

The Factors of Rice Farmers' Poverty in Indonesia: The Perspective of Land Conversion, Land Ownership Area, and Agriculture Technology

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ABSTRACT Rice is very important as Indonesia's main staple. It contributes a lot to the national expenditure where more than 80% of households of every social class consumed rice. There is a high demand level for rice but there is a limited number of farmers. Of 70% of households in rural that work in the agricultural sector, only 50% grow rice, and most of them are poor farmers. Almost 52% of Indonesia's rice is produced at Java Isle. However, production growth is only 0,7% given the rapidly increasing number of people and land conversion over the past 7 years. Most Indonesian farmers are classified as small farmers has average land ownership of only less than 0.5 hectares, making them can't innovate and only can fulfil their basic needs without saving for investment. This is made worse by around 35% of farmers don't own their land. Technology usage also become an issue where 85% of farmers don't use internet and 45% are not used in using mechanical technology. The purpose of this research is to find the effect of paddy land conversion, land ownership area, and agriculture technology on farmer's poverty in Indonesia. By using multiple regression method on 6 independent variables data from all Indonesia provinces, we found that the most significant variable to reduce farmer's poverty is land ownership area. The statistical result is supported and cross-checked by data and related policies from literature review, and interview with some stakeholders from Ministry of Agriculture, local government, paddy farmer representative, and agriculture instructor.

Keywords *Rice; Farmers Poverty; Land Conversion; Land Ownership Area; Agriculture Technology*

INTRODUCTION

The importance of rice as Indonesia's main diet can be seen both from the production and consumption sides. From the production side, Shahbandeh (2022) shows that Indonesia is the third largest rice producer country in the world with 35,3 million metric ton. The top two producers are China and India with 148,3 million, 122,27 million metric ton respectively. Although Indonesia is the third-largest country in terms of global rice production, the country

still should import from other countries almost every year. One of the reasons is because Indonesia has massive population with large per-capita rice consumption. The OECD-FAO forecast the human consumption of rice in Indonesia in 2022 to be around 123.5 kilograms per capita. (Statista, 2022)

Overall, from 70% of households in rural that work in the agricultural sector, only 50% grow rice and most of them are poor farmers. Mandang et.al (2020) stated that agriculture in Indonesia is still carried out by

millions of farmers with low education level, low land ownership, less capital, and low productivity. Due to this condition, many farmers sell their land to be developed into non-agriculture land use such as residential area, industry, and other facilities.

Ginsburg et al. (1991) stated that the major cities in the monsoon nations were mostly situated in regions where wet rice was produced. These cities were created through regional suburbanization processes in East Asia and Southeast Asia. These regions typically had high population densities that were comparable in density to cities in pre-industrial Europe because wet rice farming requires a sizable number of laborers. This old statement was supported by Daris, et al (2017) when he said that almost 52% of Indonesia's rice production is produced on the Java-isle. However, production growth is only 0,7% given the rapid increasing number of people in this island. One of the causes is the increasing land conversion over the past 7 years.

During 2016-2018 there was a significant decrease of paddy field area in Indonesia. The details of the data can be seen on the figure below.

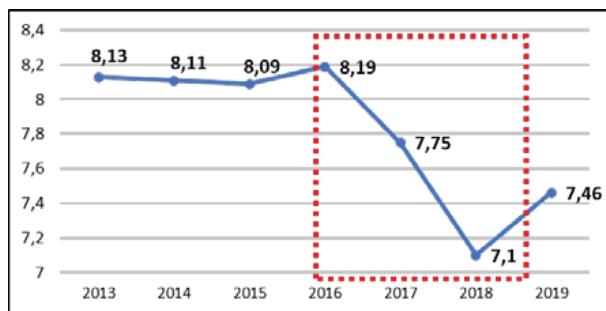


Figure 1. Paddy Field Area in Indonesia (Million Ha)

Source: Indonesia Statistic Central Bureau

Harini, et al (2012) stated that the land conversion phenomenon occurs due to the rising need for space for housing and

life fulfilment. Based on the necessities of life, people will tend to utilize land that has high economic value. United Nations (2018) mentioned that by 2018, the number of cities with at least 1 million inhabitants had grown to 548 and in 2030, a projected 706 cities will have at least 1 million residents. This phenomenon will have high potential to reduce existing agricultural land.

According to Sumaryanto et al. (1995) the negative effects due to land conversion are mainly on the loss of the opportunity to produce agricultural products such as income, employment, and related business such as rice milling and tractor business.

In terms of land ownership, Braun and Mirzabaev (2015) stated that Approximately 85 percent of the world's farms are smaller than 2 hectares that mainly located in Asia, particularly China and India, and Sub-Saharan Africa.

Average of agriculture land ownership in Indonesia gradually decreasing. The declining of land area could affect productivity level of farmers.

