

Research Article

Assessing Determinants of Household Welfare in the Indonesian Agricultural Sector

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Abstract: This study aims to assess the determinants of household welfare in agricultural sector in the Province of Aceh, Indonesia. 10,036 of the Agricultural Business Households (ABH) from the 2013 Farmer Income Survey of Indonesia were analyzed using the binary logistic regression technique. The study found that age, gender, education level of household head, number of family members, agricultural sub-sector, income diversification, marketing difficulties, utilization of received subsidies and land ownership statistically and significantly influenced the welfare of ABH. On the other hand, the variable of utilization of agricultural cooperative facilities was found to be statistically insignificant in effecting the welfare of ABH. The number of household members, marketing difficulties, gender and agriculture sub-sector have the greatest influence on the welfare of ABH. These findings suggested the importance of establishing a program to increase farmer productivity at young age, empower female farmers, increase the number of agricultural workers up to the village level, socialize family planning, increase the number of production from the horticulture, food crops, and husbandry sub-sectors. Empowerment of marketing of agricultural products, enhancement of the use of subsidy, land grants, and improvement of facilities and infrastructure of agricultural sector would also improve the welfare of farmers.

Keywords: Agriculture business household; welfare; poverty line; binary logistic regression

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INTRODUCTION

Welfare is still the main objective in *Sustainable Development Goals (SDGs) 2030*. One of the main goals among the 17 goals in the SDGs is that there is no poverty of any kind in all corners of the world and no hunger, achieving food endurance, improving nutrition, and encouraging sustainable agricultural cultivation. Welfare creation becomes such difficult obligation for many countries worldwide, including Indonesia. In developing countries, the agricultural sector becomes the most important sector in the economy and absorbs many workers (Setboonsarng, 2006). In the Southeast Asian region, in 2008, the agricultural sector contributed to the Gross Domestic Product (GDP) by more than 10% and provided jobs for more than one-third of its population (Fan and Zhuang, 2009).

Agriculture has an important meaning and it is strategic in national development. The agricultural sector is not only a food provider but also a source of livelihood for the majority of Indonesia's population. Well-managed and wise agricultural development will be able to increase growth as well as sustainable

economic equality, reduce poverty and unemployment that ultimately lead to improving the welfare of the whole Indonesian society.

In 2010, the International Fund for Agricultural Development (IFAD, 2011) stated that around 70% of Indonesia's population lives in rural areas working in agriculture and poor people often close to the population whose jobs are in the agricultural sector. Based on Central Bureau of Statistics of the Republic of Indonesia (BPS- Statistics Indonesia), there were 38.07 million people or 34.6% of the Indonesian population worked in the agricultural sector in 2013. Even though Indonesia's economic condition has been better marked by a smaller contribution of the agricultural sector (13.63%) in the second quarter of 2018, the welfare level of rural farmers is still relatively low (BPS- Statistics Indonesia, 2019).

Overall, the contribution of agricultural sector to GDP has been increasing from year to year across 34 provinces in Indonesia. Similarly, in Aceh province, the agricultural sector has been still dominant in the provincial economy by 29.60% in the second quarter of

2018. The condition of Aceh's economic structure that has been dominating by the agricultural sector has a connection to the employment. In 2017, the workers absorbed in the agricultural sector ranged from 38.86% of the working population. The performance in the agricultural sector has been quite good; it turns out to be less comparable to the welfare of farmers and farm laborers who are close to poverty.

The percentage of poor people in Aceh aged over 15 years working in the agricultural sector was 31.69%, the non-agricultural sector was 22.63% and 45.68% were unemployed (BPS – Statistics Indonesia, 2017). The number of the poor working in the agricultural sector is related to the low income of farmers and farm laborers compared to the income in other sectors. This poverty situation is evidenced by the 2013 Farmer Income Survey which showed that the average income of agricultural business households was very low. The average income of agricultural business households is recorded by 11.2 million per year or around 934 thousand per month and only covered by 45.71 of total annual incomes as large as 24.5 million per year.

