Industrialization and Loss of Rice Barns (Karawang Case Study)

P A Cakranegara
Universitas Presiden, Jababeka, Kab Bekasi, Indonesia

Email: pandu.cakranegara@president.ac.id

Abstract. Karawang is a major rice producing city and currently serves as a barn for the entire Jakarta region. Modern industrialization posed a significant threat to local farmers, in terms of economic choices, as to either continue farming or explore other more viable alternatives. This research provides a comprehension description, using several available data to aid the farmers' financial options. Secondary data were obtained from reliable public sources, including the Indonesian Central Bureau of Statistics, and were subsequently processed by the use of descriptive statistics and trend analysis. The results showed the existing conditions were responsible for the work preference in factories, due to higher compensation packages, compared to field experience. Meanwhile, land owners tend to switch to potential activities for higher economic value and profitable returns. This research extends the need for government intervention, in an effort to improve the living standard of Karawang farmers.

1. Introduction

Job creation is among the major pressing challenges faced by the Indonesian government. In an effort to resolve these predicaments, various alternatives are currently being explored, including the extension of invitations to foreign investors for the purpose of setting up large scale factories or businesses, where a high proportion of unemployed persons are possibly absorbed. Also, several attractive incentives have been endorsed, ranging from the ease of licensing and tax breaks to offering necessary startup infrastructures, e.g., land, particularly around Jakarta region (Faisal, 2019).

Subsequent, with increasing investors, landed properties tends to become limited, and the government needs to provide for more industrial estates. This expansion, therefore, begins to encroach into agricultural reserve zones, e.g., Karawang (Ningrum, 2019).

Conversely, the existence of functional production industries plays a significant role in generating jobs. Apart from direct employees, a multiplier effect created by suppliers and other internal expenses into the local economy, also occurs (Chapple, 2014). However, not every area is suitable to cultivate rice. Therefore, in order to commence planting, fertile soil and sufficient water are essential necessities. Moreover, land is a limited resource, and a plot used for manufacturing becomes inappropriate to grow rice.

Furthermore, the option is possibly considered, using the cost and benefits approach in economics, where trade-offs in decision making are potentials for optimum output (Mankiw, 2020).

This study examines the impact of industrialization on living conditions of Karawang small scale farmers, from an economic point of view. In addition, the predominant question is focused on the use of...
industrialization to help transform Karawang, from a one-time economic rice barn centre, into a more successful modern industrial hub.

2. Methods
This research employs descriptive-analytic approach (Williams, 2020), aimed at describing the Karawang situation, known as a rice-producing area, and the inherent challenges, due to industrialization.

The applied point of view is deeply based on economics, with existing analytical tool, otherwise called the cost-benefit analysis. This instrument demonstrates robust advantages, including the ability to show trade-offs faced by a policymaker, using a monetary measure.

Secondary data from trusted public sources were employed, specifically from the Central Bureau of Statistics, a state-owned institution tasked with the responsibility of providing accurate information related to Indonesia's statistical data (Statistics, 2019). The acquired data are related to agricultural land use and labor wages, particularly for factory workers and farm laborers, as well as from other sources covering land price data acquired from the home sale website and national labor wage data of the international news portal, CNN.

This research commenced with secondary data collection, and further processed, using descriptive statistics. Subsequently, the resulting data were compiled, on the basis of annual development to form a trend, aimed at observing the various changes during the industrialization era, between 2014 - 2018. Under these provisions, a cost-benefit analysis was conducted. The results showed the options generated greater benefits and lower costs in monetary terms. Also, major interesting economic deductions were developed to consider the socio-economic conditions of Karawang, in terms of both current and future sustainability.

3. Discussion
This research discusses the trade-offs faced by policymakers in Karawang on the use of land and labor factors, as well as the impact of the combined effects. However, the two circumstances are interrelated and therefore, do not exist separately.

3.1. Land
Industrial estates were initially developed around big cities, including Jakarta and Surabaya. In the Jakarta region, these projects were sited in certain areas, termed South Tangerang and Bekasi Regency. Several reasons were responsible for this selection. The first was the existence of adequate infrastructure, and second, the area was situated in close proximity to Jakarta, and the main market for industrial estate products, as a means to decentralize the Indonesian economy. These three locations have relatively low land values to attract industrial estate developers towards buying large portions at low prices and develop into integrated industrial zones. However, in the Cikarang scenario, no trade-off in land use exists, and was described unproductive and therefore, was not suitable for cultivation. As a result, the use of industrial assets tend to exponentially increase the added value (Rahadi et al, 2019). Consequently, as this facility extended towards Karawang, a rice-producing area, a trade-off in land use became evident. Furthermore, the property expansion serves as a logical step, as the community occurs next to Cikarang (Hamluddin, 2019).

