

Economic impact studies on development project of New Yogyakarta International Airport to aquaculture in Kulonprogo Coastal

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Abstract. New Yogyakarta International Airport (NYIA) is being constructed in Temon Sub District, Kulonprogo District. It lies on 587.2 ha area in the southern part of Java Island coastal area. Many areas of Kulonprogo coastal area are used for aquaculture of vanname shrimp. In that case, the aquaculture land needs to be cleared for the airport construction necessity and requires compensation. The value of the compensation needs to be right calculated by both sides, regarding the aquaculture land are local community assets. This study uses spatial analysis and visual interpretation. Whereas, the calculation of the acquisition value and income capital value uses Discounted Cash Flow (DCF) method. The result shows the area of aquaculture land which impacted to be cleared is 83 ha, means decreasing of shrimp ponds area in Temon Sub District, Kulonprogo District. The calculation of acquisition value for airport development indicates higher value than the income from the aquaculture activity. The results mean the aquaculture landlords do not incur losses due to the airport development project. These findings can be used for local government and related stakeholders to formulate a policy of aquaculture relocation and to estimate projection for aquaculture land suitability in Yogyakarta coastal area.

1. Introduction

Cities around the world are separated by physical distance, but individuals can travel relatively easily between cities using various forms of transportation [1]. As business markets become national and international in scale, airports are increasingly being viewed as catalysts for local economic development. Their ability to generate jobs and attract new business is being used in many locations as a justification for public investments in new airport construction and expansion [2]. The economic impact of airports and associated aviation activity is a crucial component of modern economies. However, what is also increasingly important is that this economic impact is fully understood and appreciated outside of the aviation sector [3].

Adi Sucipto International Airport can accommodate maximum 1.6 million passengers per year, but in fact, the number of passengers increasing every year. Recently, it is reported that the number of passengers has been reaching 7.2 million or almost five times than the ideal capacity. Regarding that issue, starting this year government develops a new airport in southern coast, precisely in Jangkarán Hamlet, Jangkarán Village, Temon Sub District, Kulonprogo District. New Yogyakarta International



Airport (NYIA) building was designed to accommodate up to 20 billion passengers and built above more than 587.2 ha area. One of the procedures in preparing the new airport development is the government considering the acquisition of land in the planned location, which the possessions do not only belong to palace grounds, but also belong to the local community. The land acquisition for the new airport development consists of 67 % of total land belongs to local community, 27 % belongs to Sultan and the rest belongs to government [4]. Public land procurement in Indonesia is based on Law No. 2 of 2012. Land procurement is an activity of providing land by giving fair and fair compensation to the entitled parties [5].

The procedure of land acquisition is a quite complicated process, due to many sectors involved, especially land acquisition belongs to the local community. NYIA development evicts settlements, agriculture land, rice field and fish pond in Jangkaran Hamlet. Due to the consideration of the land as a residence and workplace, the community is dejected to sell their land and migrate to another place. Fish ponds are income source for the local community, especially fish pond farmer. Fish pond is a kind of brackish aquaculture, which in Kulonprogo mostly farmers cultivate species of shrimp. Fish pond farmers in Yogyakarta mostly cultivate vanname (*Litopenaeus vannamei*) type of shrimp. One harvest time of the vanname shrimps or around four months, the farmer receives profit up to 50 million IDR. Because of the high profit of the vanname shrimp harvest, the local community tends to make the type of aquaculture as their primary income.

Some fish ponds area in Jangkaran Hamlet were evicted because they were included in planned location of NYIA development. In Indonesia, there is a particular procedure of compensation for the land owner which impacted by the public infrastructure development. According to Act Number 2 the year 2012 on land acquisition to be proposed for a public purpose, is regulated based on guidance on land right's assignment. In transferring the land right's assignment between seller and buyer, it is a must to considering protection and principle of reverence to the land affected parties. In SPI 306 the year 2013 mentions that the compensation is determined by public valuer as independent professional valuer who has a license of practice from Ministry of Finance of Republic of Indonesia and National Land Agency. Determination of the compensation has to be based on humanity, fairness, benefit, certainty, openness, agreement, participation, prosperity, sustainability and harmony. Some aspects to consider in the feasibility analysis of the project are technical, financial, economic, socio-cultural and environmental aspects [6].

