Agricultural Land Conversion Mechanisms, Internal Migrations, and Housing Policy: Case Studies of Industrial Estates in the Northern Cikarang, West Java Province, Indonesia

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Abstract. Various researches on agricultural land conversions stepped into the conclusion that those conversions, into housing and industrial land uses, were difficult to be controlled. Housing and industrial functions dominated those conversions on 36% and 20% respectively in the Province of West Java while they correspondingly accounted for 57% and 22% in the Java island. Other notable features of that conversions consisted of the proximity to the economic centers and occurred in rural areas that were located in urbanized regions. This paper identified that land-use change mechanisms have been including internal migrations within their dynamics in which, on the contrary, the supply for migrants’ accommodations has not been appropriately considered as the evidence-based information into the development policy. Cikarang, a prominent District of industrial estates in the Province of West Java, reflected the Central and Local Governments’ underdeveloped capacity in terms of incorporating the mechanism, data and integrating multi-sectoral programs through housing policy. Through random sampling, migrants’ origins in both areas altogether can be figured out as follows: Bogor/Bekasi (2%), DKI Jakarta (2%), West Java (35%), Central Java/D.I. Yogyakarta (41%), East Java (6%), Outside Java Island (11%). The growing internal migrations which accompanied the increasing demand for accommodations were inadequately responded to. While considerable percentage of migrant samples (46-92% in Northern Cikarang) were found to be financially capable for paying monthly rent above the standard costs of public rental housing (Rusunawa) however the housing policy was unable to innovatively design the rental systems which expanded its benefits towards various groups of lower-income and sustain its operational costs. This paper concluded that housing policy, particularly Rusunawa, would be the key where the agricultural land conversions rate can be moderated, and the internal migrations may turn into capital.

Keywords: land conversion, migrations, housing policy, Cikarang

1. The Rationale
The phenomenon of food security, housing provision, and internal migration is the phenomenon that has been seen and treated separately from one another, then resulting in the externality of a sector to other sectors. There was a slight exception in the program period from 2004 to 2009 period, where the Agropolitan program was a collaboration of the Ministry of Public Works and the Ministry of
Agriculture of Indonesia. Those ministries agreed to deal with rural development in Indonesia through the support of infrastructure and agricultural development.

In 2009, the Agropolitan guidelines were not updated at the national level, but a number of regions still implemented the program without adequate technical guidance from the national government. The program of Lahan Pertanian Pangan Berkelanjutan (LP2B) or Sustainable Agricultural Crops Land was established through Law No. 41/2009. Then this program was evaluated by Bappenas - Indonesian Ministry of National Development Planning in 2015 [1] and the study of land conversion by Balitbang Pertanian - Indonesian Agency of Agricultural Research and Development in 2011 [2] with a pessimistic conclusion on the ability of the agricultural sector to maintain the desired agricultural land area. It was specifically stated that 35% of housing land came from agricultural land at the level of West Java Province, and this figure was 55% at the level of Java Island [2]. If this scope is limited to rent-houses, so it will be seen that the agricultural-housing sector has formed the supply-demand interactions with internal migration.

On the other hand, the theory of internal migration breaks off at the factor of migrant movement flows from one location to another due to the factor of attraction and cost discrepancy - in the gravitational theory of migration. Exploring such theories results in limitations in looking at the continuing effects of internal migration on the agricultural and housing sectors, so that policy documents at the national and regional levels cannot be able to recognize these dynamics between internal migration and agricultural and housing land. If the policy is less sensitive to capture and understand these dynamics, it will respond in limited ways that affect delays in preventing agricultural land conversions. Thus, land conversion practices on the ground is an important issue in the development of this research.

2. Literature Review

Interrelation among internal migration, accommodation, and agriculture land conversion (ALC) needs an integrated explanatory theory that can figure out the mechanism and interactions among them. However, in the field of urban-rural migration studies, the dominant theory was about mobility or how migration occurs (the gravitational theory and Harris-Todaro theory) while the concern of this research is to find out empirical behaviors after migration takes place in certain areas. Post-migration activities theory needs to be formulated and achieving that goal can be conducted through the assessment of the theories on ALC drivers and housing development.