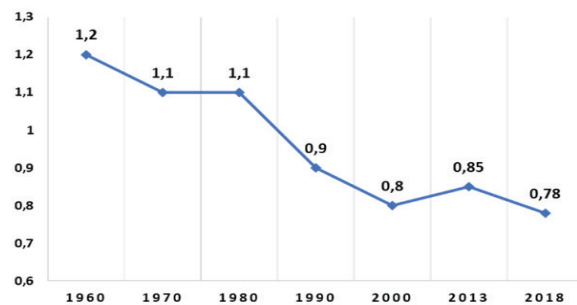


Figure 2. Average Agriculture Land Ownership in 1960-2018 (Ha)

Source: Indonesia Statistic Bureau, 2018

In term of ownership status there are 30% Indonesia farmers that don't have their own land, and regarding land area there are 77% of farmers with land ownership less than 1 Ha. Moreover, of all agriculture land, paddy

field ownership only contributes 0,18 Ha. The details can be seen on the figures below.

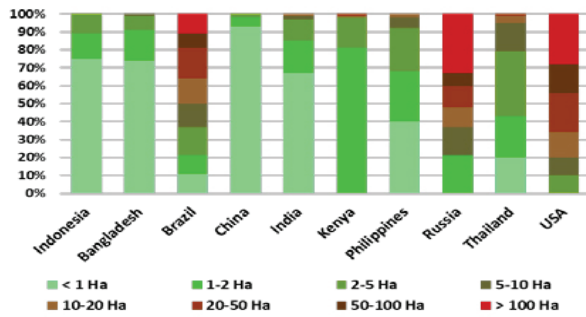


Figure 3. Proportion of Average Farm Sizes in Each Country

Source: Braun and Mirzabaev, 2015

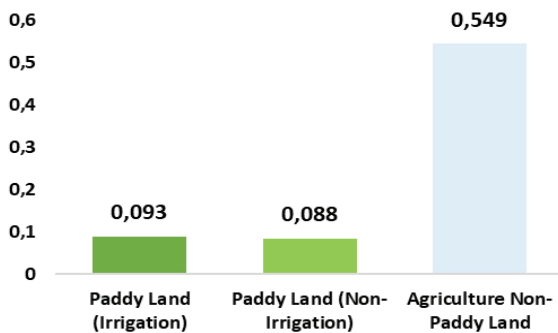


Figure 4. Average Agriculture Land Ownership (Ha)

Source: Indonesia Statistic Bureau, 2018

Area and status of land ownership have impact on farmers welfare. Susilowati and Maulana (2012) stated that the main cause of poverty in rural areas is because most of the farmers that classified as small farmers just has average land ownership of less than 0.5 hectares. Rondhi and Adi (2018) mentioned that farming on own land has the highest cost efficiency compared to profit sharing and rent.

Research by Koirala, et al (2014) about rice farmers in Philippines found that by increasing 1% of farm size can increase rice output by 4%. According to Untari and Herdjiono (2020), private land in Merauke Regency, Papua Province, is more economically efficient for paddy farming at 2.57% than leased land, which comes in at 2.51%.

Lastly, regarding agriculture technology Sehgal (2021) stated that Technology affects many areas of agriculture, such as fertilizers, pesticides, seed technology, irrigation, etc. Mechanization has led to efficient tilling, harvesting, and a reduction in manual labour. Irrigation methods and transportation systems have improved, processing machinery has reduced wastage etc., and the effect is visible in all areas.

Related to productivity, Soemarno et al (2016) stated that Paddy fields' productivity can also be affected by application of agrotechnology conducted by farmers in managing their farms. Moreover, Khamila (2019) mentioned that Indonesian agriculture has unique challenges compared to developed countries. Farmers, especially those who live in rural areas, don't have access to knowledge and industrial methods for effective and efficient farming, so it's difficult for them to increase their output.

Based on data from Indonesia Statistic Central Agency in 2018 only around 59% paddy field in Indonesia use irrigation, 85% farmers don't use internet, and 45% farmers are not used to operate mechanic technology. It shows that there are still a lot of farmers in Indonesia that haven't actively used technology in their activity. Therefore, it becomes one of main issues from government because technology usage contributes much to productivity.

Nowadays industry 4.0 and 5.0 trends are encouraging continuous improvement in agriculture through the use of digital and analytical tools (Sehgal, 2021). Emerging technologies like artificial intelligence, analytics, connected sensors, and others could boost yields even more, increase the

effectiveness of water and other inputs, and fosters sustainability and resilience in both crop cultivation and animal husbandry (Goedde, et.al, 2020). Related to internet connection for supporting smart farming, 4G coverage only covered 49,33% from all Indonesia land. There are still thousands village that haven't coverage by 4G connection (Kompas, 2020).

The objective of this study is to know the effect of some independent variables to one dependent variable. Therefore, author used deductive approach with quantitative analysis methodology. According to Creswell (2009), quantitative research is a way to test objective theories by looking at the relationship between different variables. These variables can be measured, usually using instruments, allowing numbered data to be statistically analysed.

The analysis method that is used in this research is multiple regression method. The method is used to calculate how much the effect of each variable that related to land

conversion, land ownership, and technology on farmer's poverty. Multiple regression is usually used to look for correlation from more than one independent variables to the dependent variable. Myers and Well (2003) said that the reason why multiple regression needed is at most research situations, there are many relevant variables, and more than one predictor needs to be considered.

Most of the research that are founded separately analyse between land use conversion, land ownership, and farmers poverty. Moreover, based on the location there hasn't been research with national macro level at Indonesia with this topic.

