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Land Conversion and Farmers Preference[1]

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Abstract

This paper reports the assessment of what factors determines farmerøs decision to convert their farm land (rice field) into other uses, especially business and residential. We sampled 40 farmers in Sleman Regency, Yogyakarta as a case. In addition to their social characteristics, we asked them the willingness to accept for their land if someone else wants to buy and convert it into other uses (residensial or business) and how much the compensation their asked if the regency of Sleman ask them to preserve it.

Based on the farmers expected return from their farming and their social characteristics, we found that farmers tend to preserve their land. This decision is supported when they have other sources of income, farm their own land, have larger size of land, and the further from the urban. Such information is useful to the Regency of Sleman once it needs to preserve its farming area to increase the water catchment and the reduce of the green house effect of converting the farm land (rice field) into residential or business. This is true to the fields close to the urban areas.

Keywords: land conversion, future price, farming, and sustainable farm land

1. Introduction

Research on Agriculture Use Value has been done for years. Shi et al. (1997:94) for example, found that income from farming, capital gain and the impact of urban growth determine the farm land value in West Virginia. The expected future development of land was applied in Orange County, California, (Plantinga dan Miller (2001:58). The value of land may be derived from the expected flow of income from farming and from non farming activities. The difference between the optimal value of the land and the income flow from farming is the Value Development Right. Livanis et al. (2005:3) developed further the VDR including the capital gain if land is converted into the urban. Hailu and Brown (2007:151) employed the Growth Equilibrium Model showed that the population growth, employment and per capita income from the neighboring farm land determine the farm land value in Maryland, Pennsylvania and West Virginia. Variation in the factors influence the land value and the method of estimating them indicate that there is no single factor and method that can be applied to any farm land. Research in this area is important to the fast growing region with high farm land conversion.

As experience in the other growing cities, Sleman regency also has a high land conversion rates. Between 2005 and 2008 the land conversion rate was 2 percent. The number of land conversion application was also ranked the highest in 2008 (204), with the wetland farm land size up to 81,762 meter square and 8,324 meter squares dry land.

Undervaluing the land is the common factor determines the high conversion rate. The failure to internalize the externalities and the growth of the urban area raise the farmland conversion, (Hailu dan Brown, 2007:149). Even if the government set the area be the land conservation area, incomplete information about compensation also keep the land conversion rate increasing. This paper reports the assessment of what factors determines farmerøs decision to convert their farm land (rice field) into other uses, especially business and residential. We sampled 40 farmers in Sleman Regency, Yogyakarta as a case. In addition to their social characteristics, we asked them the willingness to accept for their land if someone else wants to buy and convert it into other uses (residential or business)

and how much the compensation they ask if the Regency of Sleman ask them to preserve it.

In general the size of the land, the distance between the land and the closes road, education, age, share of income from farming, and the number of child determine the level of willingness to accept and the compensation. Moreover, based on their expected return from the farming and their social characteristics, we found that farmers tend to preserve their land. This decision is supported when they have other sources of income, they are getting older, have smaller number of child, and have higher education. Such information is useful to the Regency of Sleman once it needs to preserve its farming area to increase the water catchment and the reduce of the green house effect of converting the farm land (rice field) into residential or business. This is true to the fields close to the urban areas.

One difficulty the farmers experience are how to determine their expected income (return) from their farming. This is because of their limited information on future prices. Moreover, the monopsonist practice in buying the paddy limit the option the farmers have in setting their selling prices that limit the value of income stream from their land.

We propose that should the Regency of Sleman and other need to preserve their farm -lands, they could do so by increasing the opportunity of young farmers generation to obtain better education and out of farm jobs. In short, providing better information about price to farmers and improve the competitive market of paddy can increase the farmers expected income and the likelihood to preserve their land.

This paper is outlined as follows. Next, we discuss the methodology followed by the data used for this research. Section four discusses the estimation results and the last section, section 5, concludes.

2. Methodology

One way to assess the acceptability of a program is the Random Utility Model. This model can be used to elicit the choice or decision of the land owner on what the highest value to their land to respond the land conversion program (discrete choice model Miller et al. 2008:4 also Lancaster 2008:). The decision made by the land owner will be the maximum, minimum, or any value of their land. In their model, the preference of individual (i) on choice a is written as

$$U_a^i = V_a^i + \varepsilon_a^i$$

V_a^i explicit characteristics of the farmers
ε_a^i random factors.

The RUM model thus is

$$V = X\beta + \varepsilon$$

V be factors determine the land owner decision to maximize their utility. These include land characteristics, social-demographic and also other personal characteristics.

Thus, the decision to conserve or not to conserve or acceptance to the program is model in a logistic function. (Miller et al. 2008:5 dan Dorfman et al. 2009:125).

$$\ln[P_i / (1 - P_1)] = \alpha + \beta_1 Luas + \beta_2 Jarak + \beta_3 Usia + \beta_4 Edu + \beta_5 Porsi + \beta_6 Garap + \beta_7 Anak + \varepsilon$$

where :
1. $\ln[P_i / (1 - P_1)]$ be the log odd ratio to accept the conservation program (1= accept the program, 0= not to join the program)
2. constant be the minimum log odd ratio
3. *Luas* be the land size (meter squares)
4. *Jarak* distance between the farmland and the main road Yogyakarta-Godean (kilometer)
5. *Usia* age (year)
6. *Edu* education (Elementary=6, Secondary=9, High school=12, Diploma=15 and Bachelor=17)

7. *Porsi* share of farm income to the total farm income
8. *Garap* a *dummy vaiable = 1 if the farmer farms his own land =0 if the farmer farms other people's land.*
9. *Anak* number of children in the family
10. *ε* random error

3. Data

Primary sample data is used in this research. First, all of the famers in the farm land block are given an open question about their opinion on land conservation and the size of land. We then selected the first class land and plan to do a simple random sampling on these farmers having the first class land. But not all of the farmers can answer the question. We finally interview only farmers who can answer the question. We start with the head of the farmers group followed by the most experienced farmers.

