# The Influence of Socio Economics Characteristics and Meat Self-Sufficiency Policy on Beef Cattle Farmer's Income in Indonesia

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## ABSTRACT

This study aimed to determine the influence of the implementation of the meat self-sufficiency policy on the cattle farmers' income in Indonesia. This study used secondary data of Indonesian Family Life Survey (IFLS) that were collected in 2014. The IFLS are household data taken by survey at national level. This study used IFLS 5 data. The observed variables in this study included characteristics of farmer's household such as age, area of land cultivated, number of family members, education level, patterns integration of livestock farming and government assistance. Household income is derived from reduced revenue from agricultural sector and it cost as the dependent variable. The results of the study showed that mixed farming or livestock farming integration influenced farmer household income significantly (P<0.01). The cultivated land size affected the household income of farmers (P<0.01). The level of education, number of family members, type of assistance and age did not affect the income of household farmers. The Respondents were divided in two group, group that were exposed and those that were not to the meat self-sufficiency program. The results of study showed that government policy in meat self-sufficiency did not have a significant impact on the household income of farmers. The development of livestock in order to achieve self-sufficiency in meat needs to be done with increasing capacity of farmers to achieve farming and land use efficiency.

Keywords: Beef cattle, Farm productivity, Government policy, Self-sufficiency in meat, Smallholder farmers

## Introduction

The meat self-sufficiency policy is the government's effort to reduce dependence on imports by empower domestic cattle supply to promote an impact to farm household welfare. Improving welfare of smallholder cattle farmers is one of the ultimate goals of this program through increasing their income and farm efficiency. The meat self-sufficiency policy is one of the government's priority programs to realize food independence from local cattle. This program aims to reduce the rate of dependence on beef imports to at least 10% (Direktorat Jendral Peternakan, 2013). Local meat supply is almost entirely supplied by small-scale farmer with two to three animals in their herds (Widiati, 2014). It is considered as an inefficient business characteristic.

The purposes of the meat self-sufficiency program carried out by the government are increasing income and welfare of farmers, absorbing labor, saving foreign exchange, optimizing potential of local livestock and ensuring food security at consumer level. The existence of this program may encourage to the increase of beef cattle productivity at farm level that may affect to the increase of farm household income (Kementrian Pertanian, 2010). However, low productivity of beef cattle business, especially in breeding sector, is still an obstacle for the government. Most breeding businesses are household businesses which located in Java, Bali and Nusa Tenggara where the area is drought prone (Purwoko, 2015).

The Increasing productivity of beef cattle can be conducted by making easier for small farmers to get production facilities (feed and cattle) through the agricultural market to increase their business. The synergy between government and universities is needed to be increase the adoption of technology at the farmer level which is has a direct impact on increasing livestock productivity (Widiati, 2014). The adoption of technology also can be encouraged by increased the role of medium-scale businesses and business partnerships, it hoped that the response to the market and produce better (Ilham, 2016).

Increased productivity can be obtained by integrating of beef cattle business with agriculture in the utilization of agricultural and plantation by-product (Mayulu *et al.*, 2010).

In Indonesia there are three patterns of native beef cattle development. First, the development of beef cattle is tied to agricultural businesses such as rice fields and fields, second is livestock that is not tied to agriculture, and the third is capital intensive beef cattle business (Yusmichad, 2004). Depending on farmers livestock businesses in Indonesia, it can be grouped into three categories including traditional livestock businesses, commercial livestock businesses and semi-commercial livestock businesses including core-plasma systems (Soedjana, 2011).

The characteristic of small-scale livestock farmers business is maintenance orientation that is not yet fully business and is usually done as a part-time business that is not really concerned to financial benefits (Sunarto *et al*, 2016). The pattern of raising livestock in Indonesia is dominated by small-scale livestock businesses with an average low livestock ownership and as a saving capital (Saleh and Matindas, 2017). This low number of cattle in the herd, the low availability of land for each farmer household, limited resources, and traditional farming systems are the causes of low labor income in the agricultural sector including livestock (Soedjana, 2011).

In order to succeed the meat self-sufficiency policy, the development of crops-livestock integration is targeted to provide added value for the development of plant cultivation as well as increasing the number of cattle population (Kementrian Pertanian, 2010). Cultural aspects play a major role in farmers' decisions to adopt integrated systems where the provision of credit is not yet relevant to this integrated system. Broader distribution of integrated systems can occur if land transitions continue (Gil *et al.*, 2015).