These existing facts are so apprehensive because the majority of poor work in the agricultural sector; in fact the agricultural sector is a mainstay sector in Aceh's economy. Based on these considerations, the analysis of various factors determining welfare in the agricultural sector is crucial so that recommendations can be made to improve the welfare of the poor in Aceh. One of them is by increasing the welfare of agricultural household business. Previous studies on the determinants of farmer have been conducted in Ethiopia by Motuma and Rajan (2016) and Seid and Singh (2016) and by Ma and Abdulai (2016) in China, but none of similar study has been conducted in Indonesia. Motivated by these facts, thus this study intends to analyze the determinants of the welfare status of agricultural business households in the Aceh Province, Indonesia based on the Survey of Agricultural Income (SAI, 2013). Specifically, this study analyzes the factors affecting the welfare status of agricultural business households in Aceh province, Indonesia.

The rest of this study is structured in the following manners. Section 2 provides the selected literature reviews 2 and followed by the discussion on research method in Section 3. Section 4 provides the findings and their discussion and ended with the concluding remarks in Section 5.

LITERATURE REVIEW

Todaro and Smith (2006) suggested that the welfare of middle-class people can be represented from an increase in community life. Improvement in community life is characterized by freedom from poverty, better health level, higher levels of education and community productivity. Less poverty means more

prosperity. Therefore, "poverty" should be interpreted as "lack of well-being" and "welfare" as "lack of poverty" (Gonneretal, 2007).

According to World Bank, welfare is measured by comparing the level of income of the household and the level of necessary income to fulfill minimum needs. World Bank measures and categorizes distributions into three groups, namely: (i) 20% of residents with high income per capita; (ii) 40% of residents with middle income per capita; and (iii) 40% of residents with low income per capita.

The level of farmer welfare is related to the condition of farming because their farming business is the source of their income. Per capita income not only can provide a description of the welfare rate of the community in different countries, but also can describe the change of welfare level on the society that has occurred among many countries. The income approach per capita is suitable for use and easy to understand, and perhaps income per capita is the best indicator according to (Arsyad, 2004, Majid, 2007a, Majid, 2007b, Majid *et al.*, 2007, and Majid and Kassim, 2015). This approach also has advantages, where income per capita is focused on the *raison d'être* of development; that is the level of life and eliminating poverty.

Agricultural household is one or more households managing farm business with the aim to sell some or all of its products; own farming businesses, profit sharing, or other's business by getting income, including agricultural investment (BPS – Statistics Indonesia, 2013). Basically household gets income derived from two sources, namely main and additional income. The main agricultural household is the household whose primary income is from the agricultural sector or more than its half income; it is from one of the six agricultural subsectors (United Nation, 2007). The six subsectors are food crop subsidies, horticulture, plantations, husbandry, fishery and forestry.

RESEARCH METHODS

This study uses secondary data derived from BPS – Statistics Indonesia in the form of raw data from the Survey of Agricultural Sector Household Income in 2013 (SAI, 2013). Survey of Income of Household in the agricultural sector in 2013 is an activity of the Agricultural Census 2013. The survey of SAI 2013 is used as the source of data as it provides the description of agricultural sector household income as the main focus of this research. In addition, the number of highly representative samples is an important consideration in using this data. The sample of this study is households whose main income comes from the agricultural sector. The following figure illustrates the selection of the research sample unit.