Figure 1 highlights the need for industrial estates to access major roads or toll paths, as raw materials are frequently transported, using large trucks. These transport vehicles encounter difficulties navigating through the usual route. Without toll roads, timely distribution becomes vulnerable and tends to generate inefficient supply chains. Therefore, industrial area is expected to be built in an area next to or cut off by a toll road to cater for an effective supply chain, as observed in Figure 1.
Based on the land demand perspective, there are several sources of land requirement in Karawang. Firstly, further expansion is needed and secondly, with the emergence of industrial estates, land support becomes paramount, in terms of providing housing for employees and basic infrastructures, including markets, food places, lodging, and commercial centers (Fanama, 2020).

Several factors instigate high residential claims in Karawang. The first refers to the urbanization of industrial estate workforce. These personnel demonstrate certain important qualities, but the organization is only in need of a Technical High School graduate as a machine operator. Also, the staff mostly migrate from Central and East Java, which are densely populated areas with lower wages, and therefore, finding a place to live becomes very challenging. However, there are options to rent a house or buy a property, particularly for employees with long service years and are able to afford to stay in an industrial area. The second factor describes the real estate investors, especially with houses for rent, in order to meet urban workers’ needs (Njoo, 2019). As a consequence of high land demand and the added value of land for housing and commercial areas, there is an increase in land prices, as shown in diagram 1. The diagram ranged between 2015 - 2018 showed a steep increase, indicating an upsurge in price of approximately 50 percent in barely three years (Nugroho et al., 2020).

3.2. Labor
Indonesia’s labor wages are determined primarily based on the region’s economic capacity, and obviously differs from other regions. This salary gap tends to encourage labor migration and occurs depending on the region or sector.

The lowest income was prevalent in the Province of Yogyakarta Special Region of Rp. 1,570,992, while, the highest earning referred to Karawang with an amount of Rp. 4,234,010. However, Yogyakarta is an educational city, driven to produce numerous quality workforce to meet company needs. This gap probably led to labor migration to high-wage areas.

3.3. Synthesis
The high demand for residential and commercial land in Karawang, encourages property owners to either sell or divert the properties towards other higher economic and added value opportunities. Table 1 shows one of the direct consequences refers to the reduction of land used for rice fields.

Table 1 shows the data on the number of agricultural lands in Indonesia between 2014 - 2018. The four types of agricultural land, termed paddy fields, farms, fields, and temporary land, are not cultivated, and therefore, are redundant. However, the most significant decline occurred in wet paddy fields, at a rate of 19% in 5 years. Indonesia stands the risk of losing the entire wetland opponents with this continuous possible progression in 20 years (Ministry of Agriculture, 2020).

Wet fields are suitable for rice cultivation, and also demonstrate the highest level, due to the underlying complexities. These locations require a regular irrigation system and a continuous supply of good quality water, in order to avoid the resemblance of a swamp.

The first part of Table 2 shows the workers’ daily earnings in the last 5 years. Also, nominal wages for farmers increased on an annual basis, but under an inflation situation, then the real salaries start to decrease. This condition indicates the improvement rate in agricultural workers' wages appeared lower, compared to the rise in inflation. By using income to measure farmers' well-being, the living standard
over these five years reduces. Consequently, the outcome becomes very ironic as the rice farmers do not enjoy prosperity in the city popularly called the rice barn.

Table 1. Agricultural Land Use from 2014 to 2018

| Land Type              | 2014      | 2015      | 2016      | 2017      | 2018      | Growth 2014 to 2018 |
|------------------------|-----------|-----------|-----------|-----------|-----------|---------------------|
| Wetland                | 8.111.593 | 8.092.907 | 8.187.734 | 8.164.045 | 7.105.145 | 12.41%              |
| Irrigated Wetland      | 4.763.341 | 4.755.054 | 4.782.642 | 4.745.809 | 3.804.391 | 20.13%              |
| Non Irrigated Wetland  | 3.348.251 | 3.337.853 | 3.405.092 | 3.418.236 | 3.301.053 | 1.41%               |
| Dry Field              | 12.033.776| 11.861.676| 11.539.826| 11.704.769| 11.697.807| 2.79%               |
| Shifting Cultivations  | 5.036.409 | 5.190.378 | 5.074.223 | 5.248.488 | 5.256.223 | -4.36%              |
| Unused Land            | 11.713.317| 12.340.270| 11.941.741| 12.168.012| 10.770.888| 8.05%               |