The economic impact of NYIA development to aquaculture in Kulonprogo is studied by fair compensation value on land rights assessment, considering fish ponds is the local community's main income source. Profit or loss of fish pond owners was determined by comparison between fair compensation value and fish pond harvest revenue. Based on that background, aims of this research are to assess the estimation of the aquaculture acquisition area for the new airport development project and to compare among the fair compensation value and income from the aquaculture activity in Kulonprogo coastal area.

2. Methods

This research used some methods to achieve the objectives, namely remote sensing visual interpretation, calculation of fair compensation value and quantitative descriptive analysis. Remote sensing interpretation was used to estimate the fish pond area which included in NYIA planned location area and interpreted through satellite imagery PJ SPOT 6 the year 2016. The satellite imagery shows land use view on the surface of the earth clearly, moreover considering the principle of remote sensing interpretation, such as association, color and form, the form of fish pond can be recognized easily. Area of fish pond was estimated using Geographic Information System tools, ArcGIS. Fair compensation value was assessed based on Act Number 2 the year 2012, President Regulation Number 71 the year 2012 and Indonesian Assessment Standard (SPI) Number 301 and its technical guidance. Components of fair compensation value can be seen in table 1. Equation (1) shows equation for calculation of fair compensation value [7]. Assessment is defined as a combination of science and art in estimating the value of an interest in a property for a particular purpose and in a predetermined time. Also taking into

account all the characteristics of the property and market conditions, including investment types on the market [7].

Table 1. Fair Compensation value assessment component.

Component of Fair Compensation Value (FCV)	
Physical compensation (NPF)	Non-Physical Compensation (NPNF)
Land (L)	Tax (Tx) [5 % from NPF]
Building (B)	Legality (Lg) [1 % from NPF]
	Time lag compensation (TL) [r = 5.92 % p.a.]

The equation for calculation of fair compensation value [8]:

$$FCV = NPF + NPNF + TL$$

$$FCV = (L + B) + (Tx + Lg) + \{(NPF + NPNF) * TL\} \quad (1)$$

Calculation of fish pond properties value uses two approaches, which are cost approach and income approach. Cost approach emphasizes fish pond properties value of replacement cost new (RCN) and income approach focuses on the cash flow of the fish pond. Values of both approaches need to be reconciled to estimate the final value of fish pond properties.

The social-economic impact was analyzed using a qualitative descriptive method by interviewing local community and field observation related to community's socio-economic of the change of land use postcondition of fish ponds to an airport. Descriptive analysis aims to describe real condition in the research location. Primary data was collected by direct interview with local people as respondents. Secondary data was collected by reviewing on related literatures. Snowball method was used to collect primary data, which the way was one key person to another one to be interviewed determined based on the previous key person. Information from interview describes the community's socio-economic condition regarding land use change of aquaculture to an airport.

3. Discussion

3.1. Physical impact on new airport development

New Yogyakarta International Airport (NYIA) development planning in Jangkaran Hamlet, Jangkaran Village, Temon Sub District, Kulonprogo District was appointed based on Decree of the Governor Number 68/KEP/2015 on Determination of Location Site for New Airport Development in Special Region of Yogyakarta on 31th March 2015. NYIA was planned to lie on the 587,2-ha area [9]. The land rights for the site consists of couple ownerships, which are local communities and Sultans of Yogyakarta Palace. NYIA development planning site can be seen in figure 1, which is attached in Decree of the Governor's appendix. In the airport, development procedure was considering a land acquisition to provide land for the infrastructure. In that planning site, kinds of land cover that impacted were settlements, rice fields, moorlands and fish ponds.