We visit farmers two times. At the first stage, we collect information necessary to estimate the value of their land. Then, we revisit them to ask their willingness to join the program.

The distribution of the selected farmers is as follows: in the block Bulak Kruwet there are 6 (six) farmers, block Bulak Sumberan 8 (eight) farmers. Block Bulak Ngentak Ponggok 8 (eight) person, Bulak Sumbersari 14 (fourteen) person, and Bulak Kaliurang 5 (five) persons. So that the total respondents is 40 (forty) persons. All of the farmers are in the sub regency of Moyudan Kabupaten Sleman.

4. Results and Discussion

As mentioned, the analysis consists of three stages: first, we estimate the optimum land value and the land value it self. Based on these calculation, we define the different is the value development right. Then, we ask farmers if they would joint the conservation program by using the value of development right as a base for compensation. Finally, we characterize who will accept the offer price, the value development right, as a base for compensation. The results are as follows.

First, we estimate the optimum land value. We use the average projected farm income of all 40 farmers. We found that the income share only 39 percent of the optimum land estimate by farmers. Thus, the 61 percent attributed to the non-agricultural use. The distance to the city opens the possibility of converting the farm land into residential and business.

As Plantinga and Miller (2001) mentioned, the *Non-Agriculture Use* also fall into the *Value Development Right*. In this research, we calculate the value development right is the different between the land value and the optimal land value. The optimal land value is the owner expected value based on the best alternative land use under the current information available to the farmer. In practice, such calculation is difficult task to farmers, therefore we use the offer price as if some one will buy the land. We assume that the buyer will use the land for non farming activities, but for residential of business. The estimated coefficients are as follows:

Table 1. The Percentage Land Value per Block

No	Block	The Average Land Value	The Average VDR	The Optimum Land value
1	Kruwet	29	61	100
2	Sumberan	40	60	100
3	Ngentak	30	70	100
4	Sumbersari	48	52	100
5	Kaliurang	27	73	100

Source: author estimation based on the survey. These complete estimation can be obtained from the authors upon request.

The above value indicates that Sumbersari experiences the least threat from the urban growth because its land

value is about the same as the VDR. The higher the VDR indicates that the farmer has high expectation (value) on non farming type of land use. Consequently, the higher the VDR the higher the compensation requested by farmer to conserve their farmland.

Second, the land value based on the *Agriculture Use Value* and the *Value Development Right* are used to offer the farmer would their join the land conservation program. In this case we use simple contingent valuation, offering a *discrete choice* to the farmer with *single bounded / take it or leave it* method whether to joint or not to joint the program. We ask the farmer three questions:

1. will the farmer joint the conservation program even if the income from farming is lesser than that of other income?
2. will the farmer joint the conservation program even if the income from farming is not as good as that of other income and the government compensation to those who joint.
3. those who joint the program, will he change his mind if the offering is set between the minimum and maximum VDR forever.

From the above scenarios then we ask the farmers if they would accept the offer price. All of the farmers agree to conserve their land but when it comes to the compensation they have different opinion. Those who decide to join the program means accept the offer price but those who refuse means asking higher price. From 40 farmers, 21 of them agree to accept the VDR as a base for compensation while the 19 farmers asking for higher price.

Finally, the Logistic model is used to estimate the probability (the odd ratio) of willingness to accept the program in relation the characteristics of the farmers. The summary of the estimated parameters are reported in the following table.

Table 2. Estimated parameters of the Farmers Willingness to Accept the Program

No	Variabel	Koefisien	Std.Error	Z Statistik	Prob
1	Konstanta	1.881507	5.696991	0.330263	0.7412
2	Luas	0.002137	0.001058	2.020695	0.0433
3	Jarak	-0.000759	0.000489	-1.550985	0.1209
4	Usia	-0.042977	0.075173	-0.571717	0.5675
5	Edu	-0.029217	0.190776	-0.153149	0.8783
6	Porsi	-5.387334	2.155851	-2.498936	0.0125
7	Garap	2.908922	1.581772	1.839027	0.0659
8	Anak	-0.141493	0.328977	-0.430099	0.6671
	Mc.Fadden R²	0.499512			
	LR	27.64884			0.000255

Notes: To save some space we do not include the detail of the estimation results. These can be obtained from the author upon request.

We found that the size of the land (Luas), the proportion of farm income to the total (Porsi), and Garap which represent whether the owner or somebody else do the farm determine the likelihood of the farmer to joint the program. Other variables, distance (Jarak), farmers education (Edu), number of children (Anak), and the farmerøs age (Usia) do not significantly influence the likelihood of the farmer to joint the program.

The higher the size of the land increases the probability for farmer to accept the program. The larger the land size the higher the land value that may increase the portion of the land value to its total. Therefore the value development right will be small that increase the probability of accepting the program since the alternative (the offer) is not so appealing. Also those who has small land size maybe the farming income is also a small portion to the total income. Selling the small land size for non farm type of use will benefit the most. We confirm that the higher the portion of the income from the farming (Porsi) the higher the compensation the farmer want, if they have to conserve. When farmer do the farming, they tend to keep them or will likely to conserve.

5. Conclusion

This paper reports the assessment of what factors determines farmer's decision to convert their farm land (rice field) into other uses, especially business and residential. We sampled 40 farmers in Sleman Regency, Yogyakarta as a case. In addition to their social characteristics, we asked them the willingness to accept for their land if someone else wants to but and convert it into other uses (residensial or business) and how much the compensation their asked if the regency of Sleman ask them to preserve it.

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