The second part of table 2 compared the both salaries of farm and factory workers. Evidently, the diagram observed a difference, where the farm workers’ wages tend to decline, while for the factory workers, a significant increase was spotted, with a steep rising trend. Furthermore, the earnings of factory employees in 2020 were above 5 times the value in 2005. These inequalities show the tendency of labor migration to cross-industry, for the purpose of acquiring higher benefits.

Table 2. Wage Comparison between Manufacturer and Farm Labor

|                       | 2014      | 2015      | 2016      | 2017      | 2018      | 2018          |
|-----------------------|-----------|-----------|-----------|-----------|-----------|---------------|
| Minimum Wage for      | 2.447.450 | 2.888.978 | 3.330.505 | 3.605.272 | 3.919.291 |               |
| Manufacturer          |           |           |           |           |           |               |
| Daily Minimum         | 94.133    | 111.115   | 128.096   | 138.664   | 150.742   |               |
| Annual Income Growth  | 18.04%    | 15.28%    | 8.25%     | 8.71%     |           |               |
| Daily Income for      | 44.537    | 46.488    | 47.960    | 49.893    | 52.139    |               |
| Farm Labor            |           |           |           |           |           |               |
| Annual Income Growth  | 4.38%     | 3.17%     | 4.03%     | 4.50%     |           |               |
| Ratio between        | 211%      | 239%      | 267%      | 278%      | 289%      |               |
| Wage/Daily Income     |           |           |           |           |           |               |

Table 2 shows the comparison between the minimum wages of Karawang province in the manufacturing sector, particularly automotive companies, and farm labor. Every year, salaries in this industry expand continuously above inflation. Meanwhile, the wages of farm workers were regularly below annual inflation. As a result, the ratio between industrial wages and agricultural labor was known to improve yearly from double in 2014 to almost three times in 2018. The industrial wage ratio compared to agricultural labor measured wage inequality between these two sectors. However, higher values triggered extensive disparity, as employees with sufficient talent probably transits into industries with higher paychecks. Furthermore, with the limited number of laborers, what is left is the agricultural sector workforce with quality or competence not as high as counterparts in the industry, and this reduces the wages of farm workers. In the long run, as inter-industrial migration continues, inequality becomes very extensive, and the agricultural sector gets more depressed.

Table 3 shows the various benefits and disadvantages of transferring paddy land to residential purposes. Economically, the market has selected the location as a settlement. This choice was observed from the relatively high land prices after the conversion. Moreover, by conducting land valuation, the ideal needs to provide the highest value and best use, becomes significant (Chapple, 2014). Conversely, maintaining the plot as a paddy field does not provide higher added value for farmers and agricultural workers. The farm workers’ real wages diminishes on an annual basis.
Table 3. Benefits and Cost of Transfer of Paddy Land to Settlement

| Property Development | Farm Lands |
|----------------------|------------|
| Benefits             | Benefits   |
| Land prices are rising | Adequate rice production |
| Housing needs are met | Farmers get jobs |
| Employees do not have to travel far | Economic activity arises around housing |

| Cost | Cost |
|------|------|
| Land for paddy fields is reduced | Local rice prices remain difficult to compete with imported rice |
| The emergence of pollution caused by housing | Farmers still have low return from their lands. |

The solution tends to be an easy decision, with associated economic added value. However, from a larger perspective, a problem of food security appears to exist. This challenge are easily resolved by importing additional foodstuff, particularly in situations where the prices abroad are lower, compared to local settings. Only rice is a staple food for the Indonesian people, and its existence is related to the dignity of the people and not limited to the area (Valdes, 2019).

4. Conclusions
This study confirmed the pressure influence on the number of fertile paddy fields, as the primary land resource for rice cultivation in Karawang. The effect originated from two main conditions, termed the high demand for residential land and workers deficiency in agricultural sector. There are three economic science ingredients in producing goods and services, including raw materials, labor, and technology. This research focuses on raw materials and labor. The result showed a significant decrease in raw materials, e.g land, and also a declined workforce. Under the conditions of the decreasing two major production factors, then the output value is predicted to depreciate drastically in the future.

