

## ECONOMIC GROWTH AND EMPLOYMENT IN AGRICULTURAL SECTOR ON POVERTY IN ACEH PROVINCE

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*received: 2/4/19; revised: 24/4/19; published: 29/6/19*

### **Abstract**

*This empirical study aims to analyze the impact of economic growth and employment in the agricultural sector on poverty in Aceh Province. The study is conducted on annual time series data for the period of 1995-2017 while to explain the research objectives used Autoregressive Distributed Lag (ARDL) model and Granger Causality. The results found, in the short term, only employment in the agricultural sector has a significant effect on poverty. Meanwhile, in the long term, economic growth has a profound and negative impact on poverty. On the contrary, the absorption of labor in the agricultural sector tends to increase poverty. In addition, the results obtained that economic growth has a unidirectional relationship with employment in the agricultural sector. It was, therefore, suggested that the government should prioritize economic development in regions that have relatively high poverty rate and build an agro-industry in Aceh to increase agricultural value added and also absorb more labor so it can enable to reduce the poverty rate.*

**Keywords:** *economic growth; agricultural sector; poverty; ARDL; granger causality*

### **INTRODUCTION**

Aceh Province as a province that has regional autonomy then should be motivated to increase economic growth independently. The ideal economic growth expected by the government is economic growth that can solve macroeconomic issues in Aceh Province.

Economic growth and development cannot be separated from poverty. Edwards (1995) cited by Ijaiya et al. (2011) and Faroh (2013) states economic growth as one of the main drivers of poverty reduction in two ways. First, economic growth can increase employment and the chance of poor people on productive activities. Second, economic growth can increase labor productivity that will increase wages. It shows that the existence of economic growth is very important in improving the quality of the poor's life in the form of per capita income, welfare, and quality of social services so that poverty will decrease.

On the other hand, economic growth does not always improve the lives of poor people, if followed by a high rate of population growth. Many developing countries have even suffered from high poverty despite achieving higher economic growth in the 1960s so

that the benefits of economic growth do not directly reduce poverty. This phenomenon is often known as the "trickle-down effect" which means that the benefits of economic growth expected to trickle into the poor are not working properly (Arsyad, 1997). Therefore, in a concept of modern economic development no longer focuses on the ultimate goal of development to GDP growth or GRDP, but focuses on alleviating poverty, reducing income inequality and providing employment (Rimbawan, 2012).

During the last seven years, economic conditions in Aceh Province have faced very volatile and declining. In the same period, economic growth was quite effective in reducing poverty. It can be seen from the rise in the economy of Aceh in 2012 and 2016 cause poverty to fall by 0.11 percent and 0.35 percent (Figure 1).

According to Niyimbanira (2017), economic growth has various impact on poverty. The extent to which economic growth may reduce poverty depends on the level of poverty and how much poor people are involved productively in economic activities. Numerous studies have also proven this, pro-poor sectors, especially agriculture, have more influence on poverty reduction in Latin American countries, Southern Asia and Africa

(Berardi & Marzo, 2015 and Hasan & Quibria, 2002 in Jayadi & Bata, 2016). Thus the agricultural sector is one sector can affect poverty.

The agricultural sector is considered a source of poverty because the majority of Acehnese who works in the agricultural sector are rural people that mostly poor people. Based on the type of employment, the absorption of labor in the agricultural sector is the highest compared to workers in other sectors. The agricultural sector is able to absorb most of the labor in 2016, which is 735,063 people (35.22 percent) of the total labor force in Aceh Province (BPS, 2017). However, agricultural sector would be expected to absorb more labor but it has not shown a great performance in Aceh, because the labor productivity in the agricultural sector is still low due to limited capital and resources so that the potential for lower income has implications for poverty.

From the explanation above, it can be concluded that one of the development problems in Aceh Province is the high level of poverty in most areas caused by the capacity of Aceh's economic growth has not been optimal to overcome the causes of poverty. Other problems are low labor productivity in the agricultural sector compared to other sectors, low welfare of farmers and lack of support from government and private sector to manage natural resources in the agricultural sector. Based on these problems, this study discusses the impact of one economic sector, namely agriculture and economic growth in overcoming the problem of poverty in Aceh, which is expected to provide alternative solutions for policymakers in the future

**METHODS**

This study used secondary data on poverty levels, economic growth and the number of workers in the agricultural sector in the form of annual time series data from 1995 to 2017 period obtainable from The Central Bureau of Statistics (BPS).