With the result from national perspective, some central government institutions such as Ministry of Agriculture, Ministry of Trade, and Indonesia Logistics Bureau can understand the situation in each region and can give different treatments in policy making for each region.

Below is the list of variables that are used in this research.

Table 1. Research Variables

Conceptual Variable	Operational Variable	Explanation	Source
Farmers Poverty	Percentage of Poor People on Agriculture Sector	Dependent Variable	Indonesia Statistic Central Bureau
Paddy Land Conversion	Percentage of paddy field area change	Independent Variable	Ministry of Agrarian dan Spatial Plan
	Paddy production	Independent Variable	Indonesia Statistic Central Bureau
Paddy Field Ownership	Average of Land Area Owned by each Household	Independent Variable	Indonesia Statistic Central Bureau
Technology	Percentage of paddy field with irrigation	Independent Variable	Indonesia Statistic Central Bureau
	Percentage of rural with asphalt road that connect main road with agriculture area	Independent Variable	Indonesia Statistic Central Bureau
	Percentage of Farmers Households that Use Mechanic Technology	Independent Variable	Indonesia Statistic Central Bureau

Source: Researcher Analysis, 2022

The basic formula of multiple regression for this research can be written as below.

$$Y_i = a + b_1X_{i1} + b_2X_{i2} + b_3X_{i3} + b_4X_{i4} + b_5X_{i5} + b_6X_{i6}$$

This research used secondary data as the main source of analysis. The data is collected from some institutional agencies such as Indonesia Statistic Central Bureau, Ministry of Agriculture.

This research used data in province level with exception of Jakarta province since there is no data regarding farmers poverty at the region. Moreover, there is only very small area of paddy field at Jakarta.

As for the primary data, it is used as supporting data for the analysis result. The data is collected from interview with some stakeholders such as staff from Ministry of Agriculture, paddy farmer representative, and agriculture instructor.

DISCUSSION

The Effect of Paddy Production and Land Conversion on Farmers Poverty

The first analysis result to be discussed is the effect of paddy production and land conversion on farmers poverty. The result of the statistical analysis can be seen on the figures below.

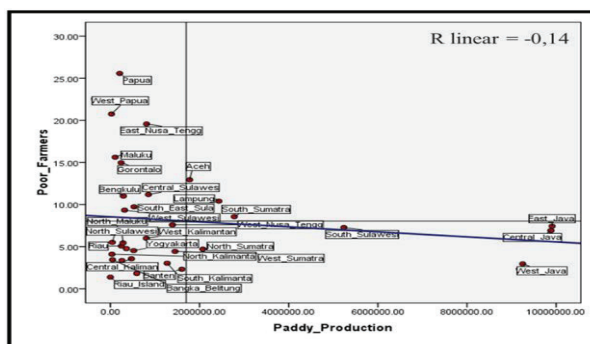


Figure 5. Scatter Plot Diagram of Paddy Production (Ton) and Poor Farmers (%)

Source: Researcher Analysis, 2022

Figure 5 shows that there is negative relationship of paddy production and farmers poverty although weak with R linear = -0,14. It means bigger the production leads to reduce farmers poverty level. National average of paddy production is 1.651.507 ton with West Java, Central Java, East Java, and South Sulawesi become the largest producer far higher than other provinces. It means that those regions are the core of paddy production in Indonesia. To visualize the data from regional perspective below are map of poor farmers percentage and paddy production in Indonesia.

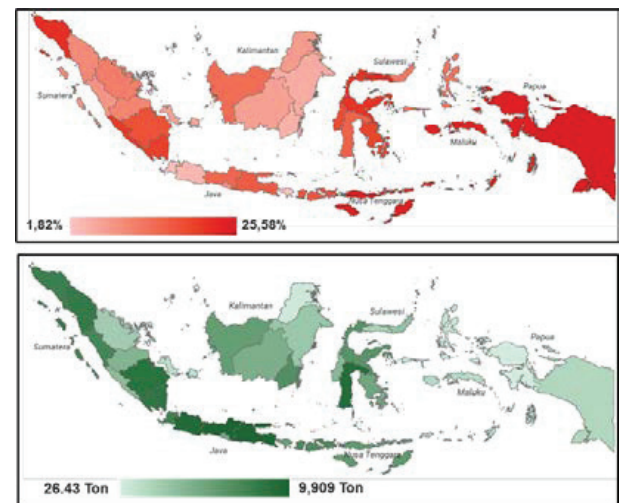


Figure 6. Map of Poor Farmers Percentage (Top) and Average Paddy Production (Bottom)

Source: Researcher Analysis, 2022

The maps above showed that in general, most of the poor farmers are located at eastern part especially Papua, Sulawesi, Nusa Tenggara, and Maluku while most of the paddy production are located at western part especially Java, Sumatera, and some parts of Sulawesi.

Next analysis is about relationship between paddy land change and farmers poverty. The result of the statistical analysis can be seen on the figures below.

