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# The Impact of Airport Construction on Farm Households' Income

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**Abstract:** Infrastructure development is needed to encourage economic growth. However, infrastructure development requires land acquisition, which may adversely impact the community. This study aims to analyze the impact of Kertajati International Airport construction on the farm households' income and welfare level. This research data used primary data with a simple random sampling method to select 76 farm households in the most affected village. The analysis techniques were income analysis and paired sample t-test. The results showed that farm income was significantly higher before the airport construction. Nevertheless, off-farm income increased after the airport construction, leading to an insignificant household income difference before and after the land acquisition. As for the prosperity level, on average, the farm households lived below the decent living standard. The results imply the importance of increasing farmers' capacity so that that compensation funds can be utilized to increase household income.

**Keywords:** Airport construction; Farm Household Income; Land Acquisition; Welfare

**JEL Classification:** D13, D62, Q12

## Introduction

The efficient and effective transportation system has many positive impacts on economic growth, such as reducing transportation and production costs through timely delivery and economic scale improvement, integrated markets, broader economic opportunities, and increasingly widespread communication links, enhancing competitive advantage. It also generates many job opportunities and encourages tourism and foreign investment (Mohmand, Wang, & Saeed, 2016). Transportation has various benefits for human life, including social, economic, political, and physical benefits. Moreover, transportation can save operating costs for business, save time for passengers and cargo, reduce accidents, reduce congestion, and facilitate logistic distribution. Besides, Indonesia is an archipelago, making the sea and air transportation sector specifically essential as a hub for inter-island and regional mobility of goods and passengers. Therefore, effective and efficient transportation is highly required, especially air transportation for regional development.

During 2014-2017, the transportation and warehousing sector performed the highest average growth of 7.24 percent even though it was the sixth-highest contributor to GDP. This sector's growth is greatly influenced by the dynamics of community mobilization and economic activity. Its importance is reflected in the increasing need for transportation services to facilitate people and goods' mobility from and throughout the country and abroad. From year to year, the air transportation subsector's growth has increased rapidly and ranked second in the transportation and warehousing sector after the railway transportation's growth.

Investment in infrastructure development for a public purpose is vital for the development of any country, and the first step towards public infrastructure development is land acquisition. In 2017, Indonesia planned 15 new airports' construction, some of which have been officially in use, and some are still under construction. One of them, Kertajati International Airport, is located in Kertajati, Majalengka Regency, West Java. This airport construction has long been planned. The plan was realized with the ratification of the Regional Regulation of West Java Province Number 13 of 2010 concerning the Development of Kertajati International Airport and Kertajati Aero city. In general, the airport construction would provide significant benefits to West Java Province. However, airport development showed positive and negative impacts on the Kertajati Subdistrict community, Majalengka Regency, West Java Province.

Moreover, the airport construction requires the acquisition of 1,800 hectares of land covering five villages in the Kertajati Subdistrict: Kertajati, Kertasari, Sukamulya, Bantarjati, and Sukakarta (Agriculture and Forestry Extension Center of Kertajati District, 2016). Land acquisition is defined in Presidential Regulation No. 36/2005 as an activity to acquire land by providing compensation to those who release land, buildings, plants, and objects related to the land or revocation of land rights. Land acquisition for airport construction was carried out from 2009-2018, including paddy fields and dry land. The biggest land acquisition was observed in 2010, covering an area of 451.91 hectares. The land acquisition included paddy land and dry land that had been legally released from the community to the government. The converted land was mainly agricultural. The land acquisition received compensation from the government. Land compensation received by farmers was different from one another. It was due to differences in the landholding and the Tax Object Sales Value (NJOP).

Many issues, including loss of ownership and livelihood of the affected people, arose during land acquisition. Infrastructure development often dislocates home, business, and farms (Dutta, 2015). Ogwang and Vanclay (2019), who examined the social impacts of project land acquisition associated with oil production in the Albertine Graben, Uganda region, suggested that people with qualifications benefit from the job opportunities. However, many other negative effects have been taking place, such as higher food insecurity of the displaced people, diminishing social and cultural cohesion, and reduced social services access. It has been exacerbated by rising immigration and more intense crime and social issues. Similarly, large-scale land acquisition for multinational companies in the Pru East Ghana had a significant positive moderate effect on employment, healthcare, and food security but had a significant negative effect on farm households'

income levels. Therefore, it is recommended that large-scale land investors employ people from the projects' host communities (Quansah, Ansah, & Mensah, 2020).