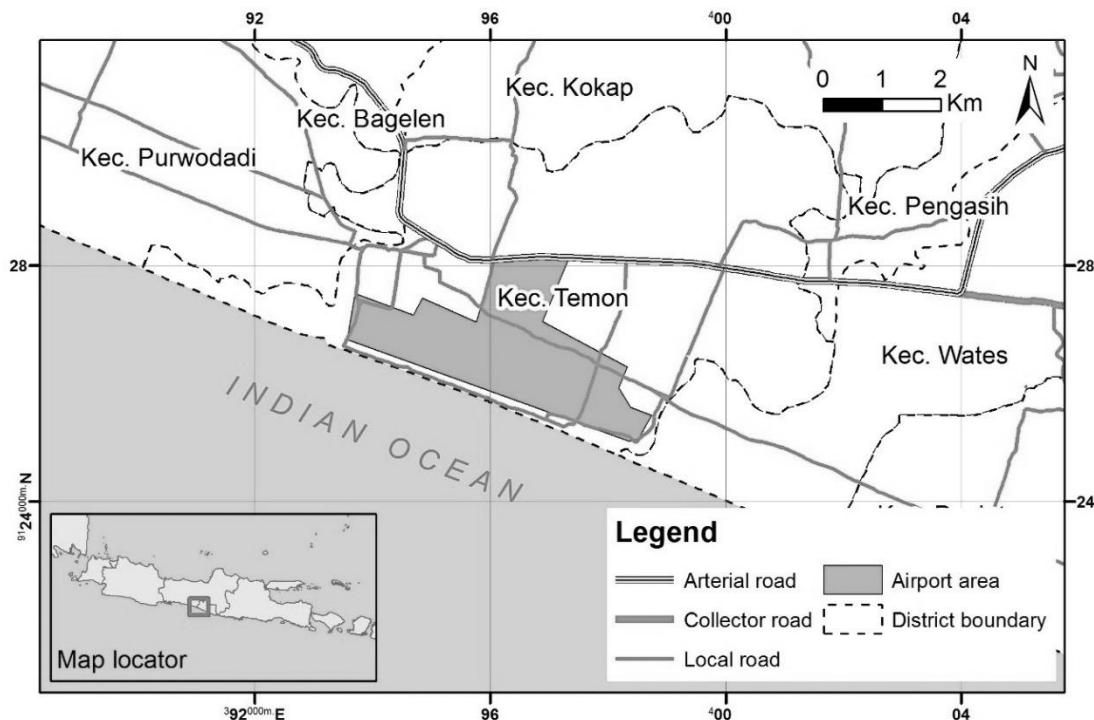


Figure 1. Map of NYIA development site.

Aquaculture sector, especially fish pond, has been very productive in the last few years, it produces very high numbers of harvest. In southern coast of Java, especially in Special Region of Yogyakarta, brackish aquaculture was a very profitable sector. Aquaculture of shrimp species, vanname (*Litopenaeus vannamei*), attracts the interest of fish pond farmers because it has more excellence than other types of shrimp, such as disease resistance, rapid growth and low feed conversion value, therefore its productivity is high on every harvest time. Furthermore, the position of Indonesia lies on equator line that having the dry and rainy season is also an essential factor for vanname shrimp to be productive along the year [9]. Based on data from Statistic Center Agency of Yogyakarta [10], the productivity of brackish aquaculture in Yogyakarta in 2011–2015 reached amounts of 3,244 tons, the highest productivity district was Kulonprogo, with productivity value was 2,581.48 tons.

Loss of fish pond area as the impact of NYIA development triggers decreasing the productivity of shrimp in Kulonprogo. Figure 2 shows NYIA development site boundary on satellite imagery PJ SPOT 6, which illustrates the site cutting fish ponds area [11]. Based on the geometric calculation using visual interpretation on satellite imagery of PJ SPOT 6, it has resulted approximately 83 ha area of the fish pond, of 313-ha total fish pond area in Kulonprogo, was impacted by NYIA development site planning. That 83-ha fish pond area consists of 379 units fish ponds with average area 2,200 m² per unit. Almost quarter of total fish pond area in Kulonprogo was lost as the impact of NYIA development.

