

# The Impact of Physical and Human Capital on The Economic Growth of Agricultural Sector in North Sumatra

<sup>1\*</sup> Puja Rizqy Ramadhan

<sup>1</sup> Departemen of Accounting, Faculty of Social Science, University of Pembangunan Panca Budi, Indonesia

**Abstract:** North Sumatra province is one of the provinces with major potential in the agricultural sector which is accounted for 16.60% in the gross domestic product (GDP) formation, it is necessary efforts so that the production of the agricultural sector can be maintained and improved. The purpose of this study is to analyze the effect of the agricultural sector capital expenditure (physical capital) and education, health, and labor (human capital) to economic growth in North Sumatra. The data used in this study are the panel data which are time series and cross section in 14 districts/cities in North Sumatra. The research using linear regression analysis method with fixed effect model. The analysis showed education, health, labor and agriculture sector capital spending has significant positive effect on economic growth as measured by the agricultural sector GDP.

**Keywords:** Capital Expenditure, Education, Health, Employment, Economic Growth

## I. Introduction

Agriculture in Indonesia is still considered as the most important sector of whole economic development sector. Moreover, since the agricultural sector has become the backbone of the national economy during the economic monetary crisis because it increases, while negative growth in other sectors. Some of the reasons underlying the importance of the agricultural sector in Indonesia are (1) the potential for a large resource with a land area of 19.814 million hectares and its diversity, (2) the share of the national income is large enough that is equal to 15.30% of a second after the manufacturing sector, (3) the size of the population who depends on the sector which is amounted to 42.80 million and, (4) the basis of growth in the countryside (Anonim, 2010; Lifianthi et al., 2012).

Plantation subsector, which is part of the agricultural sector in 2016 contributed to the highest to gross domestic product (GDP) by 3.46% followed with food crops about 3.42%, animal husbandry about 1.62% and horticulture about 1.51%. GDP of plantation subsector is gained from leading commodities such as oil palm, rubber, coconut, coffee, cocoa and sugar cane. Moreover, the highest contribution of plantation subsector are the food crops of rice, corn and soybeans. The dominant livestock commodities are large livestock, small livestock, poultry and milk. While GDP is the largest of commodities contributed by horticulture onion, various peppers, bananas, oranges and potatoes (Directorate General of Plantation, 2017). Total exports of plantation subsector from 2010 to 2015 is increasing from 21405.8 thousand tons to 32519.0 thousand tons.

Agriculture sector is still the main economy sector in North Sumatra which is agricultural sector contributing to total GDP formation in 2016 approximately to 16.06% and becoming the third place after mining and manufacturing industries. Although the agricultural sector has become the main sector in North Sumatera, the social welfare of the society is still uniformity across the regions. It shows in the high percentage of poor reached 13:39%, while the average of Indonesia reached 10.70% in 2016 (Central Bureau of Statistics, 2017). To improve the welfare of the farming community and family in North Sumatra, the utilization of leading sectors needs to be done by the local government.

The capital expenditure in agricultural sector is minor government's policy. Capital expenditures reflect the costs of the government to implement its policies. According to Dumairy (2004) and Suroso (2015), the government made a lot of expenditure to finance activities and also economic activities. Government capital expenditure in the agricultural sector during the 2010-2015 North Sumatra had increased by 25.55% (BPS, 2017). This shows the government's support starting

to develop the agricultural sector because the sector is still a mainstay in North Sumatra.

