The impact of incentives on the decision to transfer agricultural land functions to non-agricultural uses

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Abstract. The influence of incentives on landowner's decision-making regarding land-use change is an intriguing consideration when developing sustainable agricultural land policies. Owners of agricultural land in rural areas with varying characteristics and varying agricultural yields each year have varying views on changing or maintaining their land. The purpose of this study was to determine the effect of incentives on people's attitudes toward maintaining or selling land (land-use change from agricultural land to non-agricultural land). This study employed a descriptive analysis to calculate the impact of incentives from the government on the decision to change or keep the land. The responses of 500 respondents were categorized as follows: 20–46.67 in favor of land change, 46.67–73.33 neutral, and 73.4–100 in favor of maintaining land. The analysis revealed that additional factors influence the decision to sell or maintain the land. However, some villages seek to preserve land through government incentives.

1. Introduction

Land is the solid surface of Earth, which is critical for humans to sustain all activities. Land is critical for meeting human needs for food, clothing, and shelter [1] as it can produce agricultural products that can be sold to generate revenue in order to afford daily expenses [2]. Agricultural activities account for most land use in rural areas [3]. However, not all land in rural areas is used for agricultural purposes; with time, land in rural areas is now used for commercial and industrial purposes [4]. Agricultural land conversion is a type of land-use change that occurs when agricultural land is converted to another land function [5]. The conversion of land creates issues with land use [6].

Land-use changes are unavoidable as a result of population growth's high demand. Changes in agricultural land use to non-agricultural land occur in a wide variety of areas. The problem of agricultural land conversion, particularly for rice fields in Indonesia, has been a source of concern since the 1980s [7]. The majority of the land conversion process occurs along with urban-rural border areas and cultivation-non-cultivation border areas. Economically, agricultural land conversion occurs due to the pull of demand for land for non-agricultural activities and the encouragement of landowners [8]. Conversion of agricultural land directly impacts agricultural output, employment, and investment in irrigation infrastructure, particularly rice crops [9]. The Minister of Agriculture estimates that the area of raw paddy fields shrinks by 120 thousand hectares each year. Although the Ministry of Agriculture prints rice fields on newly acquired land, it cannot immediately meet the growing demand for land [10].
Pasuruan Regency is one of the areas in East Java with the most rapid land-use change. Pasuruan Regency is ranked fourth out of ten East Java regencies with a high rate of agricultural land conversion, with Pandaan District having the highest rate of paddy field conversion [11]. Pandaan Sub-District is an area that has acquired the most land for toll road construction [12]. The majority of land acquired is agricultural land. Land-use change affects the conversion of agricultural land to non-agricultural uses and the characteristics of rural areas as they transition to urban areas [13]. As a result, Pandaan District's agricultural land area decreased, resulting in a decline in food production due to land conversion [14]. Therefore, efforts have been made to manage land-use change in the sustainable agriculture land (Lahan Pertanian Berkelanjutan/LP2B) in Pandaan District program [14]. The law's establishment can preserve productive agricultural land and avert widespread agrarian land conversion to non-agricultural land.

The LP2B policy is land protection inextricably linked to an area's spatial planning, mainly rural areas. Securing agricultural land will be possible to identify which areas are designated for food agriculture. Control of agricultural land's function via LP2B is the government's control of land conversion through a variety of mechanisms, including disincentives, incentives, and the mechanism of an agreement, as well as protection and extension [15]. Determining one of the incentives and disincentive instruments is accomplished by awarding or sanctioning someone who violates or continues to convert agricultural land. For example, providing incentives to individuals who have contributed to preserving their agricultural lands, such as tax breaks on land and buildings or the provision of agricultural infrastructure [16]. On the other hand, those who violate agricultural land regulations face sanctions for their actions [17].

This study aimed to ascertain the effect of incentives on agricultural land conversion to non-agricultural land in Pandaan District, Pasuruan Regency. The conversion of agricultural land to non-agricultural land has been occurring quite rapidly in Pandaan District due to toll roads and the district's strategic location between Malang and Surabaya. According to previous research, three factors influence people's decisions about land-use conversion. The first is that trust in the investor impacts agricultural land conversion [12], the second is the influence of place attachment [18], and the third is influence place dependence [14], which will reduce the decision to change the land.