The beef cattle breeding is mostly carried out by smallholder livestock businesses with small-scale production (cow-calf operation) in small-scale businesses and usually integrated with other agricultural businesses (Winarso and Basuno, 2013). Small-scale farmers generally own land with an average of 0.6 hectares. They have family members of 5 to 6 people. The average participation in formal education is 6 years (FAO, 2018).

**The meat self-sufficiency policy**

The meat self-sufficiency policy is a government effort to suffice food from livestock, especially based on beef cattle. The targets of the Meat Self-sufficiency program include an increase in beef cattle population to 14.2 million in 2014, increasing domestic meat production to 420.3 thousand tons, increase up to 10.4%. From this increase it is expected to reduce the number of imports to only about 10% (Kementrian Pertanian, 2010).

The meat self-sufficiency policy consists of 4 aspects, technical, economic, institutional, policy and location aspects. The technical aspects cover the fields of breeding, farming, animal health, and veterinary health. In the economic aspect, the emphasis is on regulating the distribution and marketing of cattle and beef. This distribution arrangement is related to the regulation of domestic production and imports based on the needs of the consumer. Institutional support consisting of a scientist, experts, extension agents, business actors, and the government is needed to implement the objectives of the meat self-sufficiency program. The existence of groups of farmers or cooperatives is important. In addition, partnerships between related parties need to be expanded (Kementrian Pertanian, 2010)

To succeed in the meat sufficiency program, policies that support domestic beef products and breeders are needed. Cow breeding business credit support (KUPS) must be truly optimized and continue to be developed. Low interest of credit for fattening activities also needs to hold up early slaughter of cattle can be realized well (Kementrian Pertanian, 2010). There is a need for a special financing scheme such a pattern plantation development scheme. The certainty of development land, sources of cattle that guarantee the availability of quantity and quality, effective and accountable management development as a solution for the development of national cattle (Nuhung, 2015).

However, there is lack of study on evaluation of meat self-sufficiency policy particularly on its impact to the farm household at national level. Therefore, this study used the Indonesia Family Life Survey (IFLS) data that cover at national level. This policy is embodied in the several programs in the farmer community and household. Policy-related activities may include livestock assistance, counseling, livestock breed grant, loans, etc. It can be assumed that all programs related to cattle farmers in the period from 2007 to 2014 were part of meat self-sufficiency policy framework which the variable can be found in the IFLS.

**Materials and Methods**

The survey data of IFLS 5 was used for this research which were carried out in 2014. The data were collected consisting of both community and household data. The type of data that is used in this study is cross-section with household as the unit of analysis. The sample is representative of about 83% of the Indonesian population and contains over 30,000 individuals living in 13 provinces (Strauss *et al.*, 2016).

The household farmer data identification is collected from "Book 2" at the Farmers section (UT) where the respondents represent farmers' households. Then a selection is made from the "ut01" question to indicated specifically household member who works in the agricultural sector. In

"ut01am" selected based on the area of land managed.

The farmer households that conducted integrated farming called mixed farming were selected based on the most valuable agricultural assets. Mixed farming is assumed if one of the most valuable assets of a farmer's household is cattle ownership with the priority of household assets are cattle. It is assumed that the farmer's household integrates farming with cattle.

Characteristic data about age and education is taken from "Book 3a" to determine the age of the respondent. The highest level of education or level of education that has ever been achieved is in the variable "dl6" and at what level the respondent was last educated in the variable "dl7. So that the length of time the respondents get a formal education. The number of family members living in one house is taken in "book K". Total number observed is 1,560 household farmers.

Income is the difference between revenue and it costs of the farmer's household in years before. Revenues from livestock farming are taken from "Book 2" with the code "ut07" which is revenue from farming. Agricultural costs are taken from "Book 2" with the code "ut08", so as to obtain farm income by calculating the difference of them.

Community data (community and facilities) in "Book 1" section D the question "d14a" contains government programs related to livestock and agriculture. Then a selection is taken by government cow-cattle assistance on community which received. The assistance received by the community is assumed to be the implementation of the self-sufficiency program in meat which it was a government priority program. Then community data were selected converted into household data using "htrack" so it can be obtained from farmer households that receive government programs in household units.