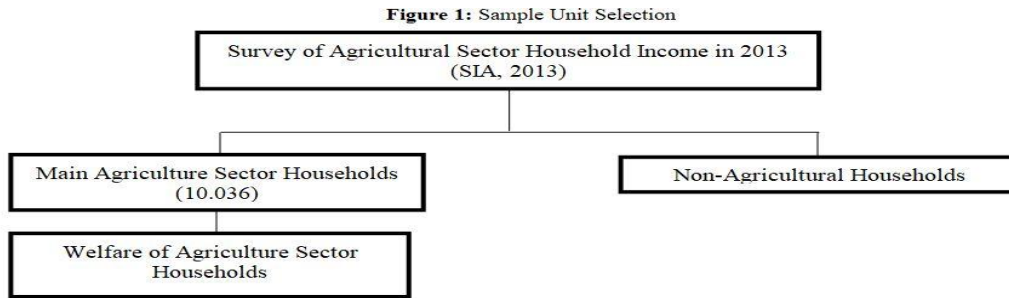
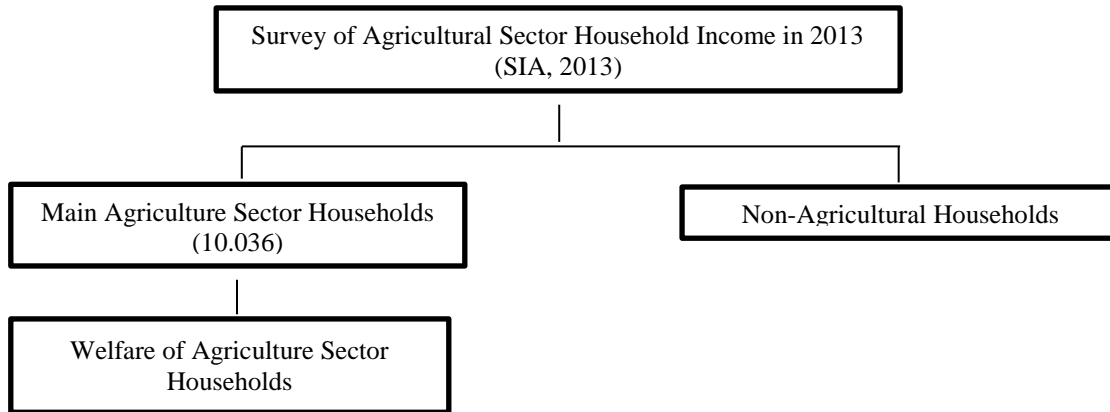


Figure 1: Sample Unit Selection



To identify the determinants of poverty status in agricultural business household, the following binary logistic regression model is used.

$$\text{Log} (P/1-p) = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \dots + \beta_nX_n + \epsilon \quad \dots\dots\dots(1)$$

Where p is the probability that Y is equal to 1, and X_i are independent variables, and β_i are the estimated regression coefficients. Logistic regression will form the predictor variable/response (log (p / (1-p))), which is a linear combination of the independent variables. Value of predictor variables is then transformed into a probability with logistic function, so that in the case of our study, the logistic model can be re-written as follows:

$$\text{AHW} = \beta_0 + \beta_1\text{AG} + \beta_2\text{GD} + \beta_3\text{EDU} + \beta_4\text{NHM} + \beta_5\text{LOS} + \beta_6\text{ASS} + \beta_7\text{ID} + \beta_8\text{SSD} + \beta_8\text{MD} + \epsilon \quad \dots\dots\dots(2)$$

where AWH is the agricultural household welfare, AG is the age of household head, GD is the gender of household head, EDU is the education level of household head, HM is the number of household members, LOS is the land ownership status, ASS is the agricultural sub-sector, ID is the income diversification, SSD is the subsidies, MD is the marketing difficulties, β_i are the estimated coefficients of independent variables, and ε is the error term.

In this model, the households whose expenditure is above the poverty line are categorized as

prosperous households (Code 1), while those below the poverty line are categorized as non-prosperous households (Code 0). To ensure that the logistic regression is meaningful, it is necessary to make a test on significance of the estimated values. The interpretation of the parameter coefficients in the logistic regression model is in the form of odds ratio. Odds ratio is used to find out how much the tendency for certain variables on the reference categories by comparing among independent variable categories.