2. Methods

2.1. Data Collection Method

Primary survey aims to obtain data from the researchers' observations through observations and interviews, using questionnaires. The following is a primary survey conducted by the researchers in Pandaan District, Pasuruan Regency, East Java, Indonesia.

2.1.1. Observation is an effort to collect data through a direct inspection to the place to be studied [19]. The purpose of observation is to provide a snapshot of the variables being studied—the results are the documentation and notes about the object being studied.

2.1.2. An interview is one method of data collection through questions posed to the respondents. Interviews were conducted by making a list of questions that would then be answered according to the respondents' thoughts. The purpose of the interviews was to find out about the owner of the LP2B land in Pandaan District and find out more about the desire of the LP2B landowner that drove their decision to change their land. Based on the calculation of the owners of the agricultural land, 500 respondents were selected as the sample.

2.2. Descriptive Analysis

In this study, the decision to maintain land in question is the respondent's attitude to maintain the respondent's agricultural land. The intention to change land is measured using statements that the
respondents score. The statements indicators related to the decision to change the land that the respondents must score are as follows:

1. I will defend the land if there is an incentive.
2. I will not defend the land if I am not given incentives.
3. Without incentives, I still retain land.
4. I am not going to defend the land, whether there is or there is no incentive.
5. I keep the land when it is bought by investors even though there is no incentive
6. I will still sell the land when purchased by investors, even though there is an incentive.

Indicators 1, 3, and 5 indicate that the respondent will maintain the land, while indicators 2, 4, and 6 indicate that the respondent will sell/convert the function of the land. Each respondent gave a different response from each statement on the questionnaire. The form of statements submitted by respondents is in the form of a scale of 1 to 5, with 1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree.

The results of the respondents' responses were classified to determine whether, with incentives, the owners of agricultural land in Pandaan District were willing to maintain their agricultural land or still wanted to change the land. Before classification, the results of all calculation scores were converted into units of 100 in order to simplify the calculation. Based on this condition, the score range starts from a score of 20 to 100. When all percentages of respondents' responses have a value of 1, 20 is calculated. If all respondents' percentage responses (100%) have a value of 5, a score of 100 is obtained. The following is the result of the respondent's statement regarding the desire to change their land. The classification of score levels can be seen in Table 1.

| Score Scale Range | Explanation | Attitude                  |
|-------------------|-------------|---------------------------|
| 20–46.67          | No effect   | Changing farmland         |
| 46.7–73.33        | Neutral     | Neutral                   |
| 73.4–100          | Take effect | Defending farmland        |

Source: Analysis, 2020

3. Results and Discussion

3.1. Food-Farming Land Condition
The area of agricultural land in Pandaan District, based on 2018 Pandaan District in Figures, is 2,847 hectares, with the largest rice fields located in Sebani Village, Sumbergedang Village, and Tunggulwulung Village. An area of 2,602.5 hectares of agricultural land is technically irrigated rice fields, while the rest is semi-technical and non-technical fields. The highest land conversion occurred in Pendaan and Jogosari villages. Most of the agricultural land for food has been converted into housing and factories. Meanwhile, in the villages where the Gempol–Pandaan toll road passes, the agricultural land for food has turned into toll roads.

3.2. Characteristics of Respondents
The respondents in this study were agricultural-land owners who live in Pandaan District. All respondents are members of farmer groups in each sub-district in Pandaan District. There are 89 farmer groups spread across all sub-districts in Pandaan District. The number of respondents selected for the sample was 500. Each respondent has different characteristics and their understanding of LP2B and incentives also varies. Furthermore, the characteristics of respondents are described in more detail in the following sub-chapters:
3.2.1. Age
The respondents who own agricultural land in Pandaan District have various ages. The age of the research respondents consisted of those aged 28 to 83. The farmers in Pandaan District are residents of productive age and elderly. Only a few farmers are young, 81 farmers were aged 25 to 40, equivalent to 16.2% of the total respondents. The farmers who own agricultural land in Pandaan District are mostly 41 to 45 years old, a total of 126 people; whereas 117 people were aged 46 to 50. This amount is equivalent to 48.6% of all farmers who own agricultural land in Pandaan District. While the least number of farmers who own agricultural land is the age group of 76 to 85 years old, which consisted of only two people: an 80-year-old and an 83-year-old farmer who own land in Nogosari Village.