Agricultural Land conversion (ALC) drivers can be classified into two groups: (i) external drivers, which are industrialization, urban population, road infrastructure development, government policy and (ii) internal drivers, such as land productivity and technology intensity [3]. Through regression which included variables of productivity (X1), the capital-labor ratio (X2) and urban population (X3) then, followed by stepwise method, it was found that urban population became variables which influenced ALC in all strata in less developed, developing, developed countries [3]. Further, housing development is one of the main activities that has caused ALC in Indonesia, especially during the last 20 years. Housing development has taken place very intensively on the outskirts of Jakarta [4]. However, how the mechanism or propagation in which urban population and housing development took a role or interconnected towards ALC has not been systematically mapped. Another forgotten information was the status of the studied area (rural, rural-urban, urban) from the initial until final data assessment, in various researches related to ALC which caused difficulty to identify and formulate effective solutions. The fact that (i) Balitbang Pertanian gave a bold statement that ALC was challenging to be controlled, either in West Java and Java [2], and (ii) Bappenas concluded that LP2B was not properly planned [1]. The review from both institutions is the reflection that research on ALC should be shifted to the ALC mechanism since this will help to make a difference.

The urban population as a key driver of ALC and its nature for accommodation (or housing), as stated above, might act as an entry point to understand the ALC that occurred in Indonesia. The monocentric urban model could help construct a detailed linkage between the two by describing that (i) land function is explained as a function of distance from the urban center and (ii) The location of CBD becomes an
attraction for employment seekers and to reduce housing cost, workers would have to live at a distance around the CBD [5]. Those theories may imply the logic of the need to have accommodation which is close to working places as an intermediary phase before ALC to happen. Coupled with the low return value of agriculture land as compared to housing land use might open the possibility for ALC. However, the unstoppable critical practice of ALC was caused by the inability to accommodate the workers in the locations which not competing with agriculture lands.

*Rusunawa* (Multi-storeys rental housing) has been an official program by the national and local governments to house the workers, which mostly migrant workers. Historically, the Government of Indonesia has not fully invested in public housing, and until very recently has dealt with the limited capacity to provide adequate, and affordable housing by enabling self-help housing and the growth of informal settlement and investing selectively in slum upgrading. On a limited scale, the Indonesian Government has provided public housing through Perum Perumnas, a public real estate company. However, due to various limitations, from 1974 to 2004, Perumnas could only develop 453,000 houses and a substantive portion of its land was left vacant [6]. In 2007, the Government of Indonesia launched the National Program for 1000 Towers to increase adequate housing supply in metropolitan cities, in the form of low-cost rental walk-up flats (*Rusunawa*) and ownership in a high-rise, low-cost apartment (*Rusunami*). Under this program, the central government provides tax incentives, ease of permits and infrastructure to reduce the development cost and subsequently the rent/purchase cost of the apartment, while the local government provides the land for the project development [7]. Additional challenges related to *Rusunawa* deserve attention. One relates to the difficulties in providing maintenance for these apartment blocks. Subsidized rental schemes can only succeed in the long term when the governmental budgeting is available also to subsidize maintenance of the public spaces and facilities in these buildings since low-income tenants cannot afford these high costs. Of concern is the non-transparent selection of beneficiaries. However, the most crucial issue concerning the *Rusunawa* program is the location of the *Rusunawa*. According to information received from various sources, there is currently a long tenant waiting list of apartment towers. These towers are located in good locations with indicators such as close to employment opportunities and public services and - in the case of relocated communities - close to the original habitation site. There are also tower with low occupancy rates for *Rusunawa* buildings that are located in remote areas.

The later explanation on *Rusunawa*’s general issues is reflected in this research’s case study area of Bekasi which owns 2 *Rusunawa*: *Rusunawa* Jaya dan *Rusunawa* BPJS Ketenagakerjaan. In 2016, *Rusunawa* Jaya with the unit capacity for 96 households experienced (i) delay in occupational function despite its completed construction in the year 2015, (ii) delay in terms of electricity and potable water supply [8]. In the year 2017, *Rusunawa* Jaya faced a non-performing monthly rent payment of 47 renters for three months as the result of renters’ shifting priority towards children's education expenditure. Another problem was mismatch beneficiaries of which non-qualified renters (with a household income of more than Rp. 2.5 million monthly) displaced the qualified renters.

