Agribusiness Based Agropolitan Area at Banggai Regency of Central Sulawesi Province

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Abstract
The research aims to find out the effect of agro industry, natural resources and infrastructure directly and indirectly to the farmers income in shallots agribusiness based agropolitan area. Data analysis method used was descriptive statistics analysis and path analysis. The research results reveal that the direct effect of natural resources to the farmer's income with path analysis value is 0.604, coefficient regression 0.909. If the natural resources owned by the adjustability of good land, has a carrying capacity of land and maintained continuously and sustainably in shallots agribusiness based agropolitan area of Banggai Regency with other variables considered fixed, then, natural resources directly affects of 0.909 to the increasing of farmer's income. The direct effect of infrastructure on the increasing of farmer's income in the area of shallots agribusiness based agropolitan is 1.420, coefficient regression 2.101. The availability of infrastructure facilities on the agriculture field such as agriculture machinery equipment, farm road, market availability, transportation, people harbor, airport and telecommunication in the area of agropolitan of Banggai Regency greatly affect with 2.101 to the increasing of shallots farmer's income. The direct effect of agro industry to the farmer's income in agropolitan area of Banggai Regency with path analysis value is 2.771, coefficient regression of 3.853. The increasing of agro industry productivity using tools and machines in the production process, increasing the marketing of agricultural products, increasing the quality of agro-products, increasing employment by 3.853 highly affect to the farmer's income. The indirect effect of natural resources on the agro industry development in increasing the income is mediation coefficient value (the indirect effect) of 3.675. It explains that the indirect effect of natural resources to the farmer's income and entrepreneurs through agro industry development are significant. The indirect effect of natural resources to infrastructure in increasing farmers' income is mediation coefficient value (the indirect effect) of 3.675. It is clear that the indirect effect of natural resources to the income of farmers and entrepreneurs through infrastructure improvement are significant.
Keywords: Agro industry, Infrastructure, Natural Resources, Income, Shallots Agribusiness

1. Introduction

Economic growth between urban areas and rural areas are very much different in terms of both infrastructure and income. The gap is caused by the driving sectors of the economy that there is multi-dimensional urban type of business, while the economies of rural sector is still dominated by the agricultural sector that the majority of the population is farmers' livelihoods.

In an effort to narrow the gap between urban and rural areas while the strategic actions that can be done is by creating rural areas into agriculture-based town known as agropolitan. The main target expected from agropolitan activity is the creation of parallel economic growth between urban and rural area.

Shallots agribusiness based agropolitan in Banggai Regency is one of the efforts developed to increase the income of shallots farmers. The availability of natural resources, infrastructure and agro industry are decisive factors in the development of shallots agribusiness based agropolitan area.

2. Holonic Manufacturing System (HMS)

2.1 Descriptive Statistics Analysis

The research was carried out in September to December 2015; the location is in Banggai Regency of Central Sulawesi Province. Descriptive statistical analysis is needed to determine the frequency distribution of the results of the questionnaire given to respondents. Besides, this analysis is used to describe in depth the variables examined, namely: the variable of natural resources (X1), agro industry development (X2), infrastructure improvement (X3) and farmer's income (Y).

2.2 Inferential Statistical Analysis

Inferential statistical analysis technique used is path analysis (Path Analysis) Conversion Charts Path to the regression equation.

Structural equation for the path diagram, namely:

X2 = a + PX1X2X2 (1)
X2 = a + PX1X3X3 (2)
Y = a + PX2Y X2 + PXiY X1 +Px3YX3 + e (3)

1) Examination of the assumptions underlying the analysis of pathways include: the relationship between variables is linear, recursive model that is causal flow system to one way, endogenous variable with interval scale in minimum, Observed measured without error (measurement instruments are valid and reliable), model specified with the correct corresponding theory.

2) Calculation by the path coefficient using SPSS 22 software For Window to calculate the direct effect while calculating the indirect effect used the procedure developed by Sobel (1982) and known as the Test Sobel (Sobel Test) with the following formula:

$$Sab = \sqrt{b^2Sa^2 + a^2Sb^2 + Sa^2Sb^2} \quad (4)$$

3) Examination of the validity of the model by calculating the coefficient of total determination using formula:

$$R_m^2 = 1 - P_{e1}^2 . P_{e2}^2 \dots\dots\dots P_{ep}^2 \quad (5)$$

Where: $P_{ei}^2 = \sqrt{1 - r^2}$ (6)

R_m^2 = coefficient determination

The amount of total determination coefficient indicates the information contained in the data that can be explained by the model. However, this research used amos coefficient determination then directly visible in the model by looking at the value of GFI.