In this case, Majalengka Regency is an area with potential in the agricultural sector. It is supported by fertile soil conditions and the availability of an adequate water supply. With an agricultural land area of 66.45 percent of the entire area of Majalengka Regency (Statistics Indonesia, 2017), the agricultural sector is the most dominant in the economic structure of Majalengka Regency. Therefore, the agricultural sector is the primary economic driver in Majalengka. However, the agricultural sector that absorbs the largest number of workers from 2014 to 2017 experienced a decline every year. It was partly due to land acquisition for the development of Kertajati International Airport. In Kertajati Subdistrict, several villages were affected by land conversion due to Kertajati International Airport development. Sukamulya village was the most affected by land acquisition for the airport construction. As a result, the airport construction has changed farmers' livelihoods and income because the shrinking agricultural land reduced farm household income, thus affecting the welfare level.

Necessarily, farmer welfare is the goal of agricultural development and national development. According to Indonesian Government Law No. 41/2009 on Social Welfare, welfare is a state of fulfilling the needs of a decent life for the community to develop themselves and carry out social functions organized by the central government, regional government, and community. The aspects used as welfare indicators according to the Central Bureau of Statistics (BPS) are household income, household consumption/expenditure, living conditions, living facilities, household members' health, ease of use of health workforce facilities, household members' quality of education, ease of entering children in education, security from interference with crime, and ease of accessing information, technology, and communication. Household income is used as an indicator to measure welfare level. Welfare measurement based on farm household income can be calculated and compared with decent living needs (KHL). In this study, household income was compared with KHL of Majalengka Regency in 2018.

Furthermore, welfare is the final goal of development, and income is one indicator of the welfare's achievement in a household, including farm households. This study aims to compare a farmer household's income before and after the Kertajati International Airport construction in Sukamulya Village, Kertajati Sub-District, Majalengka Regency and analyze the farm households' welfare level in the village based on Majalengka Regency 2018 Decent Living Needs (KHL) standard.

Based on their research, Hidayat, Ismail, and Ekayani (2017) divided the value of economic losses due to BIJB (West Java International Airport) development into four categories: loss of farm employment opportunities, loss of rice production, reduced rice farming income, and reduced farm household income. However, they did not explore the potential employment in non-farm income. Hence, this paper compared farm household income, including on-farm and non-farm income, before and after the BIJB construction. Therefore, this paper contributes to a thorough understanding of the BIJB construction's effect on farm household income from multiple sources. Despite the declining

landholding due to acquisition, the new infrastructure development also provides employment opportunities for farm households.

## **Research Method**

This research used a quantitative approach by comparing the farm household income before and after the airport construction, where there was a statistically significant difference. Comparative research according to Sugiyono (2014) is a study that compares the state of one or more variables in two or more different samples, or two different times. The data employed in this study were primary and secondary. Primary data were collected by conducting questionnaire-based interviews with respondents. Respondents in this study were farm households whose land was converted to Kertajati International Airport in Sukamulya Village, Kertajati District, Majalengka Regency. Therefore, landless farmers were excluded from the population. Using the Slovin formula, the sample consisting of 76 farm households out of 319 farm households were randomly selected. Primary data were collected in March 2019. Secondary data were obtained from various research results, reports, and documents from BPS, the Agriculture Office, the Agricultural and Forestry Extension Agency (BP4K), Bappeda (Development Planning Agency at Sub-National Level), and related government agencies.

Farm household income consisted of farm income and non-farm income. Net farm income was obtained by reducing total farm revenue by the total cost of the farm. This study's statistical test was paired sample t-test to compare farm household income before and after the airport construction. According to Ghozali (2013), a difference test is used to determine whether two unrelated samples have a significantly different mean value. To find out whether farmers in Sukamulya Village, Kertajati Subdistrict have been prosperous, the fulfillment of the Decent Living Needs (KHL) of Majalengka in 2018 of IDR 1,653,514,54 was utilized to compare the income level per capita of monthly farm household members. Per capita income was calculated by dividing household income by household size. Household income in this study consisted of profit from farming and off-farm income.

## **Result and Discussion**

This section is divided into three parts: comparison of on-farm income per harvest season, overall monthly household income consisting of on-farm and off-farm income, and the farm households' prosperity level before and after the airport construction. By incorporating on-farm and off-farm income, the changes in income level and income sources would be revealed.

Land is the most critical factor of farmers' production because it is closely associated with farmers' income levels. Table 1 presents land ownership before and after the airport construction.

**Table 1** Farmers' Land Ownership Before and After the Kertajati International Airport Construction

No	Land ownership (Ha)	Before		After	
		Number (People)	Percentage (%)	Number (People)	Percentage (%)
1	< 0.5	35	46	47	62
2	0.51 – 0.99	13	17	22	29
3	> 1	28	37	7	9
	Total	76	100	76	100

Source: Data Processed.