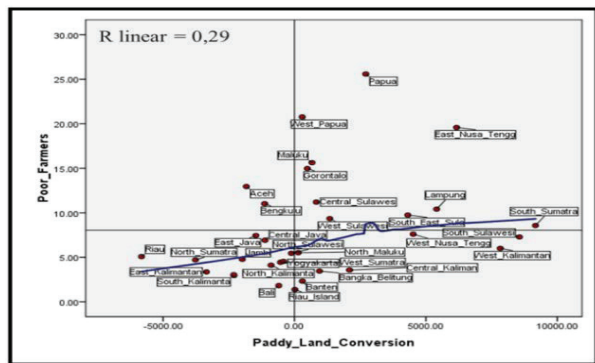


Figure 7. Scatter Plot Diagram of Paddy Land Conversion and Poor Farmers

Source: Researcher Analysis, 2022

Figure 7 shows that in contrast with researcher hypothesis, there is a positive relationship of paddy land conversion and farmers poverty although weak with R linear 0.29. It means although there is additional development of paddy field, it doesn't directly reflect to the improvement of farmers welfare.

The decreasing of paddy field occurred mostly at south area of Sumatera, Java, and some regions of Kalimantan, while the increasing are mostly occurred at south area of Sumatera, Nusa Tenggara, Sulawesi, Maluku, and Papua. The result of statistical analysis is different with researcher hypothesis. Therefore, researcher assume that maybe there is positive relation between productivity and paddy land conversion. The result can be seen below.

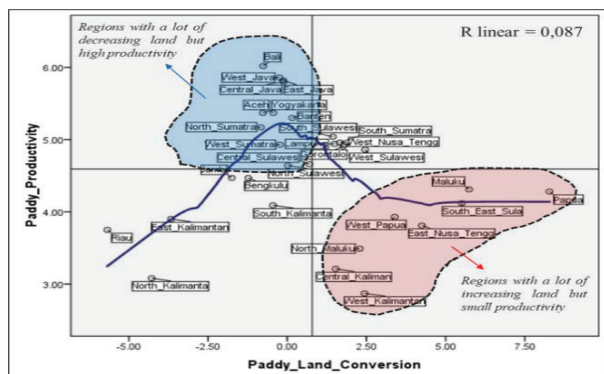


Figure 8. Scatter Plot Diagram of Paddy Land Conversion and Paddy Productivity

Source: Researcher Analysis, 2022

Figure 8 shows there is positive effect of paddy land change to productivity although very small with R linear = 0,087. It because there are regions with a lot of increasing land but small productivity, and there are regions with a lot of decreasing land but high productivity. Ideally, increasing land is followed by increasing of productivity. Therefore, eastern regions such as Papua, East Nusa Tenggara, and Central Kalimantan should boost their productivity level.

To visualize the data from regional perspective below are map of poor farmers percentage and average of rice field change yearly in Indonesia.

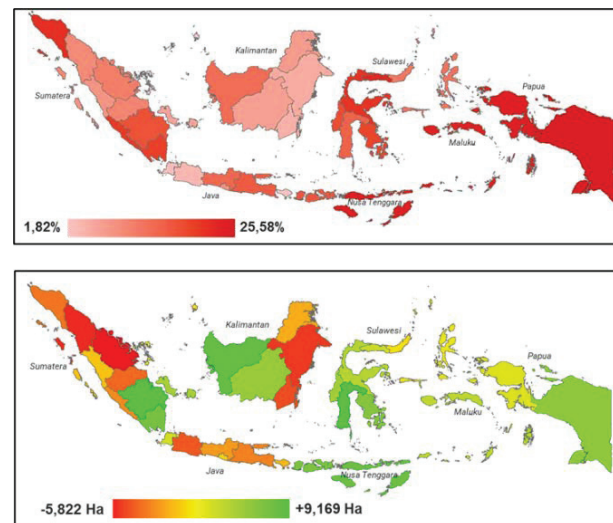


Figure 9. Map of Poor Farmers Percentage (Top) and Average Paddy Land Change (Bottom)

Source: Researcher Analysis, 2022

The maps above showed that in general, the change of paddy field is sprawled with the decreasing occurred mostly at south area of Sumatera, Java, and some regions of Kalimantan, and the increasing at south area of Sumatera, Nusa Tenggara, two provinces of Kalimantan, Sulawesi, Maluku, and Papua.

To support and understand more the result of statistical analysis, policy review and interview with some stakeholders are

conducted. From policies aspect, there are two policies related to paddy field conversion and productivity in Indonesia which are Sustainable Agriculture Crop Land and Food Estate program.

From both policies it can be assumed that the reason why eastern regions such as Papua, East Nusa Tenggara, and Central Kalimantan a lot of increasing paddy field is due to food estate program. The program main goal is to open large new agriculture land, mainly paddy land. It was held in 2015 and still ongoing now with trial and error where there are regions with successful case, and others are not.

In contrast, western regions such as Java and Sumatera need to be more focused on the implementation of Sustainable Agriculture Crop Land policy. The policy is important because Java and Sumatera are regions with highest production but decreasing a lot of paddy land are occurred. Therefore, to maintain the existence of paddy field at Java and Sumatera, the implementation of the policy should be more optimized.

To understand more the real issue and condition of paddy field conversion and productivity interview with some key stakeholders are conducted. Based on the interview it can be resumed that some causes that made paddy field conversion in Indonesia are the farmers itself convert the land into other land use due to poor economic situation and the need for housing development due to rapid population growth.