3. Result and Discussion

3.1 Path Analysis

The effect of natural resources (X1), agro industry development (X2), and Infrastructure improvement (X3) to the farmer's income (Y) was conducted using path analysis and agro industry development variable (X2) and infrastructure improvement (X3) function as variable mediating between natural resources (X1) to farmer's income (Y). The analysis was done based on the value of standardized coefficients regression results between natural resources (X1) to agro industry development (X2) and infrastructure improvement (X3) and natural resources (X1), agro industry development (X2) and infrastructure improvement (X3) to the farmer's income (Y).

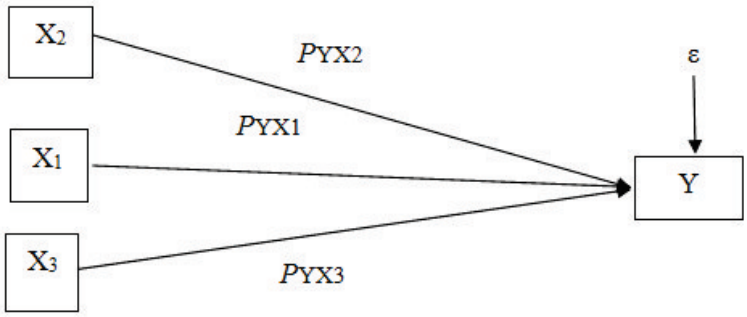

Figure 1 Relationship of Structure X1, X2, and Y to Z

Table 1 The Result of Statistics Analysis Model 2
(Natural Resources, Agro industry Development and Infrastructure Improvement to the Farmer's Income)

Variable	Coefficient Regression	S.C Beta	T counted	P (sig)	Note
Constant	0.554				
Natural Resources	0.909	0.604	2.715	0.008	Significant
Agro industry Development	3.853	2.771	9.742	0.000	Significant
Infrastructure Improvement	2.101	1.420	3.820	0.000	Significant
R= 0.876					
R^2= 0.760 = 76.0%					
Fcounted= 110.653				0.000	

Based on multiple linear calculations among variables of natural resources, agro industry development and infrastructure improvement to the farmer's income it was obtained regression equation as follow:

Y = 0.554 + 0.909 X1 + 3,853X2 + 2.101X3 + ε

The result of the multiple regression equation has the understanding that:

a. Constanta value 0.554 is not affected by natural resources (X1) variable, agro-industry development (X2) and infrastructure improvement (X3), then, the farmer's income variable (Y) is considered constant at 0.554.
b. Value of 0.909 means that if the natural resources (X1) which is owned and maintained regularly and sustained by shallots farmers in the area of agropolitan of Banggai Regency in accordance with the provisions in the implementation of appropriate farming to other variables held constant, then, the natural resources affect of 0.909 to the farmer's income.
c. Value of 3.853 means that if the development of agro industry (X2) is supported by the government of Banggai Regency in implementing the farm in order to increase the productivity of farmers and other variables held constant, then, the development of agro industry affect to farmers' income amounted to 3.853.
d. Value of 2.101 means that the improvement of infrastructure (X3) of 2.101 to the income of farmers.
Standardized Coefficients Beta (SC Beta) is the value of a path or paths where the values obtained natural resources value (X1) to the farmer's income is 0.604, the value of the path of the agro industry (X2) to the farmer's income was 2.771 and the value of infrastructure improvement (X3) to the farmer's income is 1.420. This finding means that the direct effect of cohesiveness to the income of farmers demonstrated through coefficients prices of natural resources of 0.604, agro industry coefficient price of 2.771, infrastructure coefficient of 1.420 and proved to be very significant which means that the cohesiveness of natural resources, agro industry and infrastructure directly affect to income.

Coefficient Correlation (R) based on the data processed in summaryb model show that R = 0.876 means that the variable natural resources, agro industry development and infrastructure improvement its correlation is high or strong because lied in interval $0.70 < KK \leq 0.90$. The coefficient of determination (R^2) Adjusted R Square value of summaryb model table shows that 0.760 or 76.0% of the variance farmers' income can be explained by changes in the variables of natural resources, agro industry development and infrastructure improvement by 76.0% while the remaining 24.0 % explained by other variables not examined in this research.