The success of economic development is inseparable from the role of the community. Human resources is the basis of the nation wealth, because humans are one of the factors of production which are actively raising capital, exploiting natural resources, building social organizations, economic, political and also implementing national development. In producing the qualified human resources, the education is an important and absolute thing to improve the quality of human resources. Therefore, the quality of human resources can provide a multiplier effect on the development of a country, especially in the economic sector (Laisina et al., 2015), In general, education and health levels can represent the quality of labor by improving their skills, and increasing society's health so it will make the work become more effective (Rahayu, 2014; Widodo et al., 2011; Pradipta, 2005; Baeti, 2013),

In addition, education and health also affects the quality of human resources in North Sumatra. The level of public health can be looked from a variety of indicators, one of which is the life expectancy. If life expectancy increases, so meaning it will significantly improve health and economic growth (Notoatmojo, 2010), According to BPS (2017), during the years of 2010-2015, there was an increase of 68.34-69.14% in public health which impact on the quality of labor and resulting output in the economy. Health development can drive economic growth (Tjiptoherijanto and Soesetyo, 1994). The more subdued health development, then labor productivity will be higher so as to carry out activities with the efficient production and improve competitiveness and accelerate economic growth. Although GDP of North Sumatera has increased quantitatively over the past 6 years, but its growth tends to be fluctuative. Real conditions outlined above demonstrates that economic growth could be seen from the value of GDP. Agriculture, education, labor, and health are fluctuative from year to year and those are not accorded with the increasing of the education workforce, health, capital expenditures, and the amount of labor which it should make an increase in economic growth as well. Based on this background, this study aims to analyze the effect of capital expenditure, education, labor, health, and labor to economic growth in North Sumatra.

## **II. Literature Review**

Kuznets, 1995 defined economic growth as a rise in longterm capacity of the countries concerning to provide a variety of economic goods to the citizens. The Increase in capacity is determined or made possible by advances in technology institutional and ideological to the various demands of the existing situation (Todaro and Smith, 2013). So economic growth is measured by the achievement of the development of an economy of one period to another. The ability of a country to produce goods and services will increase, due to the increase of factors of production in both quantity and quality. The investment will also grow the capital goods and technology. In addition, the labor force will increase as a result of population growth concurrently with increasing education and skills. The main indicator to see the extent to which economic growth has increased reflected in GDP rill. The increase in the real GDP causes economic activity to be fulfilled, so that the economic processes become current, which in turn increases public revenue that will be followed by a rapid welfare.

GDP is one of the important indicator to determine the condition of economic growth in a region within a certain of the period. The GDP is defined as the total value added generated by all economic units. GDP at current prices shows a shift as well as the economic structure of a region, whereas the GDP at constant prices used to determine the economic growth over time. Jhingan (2010) distinguished the determinants of economic growth into economic factors which consists of natural resources, capital accumulation, organization, technological advances, as well as the division of labor and production scale. Non-economic determinants of which consists of social factors, human factors, political and administrative factors.

Solow growth model is a development of the Harrod-Domar model which focuses on capital formation. In this theory the added factors that determine economic growth are labor and technology. Technology is regarded as the residual factor to explain the longterm economic growth and the level of economic growth which is assumed to be exogenous or influenced by various factors (Todaro and Smith, 2013). Solow suggested that economic growth model derived from the following aggregate production function (Dornbusch et al., 2011) where Y (output) is a function K (physical capital), L (labor), and A (technology).

The further development of growth theory is the New Growth Theory which provides a theoretical framework for analyzing endogenous growth. Economic growth is a result of the economic system. In this theory, Romer's (2011) considers that economic growth is determined by the production system, not from outside of the system. Technological progress is endogenous, growth is part of the decisions of economic actors to invest in knowledge. The role of capital is greater than the share of income if capital grows not only I physical capital but also in human capital concerns (Todaro and Smith, 2013). The accumulation of capital is the main source of economic growth. Capital definition is broadened to include a model of knowledge and human capital. Technological change is not something that comes from outside the model or exogenous but the technology is part of the process in economic growth. In endogenous growth theory, investment in physical capital and human capital contribute as the role play in the longterm economic growth (Mankiw and Taylor, 2011), Endogenous growth models do not show the charge of diminishing returns to capital which shows an important distinction between endogenous growth models and Sollow.

Theory of human capital focuses on the accumulation of capital in various forms of physical capital, human capital, labor, other effective and etc., which produces endogenous growth. Human capital in this research is the ability, skills and knowledge per worker. The assumptions in regards to the human capital models which are manufactured using the output of the three inputs, namely capital, human capital, and effective labor. The implication of this theory is the investment in physical capital and human capital is a major determining factor in accelerating the economic growth of a country.