3.2.2. Livelihood
The livelihoods referred to in the study consist of main and side livelihoods. Most of the respondents who own food farms have a main job as farmers, while the side jobs varied. The main livelihoods of respondents who own agricultural food land were primarily farmers, as many as 341 people or equivalent to 68.2% of all agricultural land owners. The other 159 respondents, or equivalent to 31.8% of the total respondents, were farmers who own agricultural lands with other livelihoods. Based on Figure 1, it can be concluded that from all respondents, the number of respondents who consider farming their only livelihood is more than the farmers who both own agricultural land and other livelihoods.

![LAND OWNER'S SIDE JOB](image)

**Figure 1.** Farmers owning farming land with side jobs

**Sources:** Primary Survey, 2020

3.3. The relationship between land area and income
The area of land owned is one of the factors that influence farmers’ income. The income in question is a combination of the respondent's main and secondary income. The respondents whose main livelihood is farming make income from agricultural land as their main income, while respondents who have other livelihoods may make income from agricultural land as a side income.

Based on the calculation analysis, it can be seen that, in Pandaan District, the income will be proportional to the area of cultivated agricultural land. The respondents with a land of 100 m$^2$ to 200 m$^2$ have an income of less than Rp2,000,000.00, while the respondents with land of more than 1 ha have an income of Rp8,000,000.00. The respondents who make their main livelihood as farmers and use agricultural food land as their main source of income argue that the larger the land used for agriculture, the higher the operational costs. Weak supervision over the use of production factors, such as seeds, fertilizers, medicines, limited supply of labor, and limited capital stock to finance agricultural businesses will reduce the efficiency of land management. On the other hand, a narrow area of land leads to better efforts to control production factors, with adequate use of labor, and insignificant capital availability. This implies that agricultural businesses like this are often more efficient. Therefore, it is possible that, when the harvest season arrives, the quality of rice in a narrow area is better than the quality of rice in a large area.
3.4. Incentives Received

Incentives are awards for farmers who maintain and do not convert their land for sustainable food agriculture (PP No. 12 of 2012). Each sub-district in Pandaan District receives agricultural incentives, ranging from agricultural tools and machinery, agricultural infrastructure, fertilizers, and seeds.

The incentives received the most by farmers in Pandaan District are tractors, fertilizer subsidies, and rice seeds. Almost all sub-districts in Pandaan District received these three incentives. Even though they have received these incentives, the farmer groups in Pandaan District are not satisfied with the quality of the existing agricultural assistance. Several problems were found related to the provision and maintenance of agricultural equipment assistance. For example, there were still members of farmer groups in Kemirisewu, Durensewu, Jogosari, and Pandaan villages who felt that they had never received agricultural incentives. This shows that the provision of incentives to farmer groups was less transparent. Damage to agricultural equipment also occurred in several villages, such as the assistance of electric hand spray in Durensewu Village, which is currently no longer functioning. In addition, the assistance of drilled wells in Karangjati Village is currently abandoned because it cannot release water due to the construction of the toll road. This shows that some farmer groups cannot maintain incentives for agricultural tools and machinery regularly.

The incentives most needed by respondents are seeds, fertilizer subsidies, and agricultural tools and machines. Currently, the respondents were left dissatisfied with the rice and corn seeds’ quality because poor seed quality will also affect crop yields and farmers’ income. The respondents expected that with the determination of agricultural land as LP2B, the government could regularly provide assistance or incentives with better quality and regular monitoring and evaluation.

The agricultural land has fertile land, which translates to good agricultural results. Only the sub-districts in the east of the Pandaan District, such as Karangjati, Wedoro, and Banjarkejen Villages, can produce secondary crops. Agricultural-land owners in the sub-districts are willing to maintain their land for good-quality rice and corn seeds, fertilizer subsidies, and financial assistance. The sub-districts with active farmer groups, such as Karangjati Village, Tawangrejo Village, Sebani Village, Tunggulwulung Village, and Jogosari Village, are willing to defend their land themselves, as long as the farmer group regularly coordinates with the Agricultural Extension Center, and problems in agriculture are resolved. The same criteria apply even if the land in question is fertile, produces plenty of crops, and benefits from incentives. If the agricultural landowner is satisfied with the offer price, there is a possibility that the land is sold. Other factors that influence the respondents to convert their land include the rising operational costs. Due to the water from drilled wells being curtailed due to the construction of toll roads, property owners have come to believe that agriculture revenue is unlikely.