RESULTS AND DISCUSSION

Table 1 illustrates the descriptive of the sample and investigated variables. As shown in the table, the percentage of ABH led by household head aged over 55 years tend to be more prosperous as they are more mature and can contribute the household income. The percentage of ABH with a prosperous male head of household is recorded to be lower than female head of household, which is 47.9% and 58.7%, respectively. In addition, the number of male head of household samples is greater than the female head of household, which is 8,143 out of 10,036.

In this study, the percentage of ABH along with the household heads who have higher education that are prosperous (66.4%) far higher than the ABH headed by the household heads with junior high school education (52.2%) and those who had never attended school and did not completed elementary school (46.0%). This shows that the higher the level of

education, the higher the level of welfare is. A low level of education causes a low skill of the labors resulting in low wages or income. The proportion of prosperous ABH with its members that is less than 5 people is 56.9% greater than the ABH whose members are 5-6 people by 37.6%, and the household members that are more than 6 people is 26.5%.

With regards to land ownership status, the proportion of prosperous ABH who own land was 50.17%, which is greater than 39.0% for landless ABH. If it is viewed based on Agriculture sub-sectors, the proportion of prosperous ABH was in the plantation sector by 57.66%, which is larger than in the other sectors. On the other hand, the lowest proportion of prosperous ABH is found in the food crop sector, which was only 37.96%.

According to the income diversification, the proportion of prosperous ABH diversified was 55.67%, which is greater than the households that were non-diversified by 47.90%. These indicated by the risk response and opportunity or uncertainty in employment and land. Income diversification can be obtained from the agricultural sector, non-agriculture or both.

Furthermore, the proportion of prosperous ABH utilizing cooperative facilities was 55.67%, which is greater than the ABH that did not utilize the cooperative facilities by 47.90%. By utilizing these facilities, it means that it can improve the household welfare. On the other hand, the proportion of the prosperous ABH that utilize the government subsidies in accordance with its allocation was 50.03%, which is greater than the ABH which did not utilize by 47.13%.

Table 1: Characteristics of Agriculture Households

Characteristic		Welfare status (%)	
		Prosperous	Non-prosperous
(1)		(2)	(3)
Age of household head	< 25 years	44.3	55.7
	25 - 34 years	49.9	50.1
	35 - 44 years	42.8	57.2
	45 - 54 years	46.7	53.3
	55 - 64 years	52.1	47.9
	≥65 years	54.0	46.0
Gender of household head	Male	47.9	52.1
	Female	48.7	51.3
Education level of household head	Elementary school or lower	46.0	54.0
	Primary and secondary school	52.2	47.8
	Diploma/University	66.4	33.6
Number of household members	≤ 4 people	56.9	43.1
	5-6 people	37.6	62.4
	≥7 people	26.5	73.5
Land ownership	Rented land	39.04	60.95
	Owned land	50.17	49.82
Subsector of main income source	Forestry	52.94	47.06
	Fishery	57.29	42.71
	Husbandry	50.6	49.4
	Food Crop	37.96	62.04
	Horticulture	53.22	46.78
	Plantation	57.66	42.34
Income diversification	Diversified	44.22	55.77
	Non-diversified	53.79	46.20
Utilization of cooperative facilities	Non-utilize	47.90	52.09
	Utilize	55.67	44.32
Government subsidies	Non-utilize	47.13	52.86
	Utilize	50.03	49.96
Marketing difficulties	No	49.97	50.03
	Yes	42.33	57.67

Source: Survey of Agricultural Income, 2013 (Processed)

Finally, if it is viewed from the difficulty of marketing agricultural products, the proportion of prosperous ABH that faced no difficulties in marketing (49.97%), that is greater than those who faced difficulty (42.33%).

