



Factors Influences Farmers Desire to Agricultural Land Conversion in Indonesia using Structural Equation Model Analysis

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Abstract

The objective of this research is to know what factors can influence the farmers to convert his farmland for the purpose of land conversion near the trans-Java toll road. The research uses a survey on Gantar and Terisi District in Indramayu Regency, West Java Province, Indonesia. A sample of 408 farmers from ten farmer-groups has been drawn using the cluster method. The Structural Equation Method (SEM) has been used in the statistical analysis. The dependent variable is the farmer's desire to convert his farmland. The independent variables are three latent variables with 11 observed variables. The latent variables are location, agricultural environment, and lifestyle perception. The findings of this research are unique, and novel compared to other researches on agricultural land conversion. The uniqueness and novelty of this research is that first, it finds the internal factors why farmers convert their farmland. Second, this research uses the quantitative method with SEM analysis in farmland conversion. The SEM is commonly used in management research. Third, the finding of the research is essential for food security in Indonesia because the research has been conducted on Java Island. Java Island is the most strategic area for rice production in Indonesia. The island comprises only 6.8 percent of Indonesian land area but produces more than 50 percent of the rice. Rice is the most strategic staple food in Indonesia. In the future, if most agricultural land is converted to residential and industrial area in the north Java Island, the future of food security in Indonesia may be jeopardized. The findings of the research indicate that to dissuade the farmers from converting their farmland we need to implement programs to improve the agricultural environment and promote a better life in the rural community. The program can prevent the farmlands from being converted to non-agricultural land and maintain food security thus shielding from the impact of the development of the trans-Java toll road.

Keywords: *Agricultural Land Conversion, Food Security, Indonesia, Structural Equation Model, Trans-Java Toll Road*

1. Introduction

The food security in Indonesia now is under threat. The most strategic area of food production in Indonesia is Java Island. This area comprises only 6.8 percent of Indonesian area [1], but produces more than 50 percent of the food [2], especially the northern area.

Land conversion in this vital agricultural area is now increasing because of the development of the trans-Java toll road. According to Sayaka and Tarigan (2011) [3], in 1999-2002, 73.71 thousand hectares of agricultural land in Java was converted. This comprised 71 percent of all the land conversion in Indonesia. From Irawan's research (2011) [4] the areas with the maximum conversion in west Java are Bekasi, Karawang, Subang, and Bandung regency. All these areas are near the toll-road. Thus, we can conclude that the toll road can impact agricultural land conversion in Indonesia.

The trans-Java toll road passes through northern Java, the most productive land area in Indonesia. That means conversion of agricultural land in that area is happening more rapidly. The development of the trans-Java toll road can impact the land near the toll road since it can be used more profitably in non-agricultural businesses like construction of a residential or an industrial area. The price in the area adjacent to the toll road has increased by 100 percent in only one year [5]. The price of land is rising in this area because the land near the toll road, especially near the toll gate, is valuable for residential or industrial purposes. This profitability entices the farmers to convert his farmland to non-agriculture land.

Converting agricultural land to non-agricultural land in northern Java, can lead to the disappearance of farmlands here in the long run. This phenomenon will threaten food security. The future food sovereignty in Indonesia may only be an elusive dream.

A program to ensure food security needs to be put in place. That means the government must have a plan to contain the conversion of agricultural land near the trans-Java toll road. The program must support the research of the factors responsible for the farmer's desire to convert agricultural land to non-agricultural land. The object of this research is to know what factors influence the farmer who converts his farmland to non-agricultural land.

2. Theory

Theory is needed to compile the hypothesis for this research. The location of the farmland is the factor that influences farmers who tend to convert their farmland to non-agricultural land. According to the study by Irawan (2011) [4], the districts near the toll-road are more apt to be converted to non-agricultural land compared to other regions. That means the proximity to the road is a factor behind farmer's conversion of his farmland. The proximity to the road makes the farmland more profitable commercially since it can earn huge rent [6]. Because the farmland is more beneficial for non-agricultural business, then the farmers have the desire to convert the farmland for purposes like residential area or industrial and services business area.

The agricultural environment is another factor that can influence the farmer to convert his farmland to non-agricultural land. If the environment is not conducive to agricultural business, the farmer thinks of converting his farmland. Many researches like Azadi (2010) [7], Harini (2012) [8], McDonald (2011) [9] used the agricultural environment as one of the variables that can impact the conversion from the agricultural land.