It is stated by Mr. Rokhlani, Agriculture Instructor at Tegal Regency, that “many of farmers convert their land to non-agriculture land due to some reasons such as; (1) owned

a land no longer promises a decent profit or income, (2) the difficulty of labor, the high cost of agricultural production facilities, and the increasing variety of pest and pathogen attacks have caused farmers to sell more of their land to housing developers or factory developers, and (3) Rapid population growth is accompanied by the need for land for housing, so that many rice fields are plotted”.

Through food estate program government tried to expand paddy field outside Java although the result is still not optimum. Lastly, about Sustainable Agriculture Crop Land, Mr. Umar, Head of Division at Agriculture Agency of Tegal Regency, stated that “Sustainable Agriculture Crop Land program is still top-down in implementation. Many rice farmers still don’t know that their land shouldn’t be changed into other land use. There is no certification for land under this program, and the amount of incentive given to the farmers to protect their land are still very minimal. The socialization about this program is also still lack. Therefore, at the end many farmers don’t understand the importance of paddy field and try to sell it or change it into other land use”.

Therefore it can be resumed that there is need of bottom-up participation of this regulation, and appropriate incentive system for farmers that are willing their land to be put under the program.

The Effect of Land Ownership Area on Farmers Poverty

The next analysis result to be discussed is the effect of land ownership area on farmers poverty. The result of statistical analysis can be seen on the figures below.

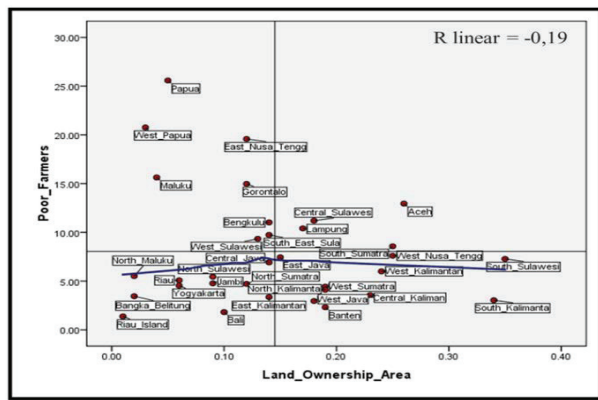


Figure 10. Scatter Plot Diagram of Paddy Land Ownership Area (Ha) and Poor Farmers (%)

Source: Researcher Analysis, 2022

Figure 10 shows that similar with researcher hypothesis, there is negative relationship of land ownership and farmers poverty (although weak with $R \text{ linear} = 0,19$). It means larger the land ownership area, smaller the poverty level. In order to visualize the data from regional perspective below are map of poor farmers percentage and average of paddy field area ownership in Indonesia.

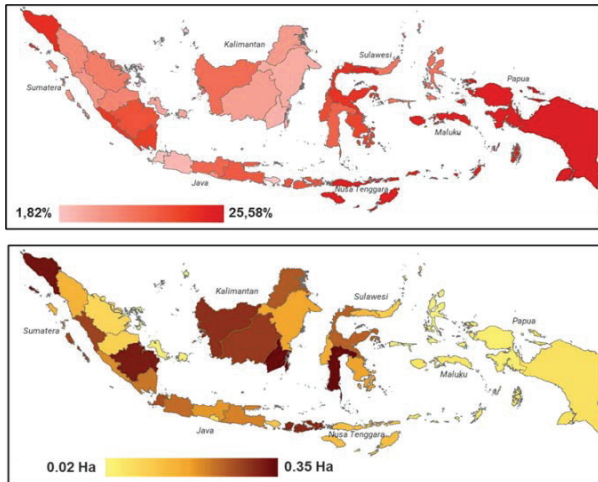


Figure 11. Map of Poor Farmers Percentage (Top) and Paddy Land Ownership Area (Bottom)

Source: Researcher Analysis, 2022

The maps showed that in general, most of the poor farmers are located at eastern part especially Papua, Sulawesi, Nusa Tenggara, and Maluku while the highest paddy land area ownership located mainly

at Kalimantan, Sumatera, Sulawesi, and West Nusa Tenggara.

To support and understand more the result of statistical analysis, policy review and interview with some stakeholders are conducted. From policies aspect, there is no special policy related to paddy land ownership in Indonesia. There is a policy called Agrarian Reform. However, the object is not specifically for farmers and agriculture land. Meanwhile, in Philippine there is a very specific program to improve land ownership for farmers called Comprehensive Agrarian Reform Program.

According to the Philippine Department of Agrarian Reform (2009) there is not enough agricultural land to be divided and distributed to each farmer and regular farmworker so that each can own his or her economic-size family farm. Given this, efforts should be made to distribute and own land more fairly while respecting landowners' rights to just compensation. This will give farmers and farmworkers the chance to improve their quality of life and dignity through increased productivity of agricultural lands.

The form of the program is a redistribution of private and government-owned land to landless farmers and farm workers. The goals are to provide landowners equality in terms of income and opportunities, empower landowner beneficiaries to have equitable land ownership, enhance agricultural production and productivity, provide employment to more agricultural workers, and put an end to conflicts regarding land ownership.