The Autoregressive Distributed Lag (ARDL) model is used as a parameter to analyze the impact of economic growth and the number of employees in the agriculture sector on poverty in Aceh Province. ARDL model plays an important role in testing econometric models because it can change the nature of economic theory from static to dynamic so that independent variable we know the difference of response between long-term and short-term due to changes in the value of explanatory variables by one unit (Gujarati, 1995). The ARDL method was first introduced by Pesaran et al. (2001). This method has three advantages over previous traditional cointegration methods. The first is not all variables examined must have integration in the same order and this can be applied when integrated variables in order one I (1) or order zero I (0). The second advantage is that ARDL testing is more efficient in this case it can be used for small data and limited

samples. The third advantage is by applying the ARDL method so that the long-term estimates obtained are unbiased (Harris & Sollis, 2003).

This study employs a model based on Chani et al. (2011), Nindi & Odhiambo (2015), and Khemili & Belloumi (2018) who also use the ARDL approach. To distinguish this study from the previous one, the researcher included an explanatory variable such as agricultural employment. The addition of the employment in agricultural sectors variable refers to Martin & Taylor (2003), Otchia (2014), Khan et al. (2015), Eseyin et al. (2016), Kadir & Rizki (2016) and Jayadi & Bata (2016). The results of the study concluded that the agricultural sector was effective in reducing poverty. For the purpose of the analysis, the model captures the employment in the agriculture sector and economic growth as explanatory variables and poverty rate as a dependent variable. So this relationship is specified as follows.

$$TK = \beta_0 + \beta_1PE + \beta_2LTSP + \varepsilon \dots\dots\dots(1)$$

Where:

- TK = Poverty level;
- $\beta_0$  = Constant;
- $\beta_1, \beta_2$  = Estimation coefficient;
- PE = Economic growth;
- TSP = Agricultural sector employment;
- $\varepsilon$  = Error term.

In general, ARDL model can be given by the following equation:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta Y_{t-i} + \sum_{i=1}^k \beta_2 \Delta X_{1t-i} + \sum_{i=1}^k \beta_3 \Delta X_{2t-i} + \theta_1 Y_{t-i} + \theta_2 X_{1t-i} + \theta_3 X_{2t-i} + \varepsilon_t \dots\dots\dots(2)$$

Where:

- $\beta_0$  = Constant;
- $\beta_1 \beta_2 \beta_3$  = Short term coefficient,
- $\theta_1 \theta_2 \theta_3$  = Long term coefficient,
- L = Logarithm
- $\Delta$  = First difference,
- k = Lag lenght,
- i = Lag order,
- $\varepsilon_t$  = Error term.

The ARDL model form in equation (2) if formulated into this study is:

$$\Delta TK_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta TK_{t-i} + \sum_{i=1}^k \beta_2 \Delta PE_{1t-i} + \sum_{i=1}^k \beta_3 \Delta LTSP_{2t-i} + \theta_1 TK_{t-i} + \theta_2 PE_{1t-i} + \theta_3 LTSP_{2t-i} + \varepsilon_t \dots\dots\dots(3)$$

Where:

- $TK_{t-i}$  = lag of Poverty level (%)
- $PE_{t-i}$  = lag of Economic growth (%)
- $LTSP_{t-i}$  = lag of Agriculture sector employment (People)

The long-term effect of this research can be written:

$$\Delta TK_t = \beta_0 + \theta_1 TK_{t-1} + \theta_2 PE_{1t-1} + \theta_3 LTSP_{2t-1} + \varepsilon_t \dots (4)$$

While the short-term effect can be written:

$$\Delta TK_t = \beta_0 + \sum_{i=1}^k \beta_1 \Delta TK_{t-i} + \sum_{i=1}^k \beta_2 \Delta PE_{1t-i} + \sum_{i=1}^k \beta_3 \Delta LTSP_{2t-i} + \delta ECT_{t-1} + \varepsilon_t \dots (5)$$

Description:  $\delta$  is the coefficient of Error Correction Term (ECT) which describes the speed of adjustment from the short term to the long term balance.

