

EFFICIENCY ANALYSIS OF STATE BUDGET ON AGRICULTURAL DEVELOPMENT IN INDONESIA 2012-2016

Sri Cahyaning Umi Salama*¹ 

¹University of Indonesia, Indonesia

ABSTRACT

Indonesia is still far behind compared to other Asian countries in agriculture. The technology and the availability of pre-facilities are still inadequate because of the many obstacles that hamper agricultural development. Agricultural development is a major component of rural development. One way to help the process of agricultural development is with the ease of access to finance. The State through the Ministry of Agriculture continues to make efforts in encouraging the development of domestic agriculture. Funds distributed are not small so it is necessary to calculate the efficient use of state budget funds in agricultural development in Indonesia. This study aims to measure the level of efficiency of the state budget for the agricultural sector. The data used are secondary data derived from the Ministry of Agriculture's financial report from 2012 to 2016. The method used is Data Envelopment Analysis (DEA) with input oriented and output oriented with Variable Returns to Scale (VRS). The input variable used is the realization of State Budget (APBN) for agriculture sector, while the output variables used are Farmer's Exchange Rate (NTP), Gross Domestic Product, and Farmer Productivity. The results show that the year 2015 becomes a very inefficient year both in terms of input oriented and output oriented. The increase in the realization of state expenditures for agriculture is not balanced by significant results, even in 2016 where the relatively small increase in the realization of the agriculture sector budget has had a comparable impact.

Keywords: *Efficiency, realization Budget expenditure, agricultural development*

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Introduction

The current conditions in Indonesia for agricultural land are still less supportive. Agricultural land continues to decline due to the transfer of the functioning of agricultural land

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*Correspondence:
Sri Cahyaning Umi Salama
E-mail:
s.c.umisalama@gmail.com

into residential land. Therefore, it is necessary to maintain agriculture strategy by doing multi-function agriculture which is very important agricultural development which require political will of government and society (Adimihardja, 2006).

The investments made by developing countries in the agricultural sector are actions that support growth and have a positive impact on the poor (Bezemer & Headey, 2008). The agricultural sector plays an important role in the economy of the country (Rivai & Anugrah, 2011). The existence of agricultural development is considered able to improve the living standard of farmers. However, the number of population with profession as farmers experienced fluctuating growth every year and is still far below the people who work as employees / laborers / employees (www.bps.go.id). Developing agriculture is similar to rural development including farmers in it (Syahyuti, 2014: 1-4).

Indonesia is known as a country with Natural Resources (SDA) is very abundant expected condition of farmers prosperous. Based on BPS data from 2012 to 2016, the Farmers Exchange Rate (NTP) continues to decline. This shows that the welfare of farmers decreases. In contrast to the realization of the state budget that has been used by the Ministry of Agriculture which continues to increase every year. The contribution of the agricultural sector to Indonesia's GDP also continues to decline.

In Vietnam, many farmers operate less than the optimum operating scale. But the results of greater productivity (Hoang Linh, 2012). In Nigeria, agriculture has also experienced some degree of inefficiency, especially in corn farmers, although supported by good technology (Karimov, Amoke Awotide & Timothy Amos, 2014). In China, for traditional farmers it is still inefficient compared to modern farmers because of the lack of technology used (Yu, 2012). Similarly, what happens in Indonesia where agricultural technology is still not well developed. The impact of technology on agriculture is to accelerate growth two to three times faster (Eberhardt & Vollrath, 2016).

Based on the Summary of the Ministry of Agriculture's 2016 Finance Report, in 2012 to 2014 the country's expenditure on agriculture continues to decline, as well as with NTP. However, in 2015 the amount of expenditure suddenly increased even more than doubled from the previous year while the NTP declined even though in 2015 the contribution of agriculture to GDP increased by 0.15% compared to 2014 (BPS). Meanwhile, according to Quarterly Indonesia Gross Domestic Product Report 2017, agricultural sector in GDP continues to increase.

However, with numbers that continue to increase does not mean the show has operated efficiently. Efficiency needs to be done considering the durability of Indonesian pengangan. Therefore, it is necessary to analyze the efficiency of APBN usage for agriculture sector in Indonesia to measure whether it is efficient. In this study, efficiency analysis using Data Envelopment Analysis (DEA) is most often used to measure efficiency. The output variables used are NTP, agricultural sector contribution to GDP, and farmer productivity. The input variable used is the realization of APBN of agriculture sector.