CARP is a very strategic program to overcome farmers land ownership issue. The program is detailed and systemized enough

to provide additional land for farmers to be cultivated. The idea to redistributed private and government land to landless farmers and farm workers is very rarely found in many countries, especially nowadays where many policies tend to favour the capitalist market which are the richer side. Not to mention that the agrarian reform is part of the long history of attempts of land reform in the Philippines. The law was outlined first in 1987. After that evaluation and development were often carried out. It means Philippine government see land as a very urgent issue. It's quite different with Indonesia where Agrarian Reform has just become one priority programs in 2015.

To understand more the real condition of land ownership issue interview with some key stakeholders are conducted.

Mr. Rokhlani, Agriculture Instructor at Tegal Regency stated that “Small land ownership does not contribute to increased income. Management of small land is very inefficient. There are some reasons why Indonesia farmers only has less than 0,5 Ha such as; (1) Indonesian farmers are mainly dominated by poor farmers that cannot afford to buy more land; (2) There is a systemic culture from Dutch colonial era that one family only could own 0,5 Ha, and that's still applied today; (3) Farming is a profession inherited from their predecessors, and they only continue it. So, after years the amount of land from inheritance keep decrease. Now farming is only a side business, not the main profession, (4) Large land are usually controlled by parties with large capital, whose land is not always cultivated for agriculture, but only as an investment that is left unmanaged; and (5) The decrease in

agricultural land (especially in Java) due to the need for land for non-agricultural purposes”.

Mrs. Eka, Staff at Agriculture Agency of Tegal Regency, Central Java stated that “there is no specific program from government to increase land ownership of farmers. The increasing area of rice field depends on the ability of each farmer. The reason why land ownership of farmer is small because the area of land is fixed but the number of farmer households keep increase”.

Based on the interview it can be resumed that the cause that made the average area of paddy field ownership in Indonesia so low is mainly due to the cultural system that has been deep rooted for a long time. Many stakeholders saw this issue as a normal situation and not a big problem that has to be solved.

The Effect of Agriculture Technology on Farmers Poverty

The next analysis result to be discussed is the effect of agriculture technology on farmers poverty. First variable is irrigation which the analysis result can be seen below.

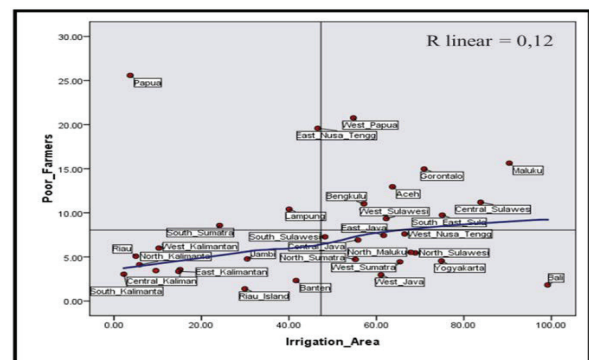


Figure 12. Percentage Paddy Field with Irrigation (%) and Poor Farmers (%)

Source: Researcher Analysis, 2022

Figure 12 shows that in contrast with researcher hypothesis, there is a positive relationship of irrigation and farmers poverty (although weak with R linear = 0,12).

It means irrigation doesn't directly reflect to the improvement of farmers welfare. The result of statistical analysis is different with researcher hypothesis. Therefore, researcher assume that maybe there is positive relation between productivity and irrigation. The result can be seen below.

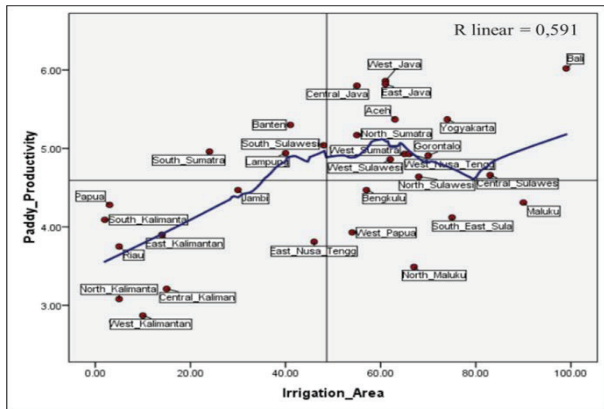


Figure 13. Percentage Paddy Field with Irrigation (%) and Paddy Productivity Ton/Ha)

Source: Researcher Analysis, 2022

Figure 13 shows there is a large positive effect of irrigation to productivity with $R \text{ linear} = 0,591$. It means although irrigation doesn't directly contribute to reduce farmers poverty, it directly boosts productivity. Then, based on previous analysis, because productivity contributes to reduce poverty, it can be assumed that irrigation indirectly effect to poverty reduction.

The percentage national average of paddy field with irrigation is 51,28% with some regions especially at Java, Sulawesi and Maluku have the largest proportion of paddy field with irrigation. Irrigation is one of the most important technologies for rice field. It's so unfortunate that there are many regions without irrigation less than 20% of paddy field. To visualize the data from regional perspective below are map of poor farmers percentage and percentage of paddy field with irrigation in Indonesia.