3. Research Questions
Observation and interviews revealed that migrant-workers became the triggers on rental rooms/houses which were provided by private sectors. Local Government’s *Rusunawa* program was not able to meet the demand for accommodation hence the supply was contributed in the forms of rental rooms/houses which were provided by private sectors through converting or selling parts of their agriculture lands. Theories on ALC spotted urban population as the significant influencer and studies on *Rusunawa* identified that this program had an internal barrier to respond to the fast increasing demand. Local Government may have the task to provide land and be more transparent on beneficiaries while migrant-workers need to commit to paying monthly rent on schedule. Providing more *Rusunawa* which captures the affordable target group (migrant-workers) shall prevent the spreading practice of ALC related to rental rooms/houses and understanding the worsened situation on the latter could motivate governments, at the national and local levels, to be more responsive. Following that, the research questions would be:
(i) what is the profile of rent affordability among the migrant-workers who resided in non-government accommodations? (ii) how are strong non-government accommodations correlated with ALC?

4. Method

Method for profiling the migrant-workers’ rent affordability was based on interviews to collect data on the rental cost of accommodation, income, and savings in the tabular format. Method for finding the strength of correlation used the Spearman Correlation Coefficient (nonparametric correlations algorithms) by considering the private supply types (owned or rental rooms/houses) as ALC’s indicators and the migrant-workers figures as an indicator of internal migration. The Spearman Correlation Coefficient is chosen to evaluate the relationship because the data that are available in this study is 15 years. Thus, no distribution test is needed to use this method of correlation since the available data is less than 30 [9]. By using the Spearman rho, the correlation value is at least 0 and at most 1, and while the sign of negative and positive indicate a relationship [10].

| Correlation   | Relationship          |
|---------------|-----------------------|
| 0.00 - 0.25   | No relationship / weak|
| 0.26 - 0.50   | Moderate              |
| 0.51 - 0.75   | Strong                |
| 0.76 - 1.00   | Very strong/ perfect  |

Table 1. is the distribution of correlation value according to Colton.

The Spearman correlation coefficient is analyzed by using SPP with the formula Spearman’s rho (ρ) [11] as below:

$$\rho_s = \frac{T_x + T_y - \sum_{i=1}^{N} d_i^2}{2 \sqrt{T_x T_y}}$$

(1)
In this study, the value of Spearman rho ($\rho$) is obtained from X as migrant workers and Y as types of private supplies. owned houses and rental rooms/houses, that both created a total supply of private accommodations. This study also uses the technic of profiling by focusing on the migrant workers who have worked and stayed in their owned or rented accommodation in the Northern Cikarang. The district of North Cikarang. West Java, is located thirty kilometers from Jakarta and has direct access to the highway that connects to Jakarta, Bandung and Java’s northern coastal regions (Figure 1). This district served as Jakarta’s first industrial parks in the 1980s with Jababeka as the leading developer that has shaped the landscape in north Cikarang through a 5,600-Ha planned new-town of Kota Jababeka. The semi-structured interview was conducted in 2017 in settlements surrounding enclaves of industrial and commercial uses in the Northern Cikarang.

Figure 1. Cikarang region as the appointed industrial area since the 1980s in the development corridor between Jakarta and Bandung.
5. Results and Analysis

5.1. The Profile of Rent Affordability

*Rusunawa* is a program of which workers, including migrant workers, are expected to be accommodated. Due to several reasons, mainly land provision and on scheduled infrastructure installments, the *Rusunawa* programs might not be able to respond to the housing demand appropriately. This section analysis aims to assess the possibility of accommodating the migrant-workers who have been renting in private rooms so the national government may ensure that future *Rusunawa* is positively needed and will have qualified renters with the ability to pay the rent continuously.

**Table 2.** Profile of contractual workers who afford to pay the monthly rent of accommodation in the Northern Cikarang.*

| Income group (USD/month) | Qualification for *Rusunawa* | Renting room expenditure to monthly income (%) | Remittance* to monