Analysis of factors affecting the growth of agriculture sector in North Sumatra

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Abstract. Agriculture sector is one of the supporting economic sectors in North Sumatra Province. In 2018, the agricultural sector (food crops, plantation, forestry, livestock, and fisheries) was the sector that contributed the largest added value to the Gross Regional Domestic Product in North Sumatera Province, namely 21.4 percent, followed by the manufacturing sector at 20.29 percent. Therefore, it is necessary to conduct research the factors that influence the growth of the agriculture sectors in North Sumatera. The secondary data from the Central Statistics Agency of North Sumatra Province are used to obtain the data since 1985-2018. The analytical method used was multiple linear regressions. The results this paper that labour and agricultural imports had a positive and insignificant effect on the growth of agricultural sector. Meanwhile, land area, exports, and an investment have a positive and significant effect on the growth of agricultural sector.

1. Introduction
One of the important indicators to see the economic condition of a region in a certain period is the Gross Regional Domestic Product (GRDP) both on basis of current prices and constant prices. The value GRDP in an area can provide information on the level of economic growth and the level of community welfare in that area. The higher the GRDP of an area, it can be said that economic growth is also higher or the level of prosperity of the community is also good [1].

North Sumatra provinces have potential natural resources, one of which is agricultural sector. Agricultural sector had considered of support for North Sumatra's GRDP. The agricultural sector in its production process to produce output requires at least two factors, namely labour, and land. Labour in the agricultural sector can be defined as labour that is devoted or needed in the agricultural production process [2]. Furthermore, to increase agricultural growth, media in the form of supporting land is also needed. From an efficiency point of view, the more cultivated land is the higher production and income per unit area [3].

Apart from the factor of land area and labour, investment can also affect the economic sector. In developing countries, agriculture is the main economic sector, agricultural investment plans are expected to consider not only impact on agriculture and food security, but also show a contribution to economic growth, job creation, and poverty reduction as well as reducing urbanization [4]. The volume of export and import can affect the development of growth in the agricultural sector, in 2018 North Sumatra's exports reached 9.65 million tons and the import volume was 7.21 million tons. When compared with the situation in 2017, the export volume has increased by 7.40 percent, and the import volume has
increased by 2.50 percent. North Sumatra's main export commodities are vegetable fats and oil. The increase exports and imports based on the agricultural sector will be able to affect the growth of agricultural sector in North Sumatra Province [5].

The phenomenon that occurs in North Sumatra Province is that the growth rate of the agricultural sector tends to slow down so that it can be said that its contribution to GDP has not been optimal. Factors considered to be able to influence the growth rate are labour, land area, exports, imports, and investment. Considering that agricultural sector is the main basis for supporting the economy in North Sumatra Province, it is necessary to study the factors that influence the growth of agricultural sector. Thus, this study is to analyse the effect of labour, land area, exports, imports, and investment in agricultural sector on the growth of agricultural sector in North Sumatra Province.

2. Research methods

2.1. Determining of research area
The study area was determined purposively (intentionally) on the grounds that north Sumatra province is an agricultural centre in Sumatra Island.

2.2. Method of collecting data
The data taken in this study is secondary data. The data required is the GRDP of the agricultural sector, labour, the land area, exports, imports, and investment in agricultural sector. Data were taken from 1985-2018 in order to obtain 34 years of data.

2.3. Data analysis method
The analysis model used is Multiple Linear Regression with the following equation:

\[ \log Y = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \epsilon \]  

Information:
Log Y : GDP
Log X1 : Labour
Log X2 : Land Area
Log X3 : Export
Log X4 : Import
Log X5 : Investment
\( \beta_0 \) : Intercept
\( \beta_{1,2,3,4,5} \) : Regression Coefficient
\( \epsilon \) : Error term

2.3.1. Determination Coefficient \( (R^2) \). The coefficient of determination \( R^2 \) is a statistical value calculated from the sample data. This coefficient shows the percentage of variation in all dependent variables that can be explained by variations in changes in independent variables.

2.3.2. Simultaneous Test (F-Statistical Test). F test can be seen from the signification of all independent variables in influencing the dependent variable. Testing of the overall sample regression (overall test) is a test that aims to determine whether the regression coefficient is significant or not simultaneously.

2.3.3. Partial Test (T-Statistical Test). The t test aims to determine whether regression coefficient is partially significant or not. This test is also known as t-test.
3. Results and discussion
The results of multiple linear regression estimates can be obtained as follows:

| Table 1. Estimation results of multiple linear regression analysis |
|-------------------|----------|-----------|-----------|
| Variable  | Coefficient  | Std. Error  | t-Statistic | Prob.   |
| C        | -27.19270    | 19.02824   | -1.429071  | 0.1640  |
| LOG(TK)  | 0.338477     | 1.431421   | 0.236463   | 0.8148  |
| LOG(LL)  | 0.151726     | 0.060285   | 2.516794   | 0.0178  |
| LOG(X)   | 1.827729     | 0.451232   | 4.050533   | 0.0004  |
| LOG(M)   | 0.404899     | 0.300917   | 1.345543   | 0.1892  |
| LOG(INV) | 0.112346     | 0.058737   | 1.912698   | 0.0661  |