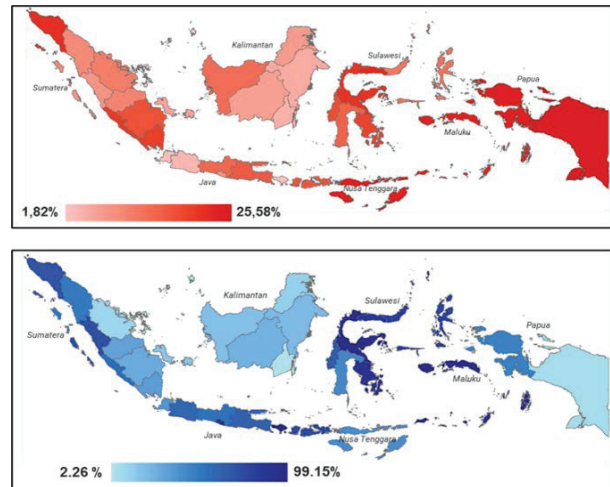


Figure 14. Map of Poor Farmers Percentage (Top) and Paddy Field With Irrigation (Bottom)

Source: Researcher Analysis, 2022

The maps showed that in general, the highest paddy land area with irrigation located mainly at Sulawesi, Java, Maluku, and northern part of Sumatera.

Next is about asphalt farm road. The result of statistical analysis can be seen on the figures below.

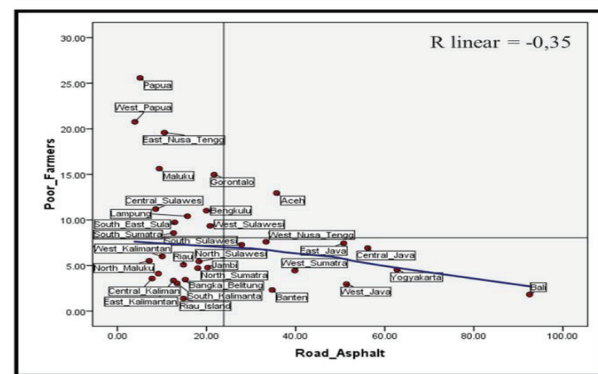


Figure 15. Percentage Village with Asphalt Farm Road (%) and Poor Farmers (%)

Source: Researcher Analysis, 2022

Figure 15 shows that similar with researcher hypothesis, there is a negative relationship of asphalt road and farmers poverty (although weak with $R \text{ linear} = 0,35$). It means asphalt road to agriculture area has positive effect to reduce farmers poverty.

National percentage of village that have asphalt road that connect main road with

agriculture area is 27% with Bali, West Java, Central Java, Yogyakarta, and East Java have the largest proportion of the road (>50% village). Farm road is a quite important agriculture infrastructure. It makes distribution process from agriculture land much easier, especially when it's made of asphalt. It's so unfortunate that there are many villages without farm road made of asphalt less than 20%. To visualize the data from regional perspective below are the map of the data.

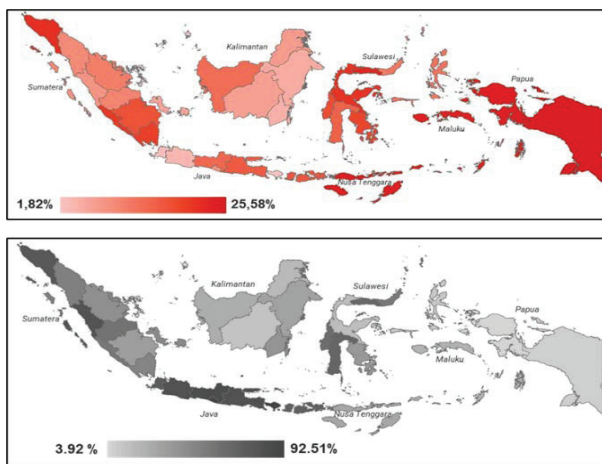


Figure 16. Map of Poor Farmers Percentage (Top) and Village with Asphalt Farm Road (Bottom)
Source: Researcher Analysis, 2022

The maps showed that the most villages that have asphalt farm road located mostly at Java and some parts of Sumatera and Sulawesi.

Next is about mechanic technology usage. The result of statistical analysis can be seen on the figures below.

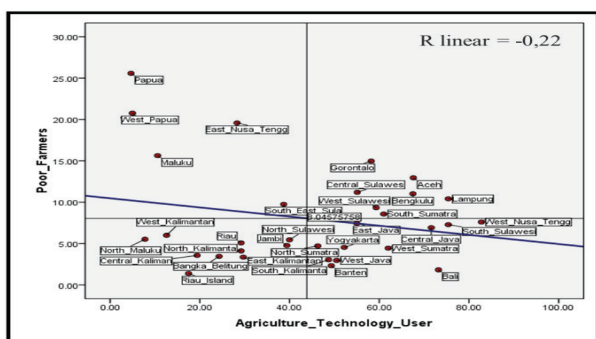


Figure 17. Map of Poor Farmers Percentage (Top) and Village with Asphalt Farm Road (Bottom)
Source: Researcher Analysis, 2022

Figure 17 shows that similar with researcher hypothesis, there is a negative relationship of mechanic agriculture technology and farmers poverty (although weak with $R \text{ linear} = 0,22$). It means mechanic agriculture technology has positive effect to reduce farmers poverty.