In this study also conducted causality testing using Granger Causality to determine the relationship of a variable to other variables whether bi-directional, only one direction or no relationship with each other.

## RESULTS

The first step that should be done is to test the stationary level of data. Stationary data is very important to result in great regression. In this paper, stationary testing was carried out by using Kwiatkowski-Phillips-Schmidt-Shin (KPSS) approach.

Table 1 presents the results of stationary test, where at the level I (0) poverty and economic growth are stationary, as proved by statistical value is smaller than the critical value at one percent significance level, so hypothesis  $H_0$  can be accepted. Whereas for the employment of agricultural sector is not stationary at level I (0), which means that this variable has a unit root so that it needs to be addressed in the first difference. The results obtained that variable is stationary in the first difference I (1) at one percent significance level and the statistical value is smaller than the critical value, so  $H_0$  is accepted. Thus, all variable has met stationary requirements according to Pesaran et al. (2001), where there are no integrated variables in I (2).

The next stage in estimating the research model is determining the optimal lag. In this study, the optimal lag chosen is based on the Akaike Information Criteria (AIC). As the AIC criteria in Table 2, the lag length that produces the best model in lag 1. This result is in line with the optimal lag test conducted by Chani et al. (2011).

The further stage is co-integration testing following the model of Pesaran & Shin (1997), which states that the co-integration test provides information about the existence or absence of co-integration on non-stationary variables. The co-integration test used in this study is Bound Test Co-integration.

The co-integration test results based on the bound test approach in Table 3 shows the calculated F-statistic is 6.308293 greater than the upper limit of 4.85 at one percent significance level. The null hypothesis regarding there is no co-integration is rejected, which means that there is a co-integration relationship on the variables in

the model. This, therefore, implies that any short-term deviation will return to long-term equilibrium.

The impact of economic growth and employment in the agricultural sector on poverty in Aceh Province is presented in Table 4. The poverty rate is significantly affected by two explanatory variables that are economic growth in the previous period and employment in agricultural sector. In addition, the coefficient of determination ( $R^2$ ) obtained is 0.351460. This means that economic growth and employment in the agricultural sector can affect poverty by 35.14 percent, while the remaining 64.85 percent is influenced by other variables.

The results of short-term and long-term effects based on the ARDL model can be shown in Table 5. The results of long-term and short-term estimates along with the error correction term (ECT or CointEq(-1)). Based on the results of the short-term estimation, it is found that the employment variable in the agricultural sector has a significant effect on poverty in Aceh Province at five percent significance level. While the economic growth has no significance in poverty.

Furthermore, the value of ECT describes the speed of adjustment from the short-term to the long term equilibrium. The ECT value must be significant and negative sign to prove the existence of a long-term stable relationship (Banerjee in Chani et al., 2011). This result shows that ECT value has a negative and significant at one percent significance level of -0.913401 that means there is an equilibrium in the poverty in long-term in Aceh Province which will adjust about 0.91 percent annually. Negative ECT values were also found in Chani et al. (2011) and Khemili & Belloumi (2018).

While the long-term estimation results indicate that economic growth and employment in agricultural sector variables have a significant effect at 5-10 percent of significance level. In other words, if there is a change in both of these variables, either the increase or decrease will affect poverty in Aceh Province.

Pesaran et al. (2001) stated that the ARDL model can be estimated using OLS when the ARDL order is found. OLS method is related to the assumption of classical linear regression models such as normality, autocorrelation and heteroscedasticity tests. If this assumption is fulfilled, the estimation results have an estimator that is Best Linear Unbiased Estimator (BLUE). Therefore, assumption testing to obtain a BLUE model can be done by testing the diagnosis of residual values. In this case, the normality was tested by using Jarque Bera Test, while heteroscedasticity and autocorrelation can be tested by applying the Breusch-Godfrey LM test and Breusch Pagan test, respectively.

The diagnosis test results in Table 6 show that this research model does not have classical assumption problems, as evidenced in the probability value above five percent significance level in all the tests performed. It indicates that the model is valid (BLUE).

In the ARDL, CUSUM and CUSUMQ methods are conducted to see whether the parameters estimated to be stable or not at five percent significance level. The results from CUSUM and CUSUMQ test will be in the form of a line plot at five percent significance level, if the cumulative sum is outside the line then the estimated parameters are not stable.

The results of the CUSUM and CUSUMQ test plots (Figure 2) show that the estimated model has a stable parameter, it can be seen in the model has a cumulative sum stays within the line plots at five percent significance level. This result is in line with the stability test obtained by Khemili & Belloumi (2018).

As mentioned previously, this study also measures a Granger causality test. This test is used to see the causality relationship between variables in the study, including poverty, economic growth, and employment in the agricultural sector. If the results show  $H_0$  is rejected, then there is a causality relationship among these variables. The lag length used is lag 1 consistent with the results of the optimum lag test.

The results of Granger causality presented in Table 7 show a unidirectional relationship from economic growth to the employment of agricultural sector at five percent significance. This result was confirmed by Daud (2017) stating that the growth in primary and secondary sectors directly affected employees. As we know that an increase in output of economy can be achieved if labor input increases. In addition, the shift of labor from the agricultural sector to other economic sectors also occurs when the economy grows and develops which is reported by the Asian Development Bank (2013: 13).

## DISCUSSION

The results of the analysis show that in the long run, economic growth has a negative sign and statistically significant on poverty at 10 percent. The value of economic growth is  $-0.545310$  as expected a priori theoretical sign of negative, it means that if economic growth rises by one percent, the poverty rate falls by about 0.54 percent. The increases in GDP volume shows that the increase in output produced which reflects better economic performance. It has a significant impact on reducing poverty. This finding confirms previous research conducted by Niyimbanira (2017) which concluded that when the economy grows, it can create much employment so that unemployed people will get jobs, and the income earned will reduce poverty. This is consistent with the research of Siregar & Wahyuniarti (2008) which argued that economic growth plays an important role in reducing poverties. Other studies that supported this research include Nandori (2010), Chani et al. (2011), Faroh (2013), Vijayakumar (2013), and Jayadi & Bata (2016). In contrast to the long-term results, economic growth has an insignificant coefficient statistically in the short

term. This indicates that increasing economic growth in the short term does not directly affect to decline in the number of poor people.

This result is in line with the research of Ijaiya et al. (2011) who analyzed the impact of economic growth on poverty reduction in Nigeria. One of the conclusions is that at the beginning of economic growth is not vulnerable to poverty, due to the lack of improvement in household consumption expenditure in Nigeria. Regarding the Aceh conditions, as well as the economic structure in most developing countries, the structure of Acehnese's economy was still supported by household consumption of 62.65 percent compared to other sectors in 2017. Almost half or about 29.25 percent of the total of 62.65 percent of household consumption is used to purchase food needs (BPS Aceh, 2018b). The economic structure that is dominated by consumption components such as in Aceh is not ideal, because it has the potential to cause a bubble economy, where the demand for goods and services for consumption is greater than the supply of goods and services produced from investments. The impact will occur when the prices of goods and services in Aceh push inflation rate in high levels (Bank of Indonesia, 2008). The insignificant effect was also proved by Nindi & Odhiambo (2015) in their article when income inequality was too high in a region, economic growth does not trickle down to the poor so that relying on economic growth alone did not ensure a decline in poverty. Aceh's Gini ratio in 2017 is 0.329 points. This Gini ratio includes low inequality. However, this low ratio is not meaningful either because it is still dominated by low-income poor groups, where the lowest expenditure distribution of 40 percent population is 20.33 percent in March 2017. This finding is similar to the ones by Afandi et al. (2017) mentions that economic growth as measured by Gross Domestic Product (GDP) does not play an important role in improving people's welfare.

The results of the analysis show that the impact of employment in the agricultural sector on poverty in Aceh Province is positive and significant both in the short and long term. The coefficient value in the short term is 43,865,247 and the long term is 49.024094. The positive sign of this variable is the opposite in the theory. This means that a one percent increase in employment in the agricultural sector will be followed by an increase in the number of poor people by 43 percent and 49 percent respectively.