There are four villages that, for their reasons, wish to retain agricultural land and not develop it. The villages are Banjar, Kebonwaris, Petungsari, and Kutorejo. Agricultural land in Banjarsari Village and Kebonwaris Village have a lot in common. The farmland in the village is good and, thus, has favorable agricultural outcomes. Active farmer groups distributing aid and holding meetings effectively create an attachment to agricultural land, which results in a reluctance to sell. Additionally, the majority of respondents obtained farmland from the inheritance system. The sale/conversion of land can be discouraged because family inheritance means processing the land. Meanwhile, in rural areas, such as Petungsari Village and Kutorejo Village, the attitude of keeping agricultural land was because of family inheritance. Landowners in Petungsari and Kutorejo villages maintained their land because the location of agricultural land is valuable. Landowners will not want to sell their land shortly but will be ready to sell it in a few years.

3.5. The decision to Maintain Land

In this study, the decision to maintain the land in question is the respondent's attitude to maintain the respondent's agricultural land. Based on the calculation of the respondents’ answers in the questionnaire survey, the score is: (i) A score ranging from 20 to 46.67 indicates that incentives do not affect the respondents in maintaining agricultural land. Hence, they tend to sell or convert agricultural land. (ii) The range of scores from 46.7 to 73.33 indicates that the respondents are neutral, meaning
that factors other than incentives make respondents tend to maintain or change agricultural land. The factors in question, for example, the respondents will continue to sell land if the price of land offered is high, or the respondents will sell the land because the existence of a toll road increases agricultural operational costs, and so on. (iii) The range of scores from 73.4 to 100 indicates that the respondents tend to maintain agricultural land. The calculation of the Average Value of Attitudes towards Land Development is in Table 2.

| Indicators of Respondents' Attitudes towards Land Development | Score Value |
|---------------------------------------------------------------|-------------|
| I will defend the land if there is an incentive (K1)          | 79.48       |
| I will not defend the land if I am not incentivized (K2)       | 63.16       |
| Without any incentives, I will keep the land (K3)             | 69.40       |
| I will not defend the land, whether there is or there is no incentive (K4) | 51.44 |
| I still keep the land when it is bought by investors even though there is no incentive (K5) | 60.40 |
| I will still sell the land when it is bought by investors even though there is an incentive (K6) | 60.68 |

Source: Analysis results, 2020

Based on Table 2, it can be seen that the K1 indicator: "I will defend the land if there is an incentive" has the highest score, which is 79.48. Incentives were given to owners of agricultural land in Pandaan District influences farmers to defend their land. Most of the respondents in Pandaan District chose to maintain their agricultural land when given incentives. This is because the respondents in Pandaan Subdistrict work as farmers and have productive agricultural land that must be processed. Landowners' income can be increased by agricultural land yields. The majority of respondents received incentives in the form of rice and corn seeds, fertilizer subsidies, and tractors. The respondents in Pandaan District are desperate for this incentive because it directly impacts their agricultural yields and income.

Indicator K4, “I will not defend the land, whether there is or there is no incentive” has the lowest score, which is 51.44. This is because the average respondent in Pandaan District will consider selling/converting land and choosing to maintain agricultural land if there is an incentive. Owners of agricultural land in Pandaan District depend on their agricultural land; they are reluctant to convert agricultural land because the land is a family inheritance that must be processed. The productivity of their agricultural land also influences the respondents' income.

4. Conclusion
Providing incentives to landowners in Pandaan District will encourage them to protect and improve their agricultural land. When presented with stimuli, most respondents in Pandaan District chose to keep their agricultural land. They needed incentives since the respondents in Pandaan Subdistrict are farmers who own and operate productive agricultural land. The larger the farmland, the more increased the income of landowners.

Besides incentives, other factors influence the respondents' decisions in keeping or selling/changing their agricultural land. The following are villages that were not affected by the incentives: Plintahan Village, Durensewu Village, Nogosari Village, Banjarkejen Village, Karangjati Village, Kemiriwewu Village, Jogosari Village, Pandaan Village, Sumbergedang Village, Sebani Village, Tunggulwulung Village, Tawangrejo Village, Sumberejo Village, and Wedoro Village.
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