Economically, this study proved the value-added increase in Karawang alongside the presence of foreign direct investment. This added value was captured, using land price and labor wage indicators, where an annual significant growth was recorded. Based on the industrial area development plan, the current trend indicated a consistent occurrence in the future.

This research suggests the need for real efforts to improve the living standards of farm workers. Annual wage inequality clearly led to the emergence of labor migration to industries with higher income opportunities. However, migration is a natural phenomenon, based on the theory of economic allocation, where more profitable industries demand higher manpower capacities to continue to expand operation and therefore, pay very attractive wages. Therefore, as the best resources allocated to the industry provide the highest value-added services, the economic output subsequently becomes potentially optimum.

References
[1] Chapple, K. (2014). The highest and best use? Urban industrial land and job creation. *Economic Development Quarterly*, 28(4), 300-313.
[2] Erawan, A. (2012). Bisnis Properti Indonesia Paling Menguntungkan di Dunia (2012, Indonesia's Bussiness property is the most profitable, globally). Rumah. com.
[3] Faisal, A. (2019). Analisis Kebijakan Pembangunan Industri Berbasis Aglomerasi (Kawasan) Industri. *Bappenas Working Papers*, 2(2), 248-269.
[4] Fanama, V. (2020). Bubble Property di Indonesia: analisis empiris survei harga properti residensial.
[5] Gunawan, H. (2020, August 09). Harga rumah tipe kecil terus melaju tanpa dukungan KPR. Retrieved January 26, 2021, from https://lokadata.id/artikel/harga-rumah-tipe-kecil-terus-
[6] Hamluddin, H., Sarwoprasodjo, S., & Purnaningsih, N. (2019). Konflik Sosial Kawasan Industri Jababeka Dalam Perspektif Komunikasi. *Makna: Jurnal Kajian Komunikasi, Bahasa, dan Budaya, 4*(1), 1-19.

[7] Indonesia, C. (2020, November 22). UMK 2021 Naik, Pengusaha Karawang Khawatir Gelombang PHK. Retrieved January 26, 2021, from https://www.cnnindonesia.com/ekonomi/20201122205214-92-573069/umk-2021-naik-pengusaha-karawang-khawatir-gelombang-phk

[8] Mankiw, N. G. (2020). *Brief principles of macroeconomics*. Cengage Learning.

[9] Ministry of Agricultural. (2020). Cetak Biru Pengebangan Hortikultura tahun 2015–2030. *Direktorat Jenderal Hortikultura Kementerian Pertanian RI*. Jakarta.

[10] Ningrum, V. (2019). Agriculture Liberalization and Marginalized Young Local People: Evidence from a Food Plantation in Lampung. *Jurnal Ilmu Sosial dan Ilmu Politik, 22*(3), 230-244.

[11] Njo, Anastasia, Narsa I. Made, and Andry Irwanto. "Dual process of dual motives in real estate market Indonesia." *International Journal of Housing Markets and Analysis* (2019).

[12] Nugroho, A. A., Purnama, M. Y. I., & Fauzia, L. R. (2020). Clustering and regional growth in the housing market: Evidence from Indonesia. *Jurnal Keuangan dan Perbankan, 24*(1), 83-94.

[13] Rahadi, D. R., & Muslih, M. (2019). Konsep Wisata Industri di Kawasan Industri Jababeka, Cikarang. *Jurnal Kajian Pariwisata, 1*(1), 53-62.

[14] Redaksi. (n.d.). Dewan Anggi : Tanam Serempak dan Pola Tanam Pengaruhi Kesuburan Tanah Sawah. Retrieved January 26, 2021, from https://www.pelitakarawang.com/2019/10/dawan-anggi-tanam-serempak-dan-pola.html

[15] Shen, K., Cheng, C., Li, X., & Zhang, Z. (2019). Environmental cost-benefit analysis of prefabricated public housing in Beijing. *Sustainability Journal, 11*(1), 207.

[16] Statistik, B. P. (2019). *Data dan Informasi kemiskinan kabupaten/kota tahun 2020*. Jakarta: Badan Pusat Statistik.

[17] Valdes, A. (2019). *Food security for developing countries*. Routledge.

[18] Williams, T. A. (2020). *Statistics for business and economics*. Cengage Learning.