Table 2 provides the findings of the effects of the determinants of agricultural household welfare. As illustrated in the table, the age variable of household heads has a significant effect on the welfare status of the ABH. The household heads that were less than 25

years old, 25-34 years old, 35-44 years old, and 45-54 years old have the possibility of welfare status by 0.524, 0.698, 0.697, and 0.925 were less than the household heads that were 65 years old and above. On the other hand, the 55-64 years-old household heads have the possibility of 1.025 that is greater than the 65 years-old and above household heads. The results of this study are in line with the research by Sharma and Singh (2015), who found that the welfare level of agricultural household was in its households that the age of household head was older; the older the age of the agricultural household heads, the more experiences are obtained by those who have the common age at productive age. Likewise with the research from

Motuma and Rajan (2016) in Ethiopia, agricultural households whose non-prosperous proportion was not as high as the average are headed by the household head that is under 18 years old.

The gender of the household head statistically has a significant effect on the welfare status of ABH. The male head of household has a tendency of 1.143 times more than the female head of household to become prosperous. This case is in accordance with the research by Etim and Patrick (2010) conducted on fishery of ABH and it showed that female heads of household are not prosperous or poorer than the male heads of household.

Table 2: Estimation Regression Models of Binary Logistics Welfare of ABH

Variable	B	Significant	Odds Ratio
<i>Age of Household Head</i>			
< 25 years	-0.646	0.020	0.524
25-34 years	-0.359	0.000	0.698
35-44 years	-0.361	0.000	0.697
45-54 years	-0.078	0.296	0.925
55-64 years	0.025	0.745	1.025
>65 years*			
<i>Gender of Household Head</i>			
Male	0.134	0.021	1.143
Female*			
<i>Education of Household Head</i>			
Elementary School or lower	-0.593	0.000	0.553
Primary-Secondary School	-0.435	0.004	0.647
Diploma/University*			
<i>Number of Household Members</i>			
4 or less people	1.583	0.000	4.870
5-6 people	0.635	0.000	1.887
7 of more people*			
<i>Land Ownership</i>			
Rented land	-0.407	0.000	0.665
One land			
<i>Agricultural Sub-sector</i>			
Forestry	0.065	0.827	1.068
Fishery	0.283	0.001	1.327
Husbandry	-0.343	0.005	0.709
Food crop	-0.935	0.000	0.393
Horticulture	-0.227	0.021	0.797
Plantation*			
<i>Income Diversification</i>			
Non-diversified	-0.673	0.000	0.510
Diversified*			
<i>Utilization of Cooperative Facilities</i>			
Non-Utilize	-0.285	0.077	0.752
Utilize*			
<i>Government Subsidies</i>			
Non-utilize	-0.304	0.000	0.738
Utilize*			
<i>Marketing Difficulties</i>			
No	0.318	0.000	1.374
Yes*			
<i>Constant</i>	0.523	0.032	1.687

In terms of the education level, the education of household head statistically and significantly influenced the welfare status of ABH. Household heads with higher education were likely to be more prosperous than those with low education. Households with the highest education level have a tendency to be prosperous at 0.553 times smaller than those with diploma education. On the other hand, the household heads with junior and senior high school education have a tendency to prosper by 0.647 times smaller than the household heads with diploma. This findings similarly to the study by Etim and Solomon's (2010) who found that broiler farmer in the region of rural areas in Uyo, Nigeria, their education level of the household head has negative relation to the welfare of broiler farmer.

Next, the variable number of household members statistically has a significant effect on the prosperous status of the ABH. Households that have the members of less than and equal to 4 people have a tendency to be prosperous 4,870 times greater than households with the members of 7 and more people and households who have the members of 5-6 people have a tendency to be prosperous 1,887 times greater than households with the members of 7 and more people. It is believed that the addition of the number of agricultural household members could improve the poverty status of agricultural households. These findings are in accordance with the research of Bogale *et al.* (2013) in Ethiopia who documented that the increasing number of the household members is in line with the increasing risk of households not to prosper.