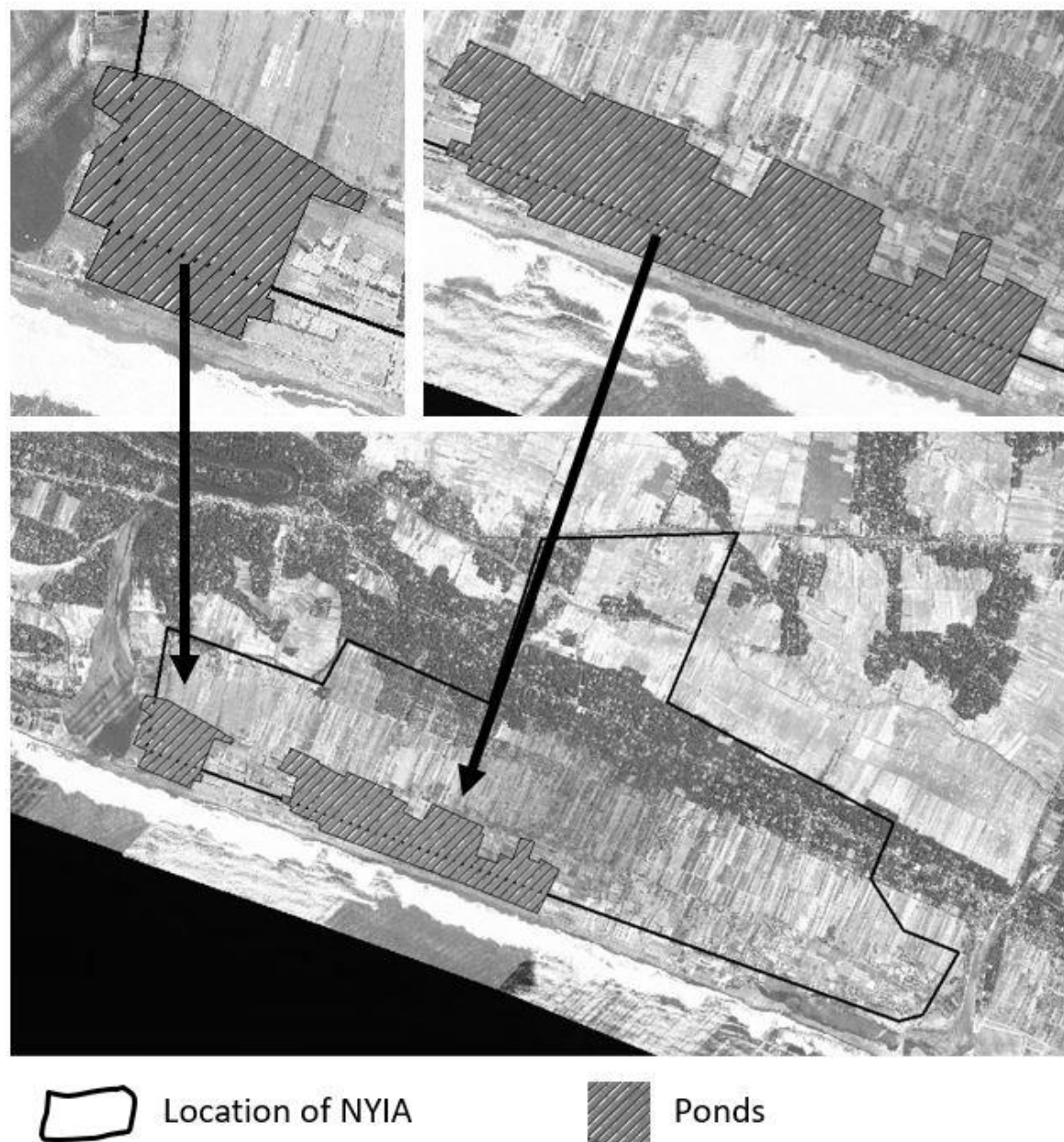


Figure 2. Impacted Area of NYIA development site (SPOT Imagery date acquisition March 2017).