Table 1 shows that the number of respondents who owned land < 0.5 hectares after the Kertajati International Airport construction increased. Respondents who owned an area of > 1 hectare after the airport construction decreased dramatically from 28 to seven farmers. Overall, the data revealed that after acquiring agricultural land for the airport construction, the land area owned by farmers was getting smaller. Basuki (2012) argued that land conversion has led to decrease in agricultural productivity. It supports the finding of Nguyen, Pham, and Lobry de Bruyn (2017) that the most significant impact of Binh Dien Hydroelectric dam construction on the Huu Trach River in Vietnam was that land for growing rice and other crops was reduced or flood.

**Table 2** Average Farm Income per Harvest Season Before and After the Kertajati International Airport Construction (Rupiah/4 months)

Elements of Income	Before	After
Average Production (Kg)	3,482	2,141
Average Price (Rp/Kg)	3,874	3,882
Total Revenue (Rp)	13,489,268	8,311,362
Total Costs (Rp)	5,881,553	3,923,789
Farm Income ***	7,607,715	4,387,573

t-statistic > t-table (3.994 > 1.66571)

\*\*\* significant at  $\alpha = 1\%$

Source: Data processed.

Table 2 displays that the average farm income before the Kertajati International Airport construction was IDR 7,607,715.00. The income was 42.3 percent higher than the average farm income after the airport construction of IDR 4,387,573. It was due to the reduction in land ownership. Farm income was significantly lower after the airport construction. This finding supports Hidayat et al. (2017), who found the loss of agricultural work opportunities (IDR 12,205,397/ha/year), loss of rice production (IDR 59,175,911/ha/year), reduced income of rice farming (IDR 37,999,535/ha/year), and reduction in total farm household income (IDR 3,999,223/year).

These findings also reinforce Bao and Peng (2016) that land conversion negatively impacted agricultural land. Thus, the large-scale land acquisition must be suppressed because of its potential long-term adverse effects (Borras et al., 2012). Further, Syahyuti (2018) mentioned that land-use change impacted food security and farmers' welfare. This

also supports Damayanti and Khoirudin (2016) who found positive association between household income and food security.

Sugeng (2012) finding explained that the conversion of paddy land to non-agricultural uses, such as housing, industrial zones, trade areas, and public facilities, could have negative economic, social, and environmental impacts. For national food security, the conversion of paddy fields is a serious threat, considering that land conversion is difficult to avoid, while the impacts on food problems are permanent, cumulative, and progressive. Many regulations have been issued by the government to control paddy fields' conversion, but the juridical approach seems dull due to various factors. In this regard, it is necessary to revitalize policies in controlling land conversion by developing economic and social approaches.

According to Kusikula et al. (2011), on the one hand, the land-use change would have an impact on increasing the quality of urban settlements, but on the other hand, it had a negative impact on increasing the number of poor people because agricultural land was turned into urban settlements, and farmers did not have new jobs. Ty, Van Westen, and Zoomers (2013) based their study on the effect of hydropower development on local livelihoods found a significant income loss and declining food security. Furthermore, the resettled farmers complained about not being able to cultivate subsistence crops because their compensation land was too small with poor soil quality. Declining food security and loss of income from cotton farming were also reported by Thondhlana (2015) in Zimbabwe due to biofuel development. Nguyen et al. (2016) indicated unequal benefits among the stakeholders, with farmers tended to benefit the least. Although they could transform their farm into a non-farm income, they faced difficulties finding stable alternative livelihood activities and using the compensation for investment.

According to Kamilah (2013), and Ruswandi, Rustiadi, and Mudikdjo (2016), the conversion of agricultural land had a big impact on farmers' household income. The food crop sector, especially rice farming, is an economic activity that provides employment to rural communities. Therefore, the conversion of land functions not only caused loss of employment but also decreased farmers' income. For farmers, the land is a productive asset as a source of family income. The proportion of land ownership that continues to decline has resulted in a decrease in farming scale. The reduced land ownership tended to decrease farm income, which in turn decreased the welfare level of farmers and their families (Dewi & Achmar, 2016).

Chinsinga, Chasukwa, and Zuka (2013), Mulyo, Sugiyarto, and Widada (2015), and Nurpita et al. (2018) explained that at the macro level, the impacts of land-use change are reduced food availability and results in reduced national food security. On a micro level, land conversion has resulted in farmers, who initially planted food crops and could meet their own rice needs for their households, no longer producing rice and had to buy it.

Another impact of land conversion is the loss of livelihoods as farmers. Based on their study in Ghana, Ablo and Asamoah (2018) uncovered that the farmers felt deprived and perceived the compensation as inadequate for their loss of livelihoods and generational

inheritance. With the loss of livelihood as a farmer, the decline in income and purchasing power impacted the decreasing economic accessibility of farm households to food (Purbiyanti et al., 2019).