Theoretical Basis

State Expenditure Budget

The State Revenues and Expenditure Budget (APBN) is the Government of Indonesia's annual financial plan approved by the House of Representatives (DPR) which contains a systematic and detailed list containing state revenue and expenditure plans for one fiscal year. According to Suparmoko (2002) the intent of the budget is the planning tool of future receipts and expenditures generally prepared within one year.

Actual State Revenue and Expenditure Budget is the realization of the APBN results used. There are two conditions of realization, namely deficit and surplus. In a deficit condition when income is less than expenditure, while surplus conditions if more income than expenditure.

The compilation of financial statements consists of revenues earned from Non-Tax State Revenues, and expenditures for personnel expenditures, goods expenditure, capital expenditures, and social expenditures.

Farmers Exchange Rate

According [Simatupang and Maulana \(2008\)](#), Farmers Exchange Rate (NTP) is a marker of farmer's welfare. The higher the NTP, the more prosperous farmers ([Sitonga, 1995](#); [Sumodiningrat, 2001](#); [Tambunan, 2003](#)). So far, the concept of NTP developed by BPS is identical with the concept of parity ratio developed in the United States and is still used dynamically. Farmers' exchange rate is also a factor in food self-sufficiency. Availability of rice for long-term domestic one of them influenced by NTP ([Widodo, 2014](#)).

The NTP formula is as follows:

$$NTP = \frac{I_t}{I_b} \times 100 \quad (1)$$

Where:

I_t = Price indices received by farmers; and I_b = Price index paid by farmers

Gross Domestic Product of Agricultural Sector

Gross Domestic Product (GDP) is the sum of all goods and services produced during one period or one year within the Republic of Indonesia. GDP is calculated according to the field of business on the basis of market value by means of Value Added ([Gilarso, 2004: 174](#)). GDP is classified into two price concepts, ie, prevailing prices and constant prices. The rate of economic growth is calculated from GDP at constant prices to know that economic growth is really a growth in the volume of goods and services rather than an increase or decrease in prices ([Arif, 2014](#)). One sector of GDP is the agricultural sector, forestry, and fisheries. Therefore, in the study only use the agricultural sector, forestry, and fisheries.

Farmers' Productivity

Productivity is an important part of an organization or company to measure quantity and quality of work by considering the benefits of existing resources including materials, technology, information, and human performance ([Romli, 2014: 166](#)). According [Kussrianto in Sutrisno \(2009: 102\)](#) that productivity is the ratio between the results achieved or output to input per unit time. The role of inputs in productivity is for efficiency and effectiveness. Productivity consists of three aspects, namely physical output per unit of productive enterprises, the effectiveness of industrial management in the use of facilities for production activities, and the effectiveness of input use.

Simanjuntak in [Sutrisno \(2009: 103\)](#) states that the factors that affect productivity there are three, namely training, mental and physical abilities, and the relationship between superiors and subordinates. Efficiency calculations have a positive effect on productivity ([Rungsuriyawiboon & Wang, 2012](#)).

$$Total\ productivity = \frac{total\ output}{total\ input} \quad (2)$$

Agricultural Operational Efficiency

The concept of efficiency was first introduced by Farrel (Coelli, 1996). The concept of Farrel efficiency measurement can take into account multiple inputs (more than one input). Farrel stated that the efficiency of a company consists of two components, namely technical efficiency and allocative efficiency of these two components can be explained by two inputs and one output.

The purpose of efficiency is to achieve optimal benefits, but in Islam it is not taught (Ali, 2009). Lovell (1993) in Coelli (1996) explains that efficiency is a productivity component and refers to the actual comparison and the optimal number of inputs and outputs. Efficiency is the ability to accomplish a job properly or in a mathematical view defined as the calculation of the ratio of output (output) and input (input) or the amount of output produced from one input used. Meanwhile, according to Hansen and Mowen (2003), efficiency is achieved through three ways, namely: First, with smaller inputs produce the same output. Second, with the same input yields a larger output; and Third, with smaller inputs producing larger outputs. Muharram and Purvitasari (2007) stated that there are three approaches in the measurement of efficiency, namely:

1. Ratio Approach

Ratio approach by using ratio approach can be done by comparing the output and input used. This approach is considered to have high efficiency if it can produce the maximum amount of output with certain inputs, but this approach has the disadvantage that the number of inputs and outputs will be calculated because if done simultaneously calculation will cause many calculations so the interpretation becomes unclear.