**Data analysis**

The method used in this study is the OLS method which is include classic assumption test, and statistic test ($R^2$ and F test). The OLS method is an econometric method consisting of independent variables and the dependent variable described in a linear equation (Lind, 2012).

$$\hat{Y} = a + b_1 X_{1i} + b_2 X_{2i} + b_3 X_{3i} + b_1 D_{1i} + b_2 D_{2i} + \ldots + b_n X_{ni} + b_n D_{ni} + e$$

Symbols:
$X_1$  = Age
$X_2$  = Household number
$X_3$  = Education
$X_4$  = Land size for farming
$D_1$  = Farming pattern (*Dummy*)
$D_2$  = Exposed to Meat Self-Sufficiency Policy (*Dummy*)
$\hat{Y}$  = Income

## Results and Discussion

### Respondent characteristics

Variables related to respondent characteristics and other variables used in this study are defined in Table 1. The characteristics of respondents are important to find out information about the socio-economic conditions of farmers.

The average income obtained by farmer households is IDR 6,759,582.00. It is also known from Table 2, that the minimum income from the farming is IDR -80,000,000.00. This shows that the expenditure made by farmer household is greater than the income. This condition is inseparable from the risks faced by farmers in conducting their business which is a biological business that is vulnerable to pests and diseases which results in the loss of farmers (Pasaribu, 2017). The average number of family members who are household dependents is 4.69 people. This means that family dependents are in the range of 4 to 5 people in each household. Labor in farming generally consists of all family members and outside workers who take part in farming (Suratiyah, 2006). The average land cultivated by farmers ranges from 100 $m^2$ to 140,000 $m^2$, with an average of 7,730.69 $m^2$. Improvement of land exploitation structures is needed to improve farmers' efforts to deal with relatively narrow agricultural land and land disparities (Susilowati and Maulana, 2017).

The age of respondents in this study was between 15 and 64 years, it based on the Indonesia productive age range. The average age of respondents is 35.02 years with a standard deviation of 12.90. In the demographic analysis

Table 1. Variable description

| Variable | Definition |
| --- | --- |
| Dependent Variable Income | Household received from the agricultural sector and livestock in the last 12 months (IDR) |
| Independent Variable Age | The age of the head of the household or household member who did farming activities in past year (Year) |
| Education | long level of formal education achieved by respondents (Year). |
| Number of family member | Household members who stayed at home (person). |
| Land size of farming | land area cultivated by farmers ($m^2$) |
| Farming pattern | Integrated / mixed between farming and livestock (*mixed farming* = 1; *non-mixed farming* = 0) |
| Meat Self-Sufficiency Policy exposed | Government assistance in the livestock sector, selected based on communities exposed to meat self-sufficiency policies and other policies in agriculture (Gaining assistance = 1; Not getting assistance = 0) |

Table 2. Characteristics of farmers

| Variable | Observation | Mean | Std. Dev | Min | Max |
|---|---|---|---|---|---|
| Income (IDR) | 1560 | 6,759,582 | 12,500,000 | -80,000,000 | 100,000,000 |
| Age (year) | 1560 | 35.02 | 12.90 | 15 | 64 |
| Family member (people) | 1560 | 4.69 | 2.04 | 1 | 16 |
| Land size of farming (m²) | 1560 | 7,730.69 | 12,199.98 | 100 | 140,000 |

Table 3. Formal education

| Education (year) | Frequency | Percentage (%) | Remark |
|---|---|---|---|
| 1 – 6 | 395 | 25.32 | Elementary School |
| 7 – 9 | 296 | 18.97 | Junior High School |
| 10 – 12 | 656 | 42.05 | Senior High School |
| 13 - 15 | 102 | 6.54 | Vocational School |
| 16 | 105 | 6.73 | Collage |
| >17 | 6 | 0.38 | Graduate, Post Graduate |

the age of the population is divided into 3 groups, namely groups of young people under the age of 15 years, productive age groups with ages ranging from 15 to 64 years and older groups which are above 65 years old (Tjiptoherijanto, 2001).