Schultz (1972) stated that the process of improving knowledge and skills through education is not a form of consumption, but it is a very big and valuable investment. Investment in education the results will not be felt in a short time, but it will be felt in the future, and it requires a relative ong time. The value of human capital in a nation is not only determined by the total population or unskilled labor (unskilled labor) but is also determined by the intelectual labor (skilled labor). In other words workers with higher education will be able to respond innovations to boost the economic growth of a country.

### **III. Methodology**

The scope of the study is to analyze the effect of capital spending, education, health, and labor to economic growth in South Sumatra. Capital expenditure (CE) in question is the government's capital expenditure in the agricultural sector. Education (EDU) is the amount of labor employed educated High School and College. Health (LEX) is the life expectancy found in South Sumatra. Labor (LB) is the number of people aged between 15 years and over recorded works. Economic growth (EG) is measured by the value of the agricultural sector GDP South Sumatra is based on constant prices of 2010. The data used are obtained from the publication of the central statistics agency and the directorate general of fiscal ministry of finance.

Using linear regression as the analysis method, the data used is the panel data of 14 districts/Cities in South Sumatra with 6 period, in years of 2010-2015. The data analysis use descriptive statistical analysis to determine the limits of the regression model. The R2 and hypothesis test on regression results use the t-statistic and the F-statistic. Regression estimation method uses three approaches namely OLS Model (common effect), the fixed effect model and random effect models (Gujarati, 2011).

### **IV. Results**

Modeling in this study using panel data regression techniques which can use three approaches are (1) a method commonconstant (The Pooled OLS method) (2) fixed effect method (FEM) and (3) random effect method (REM). Selection estimates for common-constant method will be selected when there is no difference between the dimensions of the data matrix in cross section. These models estimate the value of the constant  $\alpha$  for all the dimensions of the cross section. Here's the output of regression using a common-constant (the pooled OLS method).

Testing assumes that no autocorrelation, heteroscedasticity, multicollinearity which is presented in Table 1.

According to the Tables 1 and 2 R2 value, the value of Durbin Watson and test assumptions are qualified in all three of these methods, but the best is the FEM, so that the proper analysis is the method of FEM. Based on Table 2, the value of statistical regression F436.2927 with a statistical probability valued 0.0000 so that testing can be concluded significant

effect. Value determination coefficient of 0.991 means that the economic growth in South Sumatra capable explained by capital expenditures, labor, education and life expectancy of 99.1%, while the remaining 0.9% is explained by other variables outside the model.

The results of the data analysis is using methods fixed effect found that there is a significant and positive effect between the agricultural sector capital expenditure to economic growth in the agricultural sector of South Sumatra. The presence of a significant effect, indicating that economic growth in the South Sumatra capital expenditure is determined by the agricultural sector. With the massive influence of 5.680 when capital expenditure increase of 1 billion rupiah would increase the agricultural sector GDP amounted to 5.68 billion rupiah. The regression coefficient is positive for capital expenditure means that if capital expenditures increase the agricultural sector GDP also increased. This is consistent with the theory put forward by (Todaro and Smith, 2013) and Jhingan (2010) that the investment will increase capital goods and technology used is also growing and will increase production capacity. The capital expenditure is one of the important aspects of the investment made by the government which will affect the economic growth.