2. Regression Approach

This approach measures efficiency by using a certain level of output as a function of varying levels of input. The regression equation can be written as follows:

$$Y = f(X_1, X_2, X_3, \dots, X_n) \quad (3)$$

Where: Y = output, X = input

The downside of this approach is that it can not cope with many outputs because only one output indicator can be accommodated in a regression equation.

3. Parametric and non-parametric approaches

The parametric approach is a statistical science that takes into account the type of distribution or distribution of data that must meet the assumptions of normality. The t-test, the z-test, the pearson correlation, and the experimental design are examples of parametric statistical methods. The non-parametric approach is a statistically free distribution (not requiring the distribution of population parameters, whether normal or not). Test signs, fisher propability exact test, and chi square test are examples of non-parametric statistical methods.

The non-parametric approach is used to measure efficiency by using a linear program and tends to combine distractions and inefficiencies (Ascarya and Yumanita, 2009). The parametric approach performs measurements using stochastic econometrics and eliminates inefficiency disorders. The nonparametric approach uses a stochastic linear program and combines both interference and inefficiency.

Agriculture and Agricultural Development

Meaningful development of growth and change. Changes can be measured using several measures, namely the development of per capita income, national income, gross domestic product, economic growth, and so on. The higher the growth rate can be said the higher the success of development. While changes can be measured by equitable distribution of income, justice, and so forth (Soekarwati, 1996: 1-8).

The agricultural sector also has a role in poverty alleviation so that its position becomes one of the supporters of agricultural development. Indonesia's agricultural condition still revolves around less than optimal land use. The causes of the lack of land use are caused by several factors, namely land function change, low land productivity, and less optimum use of dry land.

According to Mosher in Hanafie (2010: 12 - 26) there are two types of conditions in agricultural development, namely absolute requirements and conditions of the transmitter. Absolute requirement consists of five conditions, namely the market used to market the results of farming, sustainable technological developments, the fulfillment of materials and tools of production locally, the creation of production motivation for farmers, and agricultural facilities are complete and ongoing. In the meantime, the absolute requirement must be supported by five broadening requirements, namely development education, production credit, farmer's gotong royong, improvement and expansion of agricultural land, and national planning of agricultural development.

Agricultural development is often coupled with rural development (Syahyuti, 2014: 1-4). The purpose of agricultural development is to produce agricultural commodities, while rural development is to improve the quality of life of rural communities. In agricultural development, the required sciences are plant and animal biology, soil and climate, and socio-economic. Slightly different from agricultural development, the science used to study rural development is economic, social, development management, and politics.

The object of development is to improve seven areas, namely agribusiness skills, agricultural investment, processing industry, environmental management, animal health, food quality and safety, and maintenance of traditions. Basically agricultural development covers many fields not only on agriculture alone. Unlike agricultural development that focuses on improving, rural development focuses on providing. The object of rural development is the provision of physical and social infrastructure, educational facilities, health and housing. It can be said that the purpose of rural development is the provision of facilities that can be used for the benefit of rural communities.

In addition to objectives, required science, and objects, there are two other things that distinguish agricultural development and rural development, the methods and analysis used, and the size used. Methods and analysis used in agricultural development include the analysis of cultivation, trading, profit, and organizing farmers. As for agricultural development known as two methods of Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). Measures used to measure agricultural development are six, namely the amount of production, productivity, labor productivity, environmental health, biodiversity, and healthy food. While the size used for agricultural development there are four, namely population income, environmental conditions, quality of life, and changes in economic structure.

Methodology and Data

This research uses non parametric approach of Data Envelopment Analysis (DEA) with assumption of Variable Return to Scale (VRS) of input-oriented and output oriented approach to answer problem formulation which measure DMU efficiency level. The type of data used is secondary data. Data obtained by searching data on the Ministry of Agriculture website that has provided data financial statements 2012 - 2016.

The first step in using DEA is to determine the input and output variables. The input used is the realization of APBN used for agriculture sector. This data is obtained from the Ministry of Agriculture's Summary of Financial Statements from 2012 to 2016. For outputs used as a result of previous literature review, Farmers' Farmer Value (NTP), Gross Domestic Product from the agricultural sector, and Farmer Productivity are used.