The average level of formal education is 9.73 years with a standard deviation of 3.85. Minimum respondents take formal education for 1 year and a maximum of 18 years. In this section, farmers are divided into two groups: those who are exposed to the meat self-sufficiency program and who are not. As many as 1,256 or 80.51% household are not exposed. The assistance in this program includes credit, new types of breed grant, and counseling or consultation related this program.

**Policy toward farmer households**

The results of the analysis of the effect meat self-sufficiency program are represented in following table. Age variable does not significantly affect income (P>0.05) regression coefficient value is -11,793.58 means that increasing one year old will reduce income by 3,639.70. The number of family members did not significantly affect the household income of farmers (P>0.05), farmers more often use labor outside the family. Farmers tend to use more labor outside the family compared to the workforce in the family, this is due to the lack of availability of labor (Abdi *et al.*, 2014).

The area of land has a significant effect on the household income of farmers (P<0.01). With a value of coefficient of positive value of 333.88, it can be interpreted that an increase in land area increases the income of farmer households. Farmers have a tendency to add livestock to large land ownership because of the availability of feed for livestock (Sahala *et al.,* 2016).

Farming pattern variable is an integration of livestock farming or mixed farming that significantly influence farmer household income (P<0.01). The integration of livestock farming increases farmers' income by IDR 7,782,864 in a year, with a single farming of farmer income are IDR 2,386,857. The integration of the livestock-farming system will have an impact on changes in the farmers' economy. Cattle breeding business is still a side business integrated with food crops (Rustijarno and Triwidyastuti, 2008). Land is an important supporting factor as the environment and availability of feed (Santoso and Prasetiyono, 2018). The system of integrating livestock farming has become the backbone of the growth of sustainable agriculture that is pro-poor in developing countries (Herrero *et al.*, 2012). Utilization of agricultural waste for livestock will support the integration of livestock business with agricultural, food crops, horticulture and plantation businesses (Santoso and Prasetiyono, 2018).

The meat self-sufficiency policy implemented at the farmer level such a loan, new types of breed grant, and counseling or consultation related this program, has no effect on the livestock household income (P>0.05). The policy pattern that promotes small scale farmers and reduces the role of large farmers cause of low performance of cattle breeding development so that it is unable to full fill consumer demand (Nuhung, 2015). To increase the productivity of national beef cattle, the government needs to increase the capacity of farmers (Purwoko, 2015). Farmers in general have not been able to access information about livestock businesses apart from fellow farmers (Fauziyah and Nurmalina, 2015). Knowledge of farmers about good maintenance of cattle farming and reproduction management will improve reproductive efficiency (Suharyati and Hartono, 2017).

Tabel 4. Meat self-sufficiency policy and farming pattern

| Variable | Frequency | Percentage (%) |
|---|---|---|
| 0 (Not exposed to Meat Self-Sufficiency Policy) | 1,256 | 80.51 |
| 1 (Exposed to Meat Self-Sufficiency Policy) | 304 | 19.49 |
| Single farming | 1,360 | 87.18 |
| Mixed Farming | 200 | 12.82 |

Table 5. OLS analysis results

| Variable | B (Coefficient) | t |
|---|---|---|
| Constant | 2,386,857 | 1.52 |
| Age | -11,793.58 | -0.58 |
| Household number | 75,893.51 | 0.53 |
| Education | 109,693.10 | 1.61 |
| Land size for farming | 333.88 | 7.88*** |
| Farming pattern | 5,396,007 | 5.54*** |
| Exposed to Meat Self-Sufficiency Policy | -262,188.1 | -0.38 |
| Number of Observation = 1,560 | | |
| F (7, 2420) = 12.99*** | | |
| R Square = 0.1253 | | |

* P<0.05 ; *** P<0.01

## Conclusions

This study shows that the policies carried out by the government in realizing Meat Self-sufficiency didn't have significant effect on increasing farmer household income yet. The pattern of farming by applying Mixed farming or integration livestock farming has a significant effect on increasing household income of farmers. Integration of cattle and crops farming may diversify the household income. Moreover, the utilization of agricultural waste can also increase the efficiency of land management. Land area also significantly affects the income of farmers in which reflected the main carrying capacity needs among cattle farmer. Therefore, this study suggests that the meat self-sufficiency policy should pay more attention to availability of land for farmer as the main carrying capacity on livestock business.

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