Marfurt, Käser, and Lustenberger (2016) concluded that the loss of natural resources associated with land acquisition and the lack of employment opportunities primarily affected vulnerable groups. Large-scale land acquisition for multinational companies in the Pru East Ghana had a significant positive moderate effect on employment, healthcare, and food security but had a significant negative effect on farm households' income levels. Therefore, it is recommended that large-scale land investors employ people from the projects' host communities (Quansah et al., 2020).

Farm households' income consists of profit from farming and other income from household members and off-farm income. The profit from farming is the sales revenue minus production cost. The comparison of farm household income before and after the construction of Kertajati International airport is presented in the following table.

**Table 3** Average Farm Household Income Before and After the Kertajati International Airport Construction (Rupiah/Month)

Components of Household Income	Before	After	Change (%)
On-Farm Income	1,901,928.75	1,396,893.25	(45.1)
Off-Farm Income	517,763.16	1,175,000.00	126.9
Farm Household Income	2,419,691.91	2,571,893.25	8.9

Source: Data Processed.

Table 3 exhibits that the average farm income per month after the Kertajati International Airport construction was lower, while the average off-farm income was higher. Decreased farm income encouraged family members to help earn a living. It was evidenced by the increase in working family members by 86 percent. It confirms the finding of Ju et al. (2016) that land acquisition in China increased the non-farm labor allocation. On average, the increase in off-farm income increased farm household income by 8.9 percent. With the t-statistic < t-table (0.499 < 1.66571) and the probability of error (0.619 > 0.05), it could be inferred that  $H_0$  was accepted. It signified that there was no significant difference in farm households' income before and after the airport construction. Besides, welfare is one of the crucial indicators in the livelihoods of farm households. Welfare can be measured using the Decent Living Standard (KHL) based on income. The KHL in Majalengka Regency was Rp1,653,514.54 per capita per month.

**Table 4** Welfare of Farm Households Before and After the Kertajati International Airport Construction

Comparison	Total Farm Household Income (Rp) (1)	Number of Household Size (Persons) (2)	Income per capita (Rp/month) (3) = (1) : (2)	The ratio of Income and Decent Living Standard
Before	170,202,250	183	930,066.94	0.56
After	172,921,250	183	944,924.86	0.57

Source: Data Processed.

Table 4 depicts an increase in the per capita income ratio to KHL after the Kertajati International Airport construction. The average value of the ratio of income per capita to KHL was  $< 1$ . It indicated that after the airport construction, household income was still below the KHL of Majalengka Regency of Rp1,653,514.54 per capita per month. Nevertheless, from a different perspective, farmers in West Java were prosperous in general because farmers' term of trade in December 2019 was 112.36 (2012=100).

## Conclusion

This study's results have contributed to the existing literature by enriching the discussion on BIJB construction's effect on the affected farm household income done by Hidayat et al. (2017) by incorporating on-farm and non-farm income. The acquisition of agricultural land due to the Kertajati International Airport construction reduced the Sukamulya village farmers' agricultural land. The results showed that the ownership of agricultural land after the airport construction was getting smaller. Therefore, production was getting smaller, so was the farmers' income. Even though farmers received compensation from land acquisition, the price of land had increased so that the compensation received could not be used to buy the same size of land. The results revealed a significant decline in farm household farm income before and after the airport construction. However, the decline in farm income was compensated by an increase in non-farm income, such as petty trading and being employees at the airport and its tenants, so that the farm households' total income before and after the airport construction was relatively the same. On average, farm households before and after the airport construction were at the same welfare level because the income per capita was still below the KHL of Majalengka Regency even though there was a slight increase in household income ratio to KHL.

The results imply the need to increase farmers' capacity to minimize the negative impacts on farm households by providing alternative employment opportunities through integrated model training, ranging from planning, implementation, evaluation, provision, and mentoring of venture capital. Besides, there is a need for counseling and assistance to the affected farm households by facilitating the compensation's wise utilization. Qian (2015) revealed that despite gradual improvement in land acquisition compensation, land-lost villagers bore uncertainties to sustain their livelihood, competed in the labor market, and adapted to urban life. Nguyen, Hegedűs, and Nguyen (2019) based their study on industrial park projects, indicating that despite household livelihoods reconstruction after land acquisition, many issues have emerged, including a high proportion of households without sufficient employment and those that spent compensation fund in unproductive ways. This study confirms Nguyen et al. (2016) and Li, Wang, and Song (2018) that compensation may need additional assistance to restore the affected communities' livelihood in the long term. Nguyen, van Westen, and Zoomers (2017) recommend that the affected households' capacity to adapt to new situations through training, consultation, and social security system, should be considered.

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