Table 1: Input and Output of DEA

| DMU | Realization of the Agricultural Sector | NTP | Gross Domestic Product (billion of IDR) | Productivity of Farmer |
|------|--|--------|---|------------------------|
| 2012 | 18,247,054,247,851 | 105,24 | 1,152,262.1 | 111.31 |
| 2013 | 15,931,270,640,706 | 104,91 | 1,275,048.4 | 114.68 |
| 2014 | 13,202,504,152,844 | 102,03 | 1,409,655.7 | 118.95 |
| 2015 | 28,679,453,487,041 | 101,59 | 1,555,746.9 | 121.94 |
| 2016 | 21,119,407,823.790 | 101,65 | 1,668,997.8 | 126.2 |

The realization of APBN as input of DEA in this research is obtained from the realization of budget for agriculture sector is the amount of budget that really used for agriculture sector. The public budget is reflected in the APBN and APBD. Measuring the success of the APBN is the achievements achieved in the implementation of activities by using existing funds effectively and efficiently (Saridewi, Noak, & Supriyanti, 2013).

With regard to agriculture and agricultural development, the outputs used are NTP, agricultural sector GDP, and farmer productivity. The three input variables are the slices of the concept of agricultural development carried by Mosher and Syahyuti.

Next process the data that has been collected by using software MaxDEA with Assumption Variable Return to Scale (VRS) with input and output oriented. From the result of such pengelohan, will assume weight efficiency, benchmark, and target input and output. The efficiency weight is on a scale of 0 to 1, closer to 1 or equal to 1 then the DMU is efficient. Benchmarks are derived from DEA calculations that look at DMUs that perform better or better.

Results And Discussion

The efficiency rating of each DMU generated from processed using DEA will result in a value between 0 and 1. If the DMU yields equal to 1 then it is declared to be efficient and if the DMU is less than 1 is declared inefficient. There are three conditions that can be measured in measuring efficiency. If less than 0.5 then declared very inefficient, whereas if more than or equal to 0.5 then declared quite efficient, whereas if equal to 1 then very efficient.

Measurement of efficiency in this study using the model of Return to Scale (VRS). The VRS model makes it possible to use multiple inputs and outputs. In the VRS model, each DMU does not operate on an optimum scale because the input and output ratios are not always the same or there is an increase in input by x times, the output does not always increase by x times.

In calculations using oriented input, each DMU shows different input and output growths. In 2012, 2013, 2014, and 2016 are declared efficient while in 2015 declared quite efficient with the requirement that some improvements to the variables be made. This is due to the score in 2015 of 0.615849 which is or less than 1 (one) so it is declared not efficient enough. Of the five years of the study period, only 2015 was declared inefficient. The cause is a two-fold increase in budget realization compared to 2014 whereas the resulting output changes are not significant.

Benchmark for 2015 as an inefficient year is 2014 and 2016. Of 0.437 or 43.7% of budget realization 2014 plus 0,563 or 56.3% of budget realization 2016 will make 2015 efficient. If 43.7% of total inputs and outputs in 2014 are added with the number of inputs and outputs in 2016 will produce numbers that are considered efficient for 2015.

Table 2: Results of Efficiency Analysis Using DEA with (input Oriented)

| DMU | Score | Benchmark (Lambda) |
|------|----------|--|
| 2012 | 1 | 2012 (1,000000000000) |
| 2013 | 1 | 2013 (1,000000000000) |
| 2014 | 1 | 2014 (1,000000000000) |
| 2015 | 0,615849 | 2015 (0,436685366551); 2016(0,563314633449) |
| 2016 | 1 | 2016 (1,000000000000) |

Source: Author's Estimation Result.