3.2 Direct Effect of Natural Resources to the Farmer's Income in Shallots Agribusiness based Agropolitan Area

Path analysis result on direct effect of natural resources to the farmer's income in agribusiness based agropolitan area is 0.604 with a coefficient regression of 0.909. The findings of this research gives a clear picture that if natural resources is owned by the adjustability of good land, has a carrying capacity of land and maintained continuously and sustainably in shallots agribusiness based agropolitan area of Banggai Regency with other variables held constant, then natural resources affects of 0.909 to the farmer's income.

Natural resource management based on the community is one of the approaches that put the knowledge and awareness of their local communities as the basis for management. The main characteristic of the approach is the effect of the local social system that is strong enough in the decision-making process. In this management system the public is given the opportunity and responsibility to manage natural resources in the vicinity.

The results showed that natural resources are essential element in achieving the ability or success of an agriculture, in raising income. One aspect of the power of natural resources is reflected in the level of fertility (nutrient content), as soil fertility can give a strong impact on the efficiency of the production cost. This is supported by the opinion of Hadi (2005) which states that the change of cropping intensity due to the availability of nutrient content of the soil in natural resource management in the agricultural sector will lead to changes in the uptake of inputs, both capital inputs (seeds, fertilizers, medicines) and labor. This is in line with the idea of Sherly, et al (2009), agricultural development is crucial in maximizing the utilization of geography and natural wealth of Indonesia, combine them with the technology to be able to get the results as expected. The agricultural sector plays an important role in providing food for the entire population and providing raw materials for industry, and for the export trade.

3.3 Direct Effect of Agro industry Development to the Farmer's Income in Shallots Agribusiness based Agropolitan Area

Path analysis result on direct effect of agro industry to the farmer's income in the area agropolitan of Bangga Regency with path analysis value of 2.771, coefficient regression of 3.853. The increasing of agro industry productivity using tools and machines in production process, increasing the marketing of agricultural products, increasing agro industry products quality, increasing employment by 3.853 which is very influential to the farmer's income. Agro-industry development directly affects to the income of farmers in shallots agribusiness based agropolitan area due to the development of agro industry in rural area need rural resources, , so the utilization of rural resources will support the development of agro industry which would certainly increase the farmer's income sourced from production improvement and the easiness of information access.

Agro-industry is extensive sub-sector covering the agricultural sector upstream industry to downstream industry. Upstream industries are industries producing equipment and agricultural machinery as well as industrial production facilities used in the cultivation process of agriculture, whereas the downstream industries are industries that process agricultural products into raw materials or goods are ready to eat or an industrial post-

harvest and agro-processing. This is supported by the opinion (Masyhuri, 2007) which states that agro industry should be the answer for the increasing of farmer;s income in rural area. Agro industry is an industry that has a multiple effect on the expansion of employment and income generation in the upstream and downstream. Agro-industry is one of the alternative developments of agricultural production in order to meet the needs of industry. Agro industry is expected to be as a bridge between the agricultural economy to an industrial economy. Agriculture should be developed with the orientation of the interests of industrial development.

3.4 Direct Effect of Infrastructure Improvement to the Farmer's Income in Shallots Agribusiness based Agropolitan Area

Path analysis result on the direct effect of infrastructure to the improvement of the farmer's income in shallots agribusiness based agropolitan area is 1.420, coefficient regression 2.101. The availability of infrastructure facility in agriculture field is agricultural machinery, farm path, market availability, transportation facility, people harbor, airport and telecommunication in agropolitan area of Banggai Regency is very influential as much as 2.101 to the increasing of farmer's income in shallots.

This research finding describes that integrated infrastructure development in agropolitan area must pay attention to the sustainability of social, economy and environment aspects. The sustainability of social aspect means the infrastructure must be useful for public, sustainability of economy aspect means must beneficial for area and farmer development, and fulfill environment aspect means the infrastructure must be green clean for the environment. Function and role of sustainable infrastructure will be able to support the development of independent agropolitan area to get to the independent agropolitan. It gets along with Dardak opinion (2002), there should be at least 10 criteria and main function (cornerstone) fulfilled. It means that the infrastructure constructed in agropolitan should be optimal, effective and efficient. Farm road (irrigation infrastructure and agribusiness road) should support the improvement of agricultural products productivity. The infrastructure of home industry, packing house, cold storage, electricity network, water supply, waste treatment installation, village access roads should support the processing of agriculture products. Infrastructure of sub terminal agribusiness, vegetable wholesale market, traditional markets, telecommunication facilities, roads among villages-cities should be able to facilitate the marketing of agricultural products to the final consumer.