Land ownership has a statistically significant influence on the welfare status of ABH. ABH that did not own land have a tendency to be prosperous 0.665 times lower than ABH who own land. This is in line with the research conducted by Seid and Singh (2016) in the South Wollo Zone, Amhara Regional state, Ethiopia who showed that the chances of households will decrease their poverty level by 14.26% if the household increases the land ownership by one hectare.

Furthermore, the variables of agricultural subsector have a significant effect on the welfare status of the ABH, although the forestry sector was not statistically significant. ABH whose primary income was from forestry and fisheries subsidies have the possibility of prosperous status 1.068 and 1,327 times higher than the plantation sector while ABH whose main income is in husbandry has a tendency to be prosperous 0.709 times smaller than plantation sector and ABH whose main income in food crops and horticulture have a tendency to be prosperous of 0.393 and 0.797 times lesser than plantation sector.

With respect to income diversification, it statistically has a significant effect on the welfare status of ABH. ABH that did not diversify their income have a

tendency to be less than 0.51 times smaller than the diversified ABH. This finding is in line with research conducted by Rabbi *et al.* (2016) who found that the income out of agriculture was an important factor affecting agricultural households.

Utilization of cooperative facilities was not statistically significant in effecting the welfare status of ABH. ABH that did not utilize cooperative facilities has the tendency to be prosperous 0.752 times smaller than the ABH that utilized cooperative facilities. This finding is in accordance with the hypothesis stating that households that utilize agricultural cooperation facilities will increase the chance to be prosperous households or higher economic status. Similarly, this finding is in line with the research conducted by Ma and Abdulai (2016) in China that found a cooperative membership has a positive and significant impact on household income of apple farmers.

Furthermore, government subsidies is found to have statistical significant in effecting the poverty status of the ABH. ABH that did not utilize subsidies from government or non-government have a tendency to prosper 0.738 times more than the ABH receiving government subsidies. Finally, marketing difficulty is found to be statistically significant in effecting the welfare status of ABH. ABH that has no difficulties in marketing their agricultural products have a tendency to be prosperous 1,374 times more than ABH that has difficulties in marketing. This evidence is in line with the World Bank (2004) statement that it is importance to provide rural infrastructure as there is a relationship between poor infrastructure and high sales transaction costs resulting in lower prices received by farmers.

CONCLUSION

Referring to the above discussion, it could be concluded that age of household head, gender of household head, education level of household head, number of family members, agricultural sub-sector, income diversification, marketing difficulties, utilization of subsidies and land ownership have statistical significant in effecting welfare status of ABH, while the variables of utilization of agricultural cooperation facilities was found to be statistically insignificant in affecting the welfare of ABH in the province of Aceh, Indonesia. Of those variables, the numbers of household members, marketing difficulties, gender and subsector of agriculture have the greatest influence on the welfare status of ABH.

Based on this findings, to further improve the welfare of the farmer, the government must be able to increase the productivity of young farmers with good quality programs and training, a program from the Women's Empowerment Service and the Agriculture Service in increasing or empowering female farmers, increasing the number of agricultural workers to the

village area so that they can increase knowledge, communication and information for farmers who have low education level, the starting the family planning socialization, increasing the number of production results of the horticulture, food crops and husbandry sub-sector so that the results obtained are comparable to other prosperous sub-sectors, the government is able to engage and socialize the farmers to not only get the main livelihood from the agricultural sector but also they can get the income from other sectors, the need of government attention in improving access that can facilitate the marketing of agricultural products, there needs to be monitoring and evaluation from the government on the appropriate subsidies, the provision of land grants and financial support in the management and monitoring of the funds use effectively and efficiently, increasing availability, completeness of facilities and infrastructure from cooperation in each region evenly so that the cooperation can be the main factor or most important holder in supporting welfare for farmers such as the other developed countries.

Finally, the government should pay high attention on the agricultural sub-sector to improve ABH welfare. However, the government must also reduce marketing difficulties, increase subsidies, and provide more cooperative facilities for the farmers' utilization so that the tendency of farmers to become prosperous could be achieved.

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