Based on the table, the multiple linear regression equation is obtained as follows:

\[
\text{log}(\text{PDRB}) = -27.19270 + 0.338477 \times \text{log}(\text{TK}) + 0.151726 \times \text{log}(\text{LL}) + 1.827729 \times \text{log}(\text{X}) + 0.404899 \times \text{log}(\text{M}) + 0.112346 \times \text{log}(\text{INV}) + \epsilon
\]  

(2)

The coefficient of determination ($R^2$) is 0.8949. This shows that 89.49% of the variation in the growth of the agricultural sector can be explained by labour variables, agricultural land area, agricultural exports, agricultural imports, and agricultural investment, while the remaining 10.51% is explained by other variables not included in the model. Simultaneously, the prob value is 0.00 < 0.10. This shows that labour variables, agricultural land area, agricultural exports, agricultural imports, and agricultural investment have a significantly effect on the growth of agricultural sector.

3.1. The effect of labour on the growth in agriculture sector
The analysis results of the labour regression coefficient value are 0.338, meaning that if the labour increases by 1%, the growth in agricultural sector increases by 0.338%. This shows that there is a positive influence between labour and the growth of agricultural sector with a statistical prob of 0.8148 > 0.10.

According to research [6] where the results showed that the labour variable in the agricultural sector had no significant effect on the growth in agriculture sector. This means that the labour variable in agricultural sector is not a good indicator to influence the growth of the agriculture sector [6].

3.2. The effect of land area on the growth in agriculture sector
The results of the analysis of the value of the regression coefficient for land area were 0.151, meaning that if the land area increased by one percent, the growth in the agricultural sector would increase by 0.151 percent. This shows that there is a positive influence between land area and the growth of the agricultural sector with a statistical prob value of 0.0178 < 0.10.

This is in accordance with statement [7], where the t significance value of the independent variable land area is 0.042 < $\alpha$ (0.05). This shows that $H_0$ is accepted, meaning that the independent variable, namely the agricultural sector land area partially has a significant effect on the dependent variable, namely the GRDP of the agriculture sector in North Sumatra Province at the level of 95% [7].
3.3. The effect of agricultural exports on the growth of agriculture sector
The results of the analysis of the regression coefficient value for agricultural exports amounted to 1.827, meaning that if agricultural exports increased by one percent, the growth in the agricultural sector would increase by 1.827 percent. This shows that there is a positive influence between agricultural exports and the growth of the agricultural sector with a statistical prob value of 0.0004 < 0.10.

According to research [7] where the results of the analysis show that the t significance value in agricultural export variable is 0.02 ≤ α (0.05). This shows that H_1 is accepted, which is the independent variable, namely the export of the agricultural sector partially has a significant effect on the dependent variable, namely the GRDP of agricultural sector in North Sumatra Province at the level of 95% [7].

3.4. The effect of agricultural imports on the growth of agriculture sector
The results of the analysis of the regression coefficient value on agricultural imports are 0.404, meaning that if agricultural imports increase by one percent, the growth of the agricultural sector will increase by 0.404 percent. This shows that there is a positive influence between agricultural imports and the growth of the agricultural sector with a statistical prob value of 0.1892 > 0.10, so H_0 is accepted and H_1 is rejected so that agricultural imports have no significant effect on the growth in the agriculture sector. This is in accordance with statement [8], where the causality test obtained the import probability value of 0.56 > 0.05 so that the null hypothesis (H_0) was accepted. This means that the import variable has no significant effect on the growth of the agricultural sector [8].

3.5. The effect of agricultural investment on the growth in agriculture sector
The results of the analysis of the value of the regression coefficient on agricultural investment are 0.112, meaning that if agricultural investment increases by one percent, the growth in the agricultural sector increases by 0.112 percent. This shows that there is a positive influence between agricultural investment and the growth of the agricultural sector with a statistical prob value of 0.0661 < 0.10, so H_0 is rejected and H_1 is accepted so that agricultural investment has a significant effect on the growth of the agricultural sector.

3.6. The effect of agricultural investment on the growth in agriculture sector
The results of the analysis of the value of the regression coefficient on agricultural investment are 0.112, meaning that if agricultural investment increases by one percent, the growth in the agricultural sector increases by 0.112 percent. This shows that there is a positive influence between agricultural investment and the growth of the agricultural sector with a statistical prob value of 0.0661 < 0.10. This is based on research [9] namely that investment by large companies carried out by domestic (PMDN) and foreign (PMA) companies have a positive impact on GDP in the Agricultural Sector.

4. Conclusions
Simultaneously, labour, land area, exports, imports, and investment significantly affect the growth of the agricultural sector. Partially, labour and imports have a positive and insignificant effect on the growth of agriculture sector. Meanwhile, land area, exports and investment have a positive and significant effect on the growth of agricultural sector.

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