One of the factors that might underlie is the low of productivity of the Acehnese who work in the agricultural sector, this is understandable most of them live below the poverty line living in rural areas. The limitations of capital and the resources they have are not able to increase their income. It was emphasized by recent findings of Susilastuti (2018), which stated that narrow land ownership makes people only work as farm labors, not as landowners. In addition, Vijayakumar

(2013) added that a climate change with an abnormal pattern for farmers such as drought and natural disasters disrupts agricultural production which then triggers the price of agricultural products to fluctuate. This situation is further disrupted by the benefits that are more often enjoyed by the agent while much agricultural employment is paid very low. This has really suffered the employment of agricultural sector in rural areas, and finally, the number of poor people is increasing.

The results of this study contradict with Martin & Taylor (2003), Otchia (2014) found, Khan et al. (2015), Eseyin et al. (2016), Siregar & Wahyuniarti (2008), Kadir & Rizki (2016), and Jayadi & Bata (2016) that agricultural development has a negative effect on poverty.

### CONCLUSIONS

The results obtained by an ARDL model and Granger Causality approach indicate short-term and long-term relationships between the variables of the study. In the short term, only the agricultural sector workers have a significant effect on the level of poverty in Aceh Province. Meanwhile, in the long term, economic growth has a negative impact on poverty, means that the economic growth is quite effective in reducing poverty. Conversely, the absorption of employment in agricultural sector tends to increase poverty in Aceh Province, this is due to limited capital and resources, climate factors and low earnings of agriculture employment make it harder many of them to get a higher income. In addition, the results obtained that economic growth has unidirectional causality against employment in the agricultural sector in Aceh Province.

Based on the conclusions, the authors put forward some suggestions as it is necessary to accelerate economic development in the entire of Aceh province by fostering areas that have relatively high poverty populations. Economic growth with equity distribution will stimulate regions to pursue retardation so they can minimize the gap between the poor and rich people and finally poverty rate can be eliminated. The government of Aceh must optimize the potential of agricultural subsector by increasing its human resource capabilities, especially education, providing capital and production facilities to commodity marketing. In addition, it is necessary to develop other sectors that support the agricultural sector, for example, the industrial sector that processes agricultural products (agro-industry) in Aceh to increase the added value of agricultural products and absorb a wider workforce, so that it is possible to alleviate poverty in Aceh Province.

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Table 1. Stationary test using Kwiatkowski-Phillips-Schmidt-Shin (KPSS)

Variable	LM Statistics of KPSS		Result
	At Level	First Difference	
TK	0.153601***	-	I(0)
PE	0.136857***	-	I(0)
LTSP	-	0.161014***	I(1)

Note: \*\*\*, \*\*, \* significant at 1%, 5%, 10%  
Source: Results of research (2018)

Table 2. Optimal Lag Length Determination

Lag	AIC	SC	HQ
0	10.81138	10.96015*	10.84642*
1	10.78665*	11.38177	10.92684

Source: Results of research (2018)

Table 3. Bound Test Cointegration

F-statistics:	Critical Values		Result
	Lower Bound	Upper Bound	
6.308293			
1% significance level	5.15	6.36	Co-integrated
5% significance level	3.79	4.85*	
10% significance level	3.17	4.14	

Source: Author's computations using Eviews 9 (2018)

Table 4. ARDL Model Estimation

Variable	Coefficient	t-statistic	Prob.
TK (-1)	0.086599	0.465531	0.6475
PE	-0.084782	-0.498440	0.6246
PE (-1)	-0.413305	-2.183521	0.0433**
LTSP	43.86525	2.663159	0.0164**
C	-578.8844	3.944029	0.0109
R square = 0.351460		DW statistic = 1.725785	
Adj. R square = 0.198862		F-statistics = 0.100497	

Note: \*\*\*, \*\*, \* significant at 1%, 5%, 10%,  
Source: Results of research (2018)