Based on calculations using DEA, to achieve efficient results in 2015 it is necessary to determine the achievement targets during 2015 by looking at input and output variables. In 2015, the projected inputs are Rp 17,662,211,842,297 and the NTP output is 101,8159, the GDP for agriculture is Rp 1,555,747 billion, and the farmer's productivity is 123,034 to be efficient. When compared to the conditions occurring in 2015, the realization of state expenditure for the agricultural sector is much greater than the calculation using the DEA which should have cut the realization of expenditure as much as 38% of the actual conditions. The projection for NTP to be achieved is 0.2259 points from the actual condition and the projected productivity of farmers increased by 1.094 points. While for agricultural sector GDP did not change

Table 3: Input Projection Needed 2015 (input oriented)

| DMU | Projection (Realization of the Agriculture Sector) | Projetion (NTP) | Projection (GDP in billion IDR) | Projec-tion(Po-ductivity of Farmer) |
|------|--|-----------------|---------------------------------|-------------------------------------|
| 2012 | 18.247.054.247.851 | 105,24 | 1.152.262 | 111,31 |
| 2013 | 15.931.270.640.706 | 104,91 | 1.275.048 | 114,68 |
| 2014 | 13.202.504.152.844 | 102,03 | 1.409.656 | 118,95 |
| 2015 | 17.662.211.842.297 | 101,8159 | 1.555.747 | 123,034 |
| 2016 | 21.119.407.823.790 | 101,65 | 1.668.998 | 126,2 |

Source: Author's Estimation Result.

On calculations using output oriented, 2015 remains an inefficient year. In contrast to using oriented inputs, the efficiency score on the oriented output is not far from the number

1, which is 0.991364. Just under 0.008712 points to be efficient. The 2015 benchmarks are 2013 and 2016 with 0.2531 and 0.7469 respectively. That is, as much as 25.31% from 2013 added 74.69% from 2016 will generate numbers that will make the year 2015 efficient.

Table 4: Results of Efficiency Analysis Using DEA with (Output Oriented)

| DMU | Score | Benchmark (Lambda) |
|------|----------|---|
| 2012 | 1 | 2012 (1,000000000000) |
| 2013 | 1 | 2013 (1,000000000000) |
| 2014 | 1 | 2014 (1,000000000000) |
| 2015 | 0,991364 | 2013 (0,253072546509) 2016(0,746927453491) |
| 2016 | 1 | 2016(1,000000000000) |

Source: Author’s Estimation Result.

If the input oriented amount of re-enactment of agricultural sector expenditure should be reduced by 38% then in the output oriented reduced by 42%. Not much different from input oriented. Meanwhile, other things that need to be improved based on projections using DEA are NTP raised by 0.885 points, GDP increased by 13,553 billion rupiah, and farmer productivity increased by 0.25 points.

Table 5: Input Projection Needed 2015 (output oriented)

| DMU | Projection (Realization of the Agriculture Sector) | Projection (NTP) | Projection (GDP in billion IDR) | Projection (Productivity of Farmer) |
|------|--|------------------|---------------------------------|-------------------------------------|
| 2012 | 18,247,054,247,851 | 105.24 | 1,152,262 | 111.31 |
| 2013 | 15,931,270,640,706 | 104.91 | 1,275,048 | 114.68 |
| 2014 | 13,202,504,152,844 | 102.03 | 1,409,656 | 118.95 |
| 2015 | 19,806,432,735,229 | 102.475 | 1,569,300 | 123.2846 |
| 2016 | 21,119,407,823,790 | 10,65 | 1,668,998 | 126.2 |

Source: Author’s Estimation Result.

Comparison of calculations using input and output oriented shows the same result, ie in 2015 countries are less efficient in using state budget for agriculture sector. Expenses that are twice as large as the previous year did not produce the desired results. NTP, which is one indicator of the welfare of farmers, does not increase and it decreases. The increase in GDP in the agricultural sector did not increase as expected in 2016 where the realization of the agricultural sector decreased but the NTP increased, the contribution of the agricultural sector to GDP also increased and productivity increased even 5 points from the previous period. Increased NTP indicates that the price received by farmers should be greater than the price index paid by farmers in the original condition.

Conclusion

Based on the results of analysis and discussion, it can be drawn conclusion research Efficiency Efficiency of State Budget for Development of Agriculture is as follows:

1. The Data Envelopment Analysis (DEA) method can be used to measure the relative efficien-

cy of a Decision Making Units (DMU) that has relatively equal inputs and outputs including comparing the relative efficiency of APBN realization in 2012 to 2016.

2. Year 2015 becomes an inefficient year both from calculation using input oriented and output oriented.

3. An increase in agricultural expenditure realization in 2015 does not provide satisfactory returns, as NTP declines, the contribution of the agricultural sector to GDP rises insignificantly, and productivity only slightly increases

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