3.5 Indirect Effect of Natural Resources to the Farmer's Income in Shallots Agribusiness based Agropolitan Area through Agro industry Development

The finding of the research on the indirect effect of natural resources to the farmer's income through agro industry development and entrepreneurs is mediation coefficient value was 3.675. The finding explained that the indirect effect of natural resources to the farmer's income through agro industry development was significant which means there is indirect effect of natural resources to the farmer's income and entrepreneurs through agro industry development. Integration between concept of agro industry development by utilizing natural resources becomes important its relation in providing and distributing production facility, fund and investment supply, technology, and commercial system support and effective trade. Agro industry development basically is expected not only to foster the growth of economy level but also directed to increase working opportunity and farmer's income. To actualize strategy optimally, the formulation of agricultural development planning, it needs to suit it with the characteristics of area and the availability of advanced technology. So, resources allotment and limited fund can produce optimal output, which is in turn will give positive impact to the farmer's income.

This research proves that the use of natural resources sustainably with agro industry development very determine to change the characteristics of farmer's social economy in increasing their income so it is able to manage natural resources intensively for the sake of achieving productivity improvement or food security achievement and economy security. Empowering farmer and entrepreneurs through shallots agribusiness development in the form of primary production activity (on farm), processing (agro industry), production facility distribution and marketing in agropolitan area intends to reach tough farmer as one of the components to develop prosperous agriculture, efficient and powerful so it creates wealthy people.

3.6 Indirect Effect of Natural Resources to the Farmer's Income in Shallots Agribusiness based Agropolitan Area through Infrastructure Improvement

The research result of indirect effect of natural resources to the farmer's income and entrepreneurs with infrastructure improvement is the value of mediation coefficient (indirect effect) which is 3.689. This finding explain that the indirect effect of natural resources to the farmer's income and entrepreneurs through the improvement of infrastructure is positive and significant which means that there is indirect effect of natural resources variable to the income with infrastructure improvement.

This research proves that natural resources usage sustainably with infrastructure improvement is the availability of agricultural machinery, construction of modern market, available transportation with reachable road access to the agriculture location, easiness to access market information which is very supportive in

increasing farm production. Government support forms making farmer's protection regulation, easiness to have loans for business capital from bank by considering small credit interest with easy guarantee by the farmer. The effect of infrastructure improvement in shallots agribusiness based agropolitan area indirectly increasing the farmer's income. This finding indicates that the role of natural resources with infrastructure improvement as the supporting of the farmer's movement is the central point in providing the increasing of the farmer's income. Moreover, the process of natural resources can run properly if it is supported by the improvement of infrastructure. Therefore, the improvement of infrastructure is very important in the process of natural resources through the improvement of infrastructure that giving easiness for the farmer to have ability to help their own selves to achieve goal in improving their wealthy. The utilization of natural resources optimally and rationally aim to improve the wealthy of the people, utilizing it wisely as the preservation rules will not only improve their lives, but also will create a sustainable utilization. Thus, the stipulation of agropolitan area is designed locally by concerning the reality of agribusiness development in every area. At the end, the final goal want to be achieved from the policy of agropolitan area development is as one of the alternatives of area development concept that is able to encourage local economy, create development synergy among area more balanced, be able to solve problems of rural area development and increase the management of sustainable agriculture.

4. Conclusion

Path value or paths to the direct effect of natural resources on the farmer's income is 0.604, path value or agro industry development path to the farmer's income is 2.771 and path value or infrastructure improvement path to the farmer's income is 1.420. Based on the testing, the direct effect on agro industry development to the income is with path value or the highest path. The indirect effect of natural resources to the farmer's income through agro industry development is 1.087. Based on the testing, natural resources positively do not affect and insignificant to the farmer's income through the agro industry development as intervening variable. The indirect effect of natural resources affect to the farmer's income through infrastructure improvement in agropolitan area which is 0.565, then, the natural resources indirectly affect to the farmer's income through infrastructure improvement of shallot agribusiness based agropolitan area in Banggai Regency of Central Sulawesi Province.

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