**Table 1: Results test analysis assumptions**

Information	Common	Fixed	Random
R Squared	0.6892	0.9911	0.3116
Adjusted R	0.6735	0.9889	0.2767
heteroscedasticity (test park)	0.0504	0.2339	0.1801
Normality (Jarque-Bera)	0.00000	0.00000	0.00000
F statistic	43.8080	436.2927	8.9404
Prob (F statistic)	0.0000	0.0000	0.000005
Durbin Watson	0.5116	1.6318	1.2679
Hausman test (probability)	0.0005	0.0005	0.0005

Source: Data processed, 2017

**Table 2: Results regression method using commonconstant, fixed effect, random effect**

Information	Common	Fixed	Random
Constants	-15273.07	-35994.23	-33370.87
CE	7.895530 (0.2592)	5.680211 (0.0091)	7.153880 (0.0009)
LB	13.78199 (0.0000)	0.924893 (0.6301)	3.932014 (0.0270)
Communities	-56.48709 (0.0661)	50.13351 (0.0019)	33.57334 (0.0216)
LEX	246.1157 0.0381	555.6816 0.0280	512.7996 0.0058

Source: Data processed, 2017. The number in parenthesis is probability. The test result data can be modeled using the equation FEM below:  $EG = -35994.23 + 0.9248 LB + 50.1335 EDU + 555.6816 LEX + \mu$

Workforce education has significant positive effect on economic growth in South Sumatra. With a coefficient of 50, 13 means that if the number of educated labor force increased by 1 thousand then the agricultural sector GDP also increased by 50, 13 billion. This supports the theory of Jhingan (2010) that human capital which is supported by education and training is one of the important aspect in the development of human resources which will affect the economic growth.

Health has positive and significant impact on economic growth in South Sumatra. With 555 568 coefficient indicates that if the health of the population increase is reflected by the increasing life expectancy of 1 year, it will cause the agricultural sector and GDP increased by 555 568 billion rupiahs. This is consistent with the theory that stated the higher levels of the public health of a region that will increase of economic growth in the region. Increasing in health will improve labor productivity and affect the roomates, ultimately in the resulting output.

Labor has not a significant effect on economic growth in South Sumatra. A probability value of 0.63 indicates that the number of workers has no effect in the agricultural sector of GDP in Sumatra South. This is not accorded with the proposed growth theory (Solow, 1956) which stated the development of the Harrod-Domar model focuses on capital formation. In this theory the added factors that determine economic growth is labor and technology.

Related to the variables measuring by human capital which consist of education and health workers, the findings of this study support the previous research which stated that education and health have a significant effect on economic growth (Yuhendri et al., 2013; Retno 2013; Nowak and Dahal, 2016) Wang and Liu, 2016.

This indicates that the unskilled labor did not make the economy growth, which is to boost economic growth are more educated work force (skilled labor). The results of this study are also consistent with the fact that there are empirical in South Sumatra that the percentage of educated labor is only 29.92% in 2016 of the total workforce in South Sumatra. It means that the majority of workers who work in South Sumatra are not educated (70.08%), so that the resulting lower productivity and its contribution to economic growth becomes insignificant. It can be concluded that simultaneously, capital expenditure agriculture, education, health, labor has significant effect on economic growth in the agricultural sector, while partial amount of labor does not affect the economic growth in South Sumatra.

## V. Conclusion

The purpose of this study is to analyze the effect of the agricultural sector capital expenditure (physical capital) and education, health, and labor (human capital) to economic growth in South Sumatra. The data used in this study are the panel data which are time series and cross section in 14 districts/cities in South Sumatra. The research using linear regression analysis method with fixed effect model. The analysis showed education, health, labor and agriculture sector capital spending has significant positive effect on economic growth as measured by the agricultural sector GDP. Following suggestions are presented:

1. District governments need to optimize and plan for the agricultural sector capital expenditure effectively, efficiently and transparency, and right on target. The duration of the bureaucracy and administrative system in the process of disbursement of funds, causing delays in the process of capital expenditure for which funds large enough. Another thing that is so the problem of the fear of aperture countries in the region to use capex due to tight administrative system and the rules are always changing.
2. Local governments need to formulate policies to improve the quality and level of education related to the development of the agricultural sector, such as building of educational infrastructure to remote areas so that people can enjoy education and skills.
3. Community health promotion programs need to be increased to provide health facilities to the village so that people can maintain further reviews reviews their health and productivity increases.
4. For further research needs to add other variables outside the model which could affect economic growth such as investment, competitiveness, happiness index.

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