3.2. Comparison fair compensation value and fish pond intrinsic value

Comparison among fair compensation value based on fish pond properties value in the area has to be assessed to determine whether the farmer was aggrieved by the land acquisition or not. Assessment of fair compensation value was calculated based on Act Number 2 the year 2012, President Regulation Number 71 the year 2012 and Indonesian Assessment Standard (SPI) Number 301 and its technical guidance. Assessment of fair compensation value consists of two main components, which are physical compensation and non-physical compensation. Result of the assessment of fair compensation value in the research area is presented in table 2.

Table 2. Fair compensation value assessment of fish pond land in NYIA airport plan area.

Component	Value (IDR)/Total Impacted Area
Physical compensation	718,421,436,225
Non-physical compensation	56,008,654,511
Fair compensation value	774,430,090,736

The result of fair compensation value shows value approximately 774 trillion IDR/total impacted area consists of 93 % physical compensation and the rest is non-physical component compensation. Nonphysical compensation is a premium privilege for landowners as unwilling to sell compensation. Calculation of fish pond properties value is presented in table 3; it shows the result the value of 92 trillion IDR.

Table 3. Reconciliation of fish pond property value assessment.

Method	Value (Rp)	Weight	Property Value per fish pond (IDR) (2,200 m ²)	Total Property Value (IDR) (834,301 m ²)
Income approach	245,517,663	0.85	245,655,263	92,695,808,087
Cost approach	246,435,000	0.15		

Comparison value of fair compensation and properties value can be seen in table 4. The result shows the fair compensation value is higher than the properties value, more than eight times. It because properties value consists only intrinsic value of the fish ponds, at the other side, fair compensation value considers premium value, unwilling to sell compensation, as mentioned above. It shows fish pond farmers were not aggrieved economically by the land acquisition for NYIA development.

Table 4. Comparison between fair compensation value and property value.

No.	Component	Value (Rp)
1	Fair compensation value	764,396,187,327
2	Property value	92,695,808,087

3.3. Socio economic impact on new airport development

NYIA development in Jangkaran Hamlet, Jangkaran Village, Temon Sub District, Kulonprogo District gave social impacts to the local community, one of them was historical value owned by the local community who already lived in the area for a long time. Fishpond activity is the source of their income, by the developing of NYIA will reduce it, as we know that fishponds in the southern part of Yogyakarta is a small-scale fisheries business [12]. Places where they were born, lived, grown and worked had to be evicted for the public facility development. Noise pollution is also one of the consequences that need to be considered by the local community who live surrounding the airport. Supporting infrastructures for the new airport need to be developed by the government in the surrounding area. Nevertheless, the NYIA development also gave positive impacts, such as increasing local income, job opportunities, the use of public transportation (train and bus to airport). As the capacity for passengers in the airport increase, it will lead the tourist increasing numbers who come to Yogyakarta. It will have an impact on making the higher price of land and the most important is accelerating regional development of Yogyakarta.

Based on the assessment of fair compensation value of fish pond given by the government was very high compared to fish pond productivity, the shrimp farmers were benefiting from the land acquisition

process. There are two alternatives for the shrimp farmer whose their fish pond impacted by NYIA development. The first alternative has relocated the fish ponds to other areas and the second one is they change their livelihood to supply service and trade that supporting airport services.

4. Conclusion

1. Based on geometric calculation on satellite imagery of PJ SPOT 6, the approximately 83 ha area of fish pond was impacted by NYIA development site planning.
2. Fish pond land acquisition for NYIA development shows the fair compensation value is higher than the properties value, more than eight times, means the fish pond owner was not aggrieved by the government.
3. Two alternatives for the shrimp farmer whose their fish pond impacted by NYIA development are fish pond relocation or changing livelihood to support airport service.

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