Lifestyle or physiological factors that the desire of farmers to live in the city and work in the industrial and service sectors can impact their desire to convert their farmland. The research of Firman (1997) [10] indicates that the socio-economic development in the city can affect agricultural land conversion in the north of Java. Another study of Permatasari (2016) [11] suggests that the expansion of industrial area can impact the agricultural land conversion.

3. Method

This research uses the survey method. The location of this research is Gantar and Terisi District, Indramayu Regency, West Java Province, Indonesia. The west Java province is selected because the trans-Java toll road is operational here [12]. The Indramayu Regency is chosen because this district has the most significant rice production in West Java Province [13]. The Gantar District is selected because this district has the highest rice production in Indramayu Regency [14]. The Terisi District is chosen because the trans-Java toll road and the toll gate passes through this district. Previous researches for different purposes have also been carried out at this location.

The data is taken from paddy farmers as respondents. The cluster method is used. The Primary Sampling Unit (PSU) is a farmer-group. The research takes five farmer-groups from Gantar District and five farmer-groups from Terisi District. The farmer-groups are randomly selected. Respondents include all members of the selected farmer-groups and are taken by census. From the chosen farmer's group, 408 farmers were selected as respondents.

The Structural Equation Model (SEM) is used for analysis in this research. The dependent variable (Y) is the farmer's desire to convert his farmland. The latent independent variables are the location (X1), the agricultural environment (X2), and lifestyle perception (X3). The observed variables of location are the proximity to the road (X11), the proximity to the trans-Java toll road (X12) and the traffic on the road (X13). The observed variables of the agricultural environment are competition for the farm business of this area (X21), the land size (X22), the income from non-agriculture business (X23), and the cost of the farm business (X24). The observed variables of lifestyle perception are modernity (X31), the desire to work in a non-agriculture job (X32), the desire to be a cosmopolite (X33), and the desire to live in the city (X34). The data is ranked on an ordinal scale of one to five where one is the lowest and five is the highest. Amos version 20 has been used to analyze this research.

4. Result

The result of the SEM analysis is shown in Figure 1.

Table 1 shows the results of the SEM analysis of this research. The latent variables that are significant at the 95% confidence level are the agricultural environment (X2) and lifestyle perception (X3). The location X1 would be significant at a confidence level of 90%. However, the confidence level in this research is 95%, which means only the X2 and X3 latent variables are significant.

The observed variables of all X2 and X3 are highly significant which means that all the observed variables are good indicators for latent variables.

The variable of competition agribusiness in this area is the indicator for agricultural environment. This variable is positive significant, which means that competition among the farmers in food agribusiness can influence the farmers to convert their farmlands.

Another variable for the agricultural environment is the size of the farmland. This variable has a significant positive effect on the decision of the farmer to convert his farmland. The reason behind this decision can be analyzed in future research using the qualitative method.

Income from non-agricultural business can influence the farmer's decision to convert his farmland. If the non-agricultural business is more profitable, the farmer has the desire to change the business from an agricultural business to a non-agricultural one.

The rising costs of the agricultural business leads to decline in the profits of agricultural business. This positively impacts the farmer's desire to move out of the business of agriculture.

The desire to work in a non-agricultural job, to be a cosmopolite, and to live in the city is the same reason the farmer is not interested anymore to conduct business or work in the agricultural sector. Thus, the farmer tends to convert his farmland to non-agricultural business.

5. Discussion And Implementation

The results of the research indicate two primary reasons as to why the farmers desire to convert their farmlands. First is the agricultural environment owing to which the farmers perceive the agriculture business to be less profitable compared to the non-agricultural business. Second is the farmer's perception that living in the urban society and working in the industrial and service sector is more prosperous compared to working and living in the rural agricultural community.

The location is not a significant factor in the farmer's desire to convert his farmland, but the location provides an added incentive to farmers who desire to convert or sell their farmlands. The land near the toll road, especially near the gate, is more lucrative for building residential or industrial areas compared to farmlands. Moreover, according to Chung (2002) [15], the toll road has a negative effect on agricultural marketing in a rural area because it creates an "invisible wall" between the rural and other areas.

The land near the gate of the toll road is highly valuable land. So, businesspersons try to buy this land from the farmers at a high price to develop real estate. These high prices tempt the farmers who sell their land; then the businessmen convert the farmlands. After real estate has been developed on this land, the farmland near the newly built real estate increases in value. Thus, the conversion of the farmland becomes a continuous process.