Table 5. Short and Long-term Effects

Short term effect			
Dependent Variable : D(TK)			
Variable	Coefficient	t-statistic	Prob.
D(PE)	-0.084782	-0.498440	-0.6246
D(LTSP)	43.865247	2.663159	0.0164**
CointEq(-1)	-0.913401	-4.910167	0.0001***
Long term effect			
Dependent Variable : TK			
Variable	Coefficient	t-statistic	Prob.
PE	-0.545310	0.264479	0.0549*
LTSP	49.024094	19.920061	0.0275**
C	-633.768168	272.287068	0.0325

Note: \*\*\*, \*\*, \* significant at 1%, 5%, 10%,  
Source: Results of research (2018)

Table 6. Diagnostic test

Testing	Statistics value	p-value
Normality (Jarque-Bera test)	0.679908	0.711803
Autocorrelation (LM Lagrange Multiplier)	0.084233	0.7716
Heteroscedasticity (Breusch Godfrey test)	6.985514	0.1367

Source: Results of research (2018)

Table 7. Granger Causality

Dependent Variable	F-statistic			Decision
	TK	PE	LTSP	
TK	-	0.64790 [0.4308]	1.94535 [0.1792]	Accepted H <sub>0</sub>
PE	1.59913 [0.2213]	-	1.35764 [0.2584]	Accepted H <sub>0</sub>
LTSP	0.00992 [0.9217]	8.57536 [0.0086]*	-	Rejected H <sub>0</sub> (PE→LTSP)

Note: \* denote a causal relationship at 5% significance level.

[ ] = probability value; Lag 1.

Source: Results of research (2018)

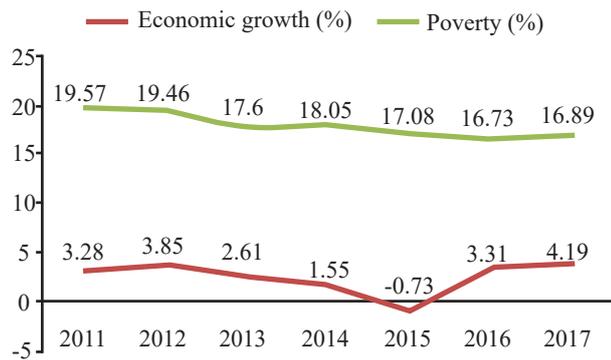


Figure 1. Economic growth and poverty in Aceh Province, 2011-2017

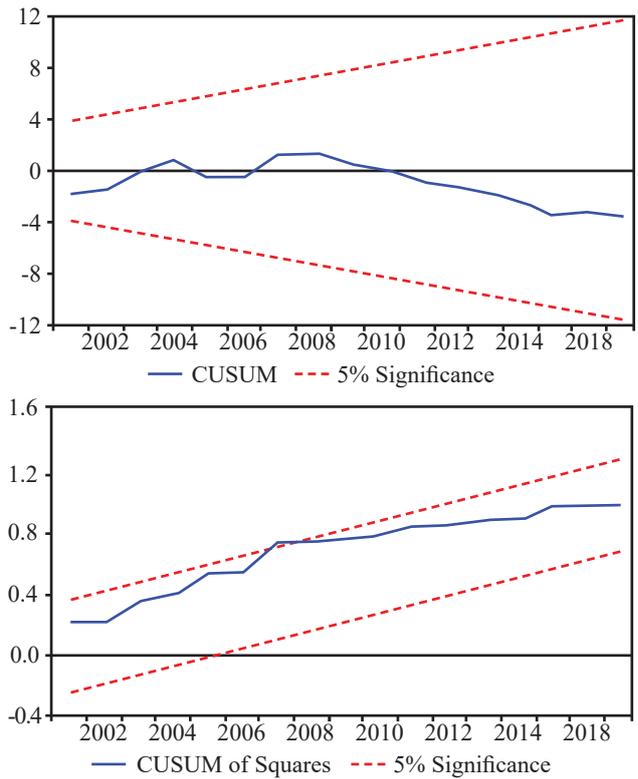


Figure 2. The result of Cumulative Sum (CUSUM) of Recursive Residuals and Cumulative Sum of Squares (CUSUMSQ) of Recursive Residuals