National percentage of Farmers that Use Mechanic Agriculture Technology is 55,59% with West Nusa Tenggara, South Sulawesi, Bali, Lampung, and Central Java have the largest proportion (>70% farmers). The use of mechanic technology can boost paddy productivity much better than conventional technology. It's so unfortunate that there are many regions where less than 30% farmers haven't get used to mechanic technology. To visualize the data from regional perspective below are the map of the data.

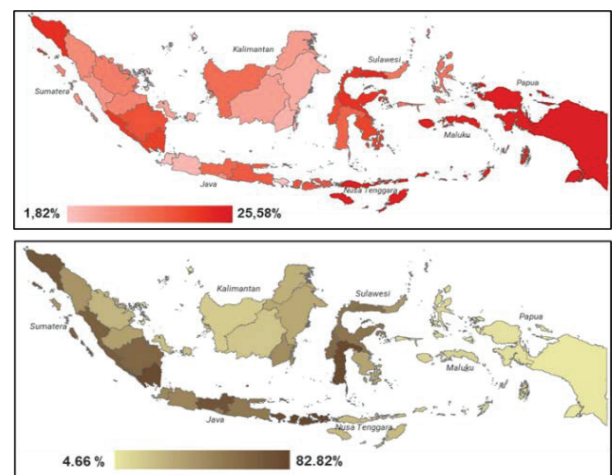


Figure 18. Map of Poor Farmers Percentage (Top) and Farmers that use Mechanic Technology (Bottom)
Source: Researcher Analysis, 2022

The maps showed that in general, most farmers that use mechanic technology are mainly from Bali, West Nusa Tenggara, and some parts of Sumatera and Sulawesi.

There are some key points based on the interview with key stakeholders regarding agriculture technology. Mr. Rokhlani,

Agriculture Instructor at Tegal Regency, said that “Smart farming has been socialized to farmers. However, it hasn’t been fully implemented. It’s good if the technology is user friendly for farmers. The most needed technology is technology to improve land productivity. Safe and environmentally friendly technology is important that rice fields especially in Tegal Regency become a healthy land. Indonesia farmers are different with farmers from developed country. Therefore, we need small hand tools

technology that are simple, user friendly, and can be used by many farmers individually”.

From the interview it can be resumed that due to high number of farmers, Indonesia farmers prefer to use small hand tools machine that are simple and user friendly than big machine. Smart Farming technology is good idea, but Indonesia farmers haven’t urgently need it for now.

Multiple Regression Model Result

The result of multiple regression model can be seen below.

Table 2. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of The Estimate
1	0.801 ^a	0.642	0.553	3.88473

a. Predictors: (constant), Agriculture_Technology_User, Paddy_Land_Conversion, Land_Ownership_Area, Road_Asphalt, Irrigation_Area, Paddy_Productivity

Source: Researcher Analysis, 2022

Table 2 shows that the effect of 6 variables to farmers poverty is statistically significant with R value 0.801. Adjusted R

square value of 0.553 indicates that 55,3% of the variation in farmers poverty can be explained by the multiple regression model.

Table 3. Anova Summary

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	650.198	6	108.366	7.181	0.000 ^a
Residual	362.187	24	15.091		
Total	1012.385	30			

Source: Researcher Analysis, 2022

Table 3 shows that the sig. value is less than 0,05 indicates that the model is

significant with 95% confidence level.

Table 4. Coefficients Summary

Model	Unstandardized Coefficients		Std. Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	7.882	6.674		1.181	0.249
Paddy Land Conversion	1.352	0.317	0.668	4.260	0.000
Paddy Productivity	1.235	1.864	0.177	0.662	0.514
Land Ownership Area	-29.483	12.861	-0.427	-2.292	0.031
Irrigation Area	-0.044	0.039	-0.208	-1.125	0.272
Road Asphalt	-0.118	0.061	-0.413	-1.933	0.065
Agriculture Technology	0.074	0.068	0.291	1.085	0.289

Source: Researcher Analysis, 2022

Table 4 shows the model from the statistic result that can be typed as below.

$$Y_i = 7.882 + 1.352X_{i1} + 1.235X_{i2} - 29.483X_{i3} - 0.044X_{i4} - 0.118X_{i5} - 0.074X_{i6}$$

Explanation:

Y = Farmers Poverty

X1 = Land conversion area

X2 = Paddy Productivity

X3 = Average Land Ownership Area

X4 = Percentage of paddy field with irrigation

X5 = Percentage of villages with farm road

X6 = Percentage of farmers households that use mechanic technology

Based on standardized coefficients value, variable that most significant to reduce farmers poverty is land ownership area with value -0,427.

CONCLUSION

This research has identified different factors that contributed to rice farmers' poverty. Of all the variables, the most significant to reduce farmers poverty is land ownership area, followed by the transportation access through asphalt farm road, and then irrigation.

Productivity level at western region mainly Java and Sumatra still high although there is reduction of land area. Therefore, Sustainable Agriculture Crop Land policy should be fully implemented at these regions. On the other hand, although from Food Estate program, a lot of new land are increased at eastern region, the productivity level is still low. Therefore, there should be improvement from technology and human resources quality.

Land ownership area is quite important. Therefore, Ministry of Agriculture and

National Land Institute can make a policy regarding the issue just like the CARP policy at Philippine.

With concern of small landownership area, government should focus on provide modern technology that are user friendly for farmers to boost production

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