The most productive farmlands to produce staple food in Indonesia lie in the northern Java region. For developing the trans-Java toll road alone, 4264 hectares of farmland have been converted [16]. The impact of the trans-Java toll road is predicted to go beyond the development of that toll road. This can be a consecutive year-by-year impact, and the effect may increase because of the multiplier effect. Unless this phenomenon can be contained through government programs, the farmlands in north Java may vanish in the future, and the food security in Indonesia will remain only a dream. Thus, food security in Indonesia is threatened in a big way.

The government of Indonesia must implement programs to deter the process of converting the agricultural land in the areas through which the trans-Java toll road passes. It may be impossible to completely stop the conversion process, but the programs must reduce the speed of the operation, so that it has the time to develop farmlands in another area. This will ensure that the food security of Indonesia is maintained.

The government has put in place a law for maintaining food security which is Law No. 41 [17] that forbids changing farmlands meant for food production to any other use. But the law must be promoted and popularized among farmers. The government must raise awareness on food security in all areas along the trans-Java toll road. This program can deter the conversion of the farmland meant for food production for non-agricultural purposes.

The purpose of the government program is to withhold agricultural land conversion by promoting the program among farmer-groups owning farmlands across the trans-Java toll road. The findings of this research about the factors that influence the farmers' desire to convert their agricultural land can be used to design the content of the program. The topics that can be used for the promotion are that farm business is still profitable and life in the urban community is not always prosperous. These topics are drawn from the results of this research. For more effectiveness, the program can also popularize Law No. 41 that forbids changing the farmland for other uses.

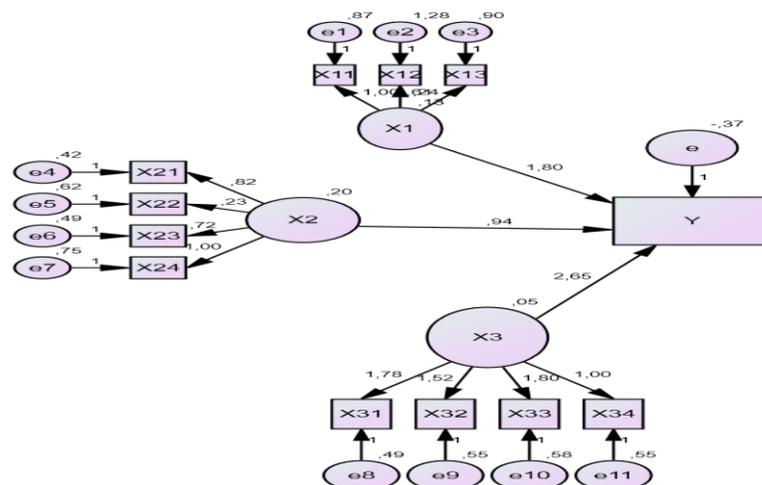


Figure 1: The result of the SEM analysis

The figure 1 shows the result of the SEM in this research.

Table 1: The Result

Variable			Estimate	P
X11	<---	X1	1	
X12	<---	X1	0,61	***
X13	<---	X1	0,245	0,05
X24	<---	X2	1	
X23	<---	X2	0,717	***
X22	<---	X2	0,231	0,049
X21	<---	X2	0,824	***
X34	<---	X3	1	
X33	<---	X3	1,804	***
X32	<---	X3	1,521	***
X31	<---	X3	1,776	***
Y	<---	X1	1,799	0,078
Y	<---	X2	0,94	***
Y	<---	X3	2,651	***

***) Highly Significant

6. Conclusion

The factors that influence the farmer's desire to convert his farmland are the agricultural environment and the perception of lifestyle. Agricultural environment means that food agribusiness is less profitable than the industrial and service sectors. Perception of lifestyle means the life in urban community is more prosperous than in the rural agriculture community. This insight can be used to form topics for the promotional program to deter the conversion of agricultural land in farm areas across the trans-Java toll road.

The program can reduce the negative impacts of the trans-Java toll road on agricultural land conversion. This program is vital for food security in Indonesia. Even though the Indonesian government does not have farmland conversion on its agenda, farmland conversion in the area around the trans-Java toll road has been increasing rapidly. The production of staple food in Indonesia has been decreasing rapidly because north Java has the most strategic farmlands in Indonesia.

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Reference

- [1] BPN.(2009). "Undang-Undang Nomor 41 Tahun 2009 Tentang Perlindungan Lahan Pertanian Pangan Berkelanjutan [Law No. 41 of 2009 on the Protection of Agricultural Land Sustainable Food]". Retrieved March 10, 2016 from <http://www.bpn.go.id/Publikasi/Peraturan-Perundangan/Undang-Undang/undang-undang-nomor-41-tahun-2009-888>
- [2] Bappenas. (2008). "Tol Picu Konversi Lahan Sawah [Toll-Road Trigger Rice Field Conversion]," [Online]. Retrieved on April 26, 2018 from <http://perpustakaan.bappenas.go.id/lontar/file?file=digital/kliping/TOL%20Picu%20konversi%20Kps.pdf>
- [3] H. Chung. (2002). Some socio-economic impacts of toll roads in rural China. *Journal of Transport Geography*, 10, 145–156
- [4] BPS Indramayu. (2017). "Luas panen, Produktifitas, dan Jumlah Produksi Padi di Kabupaten Indramayu Tahun 2013" [Online]. Retrieved May 31, 2017 from <https://indramayukab.bps.go.id/linkTabelStatis/view/id/13>
- [5] BPS Jabar. 2014. "Produksi Padi Menurut Kabupaten/Kota di Jawa Barat (Ton), 2009-2014 [Production of Paddy by Regency / City in West Java (Ton), 2009-2014]." [Online]. Retrieved July 4, 2015 from <http://jabar.bps.go.id/linkTabelStatis/view/id/135>
- [6] BPJT. (2016). Operate Toll Road. [Online]. Retrieved September 3, 2016 from <http://bpjt.pu.go.id/konten/en/progress/beroperasi>
- [7] Permatasari, P.A., Fatikhunnada, A. , Liyantono, Syartiniliaa, S., and Nurdiana, A. (2016). Analysis of Agricultural Land Use Changes in Jombang Regency, East Java, Indonesia Using BFAST Method. *Procedia Environmental Sciences*, 33, 27-35
- [8] Firman, T. (1997). Land Conversion and Urban Development in the Northern Region of West Java, Indonesia. *Urban Studies*,34(7), 1027-1046
- [9] McDonald, A. A., Liu, J., Harold, P., & Kress, K. (2011). A socio-economic-ecological simulation model of land acquisition to expand a national wildlife refuge. *Ecological Modelling*, 140 (1), 99-110
- [10] Harini, R., Yunus, H. S., Kasto & Hartono, S. (2012). Agricultural Land Conversion: Determinant and Impact for Food Sufficiency in Sleman Regency. *Indonesian Journal of Geography*, 44(2), 120-133
- [11] Azadi, H., Ho, P., & Hasfiati, L. (2010). Agricultural Land Conversion Drivers: A Comparison Between Less Developed, Developing and Developed Countries. *Land Degradation and Development*, 22(6), 596–604
- [12] Petit, C., Aubry, C., & Hall, E.R. (2011). Agriculture and proximity to roads: How should farmers and retailers adapt? Examples from the Ile-de-France region. *Land Use Policy*, 28(4), 867-876
- [13] Detik Finance. (2018). "Bakal Dilewati Tol Cinere-Serpong, Harga Tanah di Wilayah ini Meroket [Will Be Passed by Cinere-Serpong Toll, Land Prices in the Region are Skyrocketing]." [Online]. Retrieved April 18, 2018 from <http://berita.lewatmana.com/bakal-dilewati-tol-cinere-serpong-harga-tanah-di-wilayah-ini-meroket/>
- [14] Irawan, B. (2011). "Konversi Lahan Sawah di Jawa Barat: Kecenderungan dan Pengaruhnya Terhadap Produksi Padi Sawah [Conversion Wetland in West Java: Trends and Effect on Rice Production]." IPB Press. [Online]. Retrieved February 29, 2016, from <http://www.litbang.pertanian.go.id/buku/konversi-fragmentasi-lahan/BAB-IV-1.pdf>
- [15] Sayaka, B. & Tarigan, H. (2011). "Efektivitas Peraturan Dalam Mengendalikan Konversi Lahan Pertanian [Effectiveness of Regulation in Controlling Agricultural Land Conversion]," in *Konversi dan Fragmentasi Lahan Ancaman terhadap Kemandirian Pangan [Land Conversion and Fragmentation Threat to Food Self-Reliance]*. Jakarta: Penerbit IPB Press, 279-291
- [16] Kementan, "Aplikasi Data Base Lahan [Appliation Land Data Base]," 2015. [Online]. Retrieved February 5, 2016, from <http://prasarana.pertanian.go.id/lahanmy/>
- [17] BPS. "Badan Pusat Statistik [Central Bureau of Statistics]." 2015. [Online]. Retrieved May 2, 2015, from <https://www.bps.go.id/site/resultTab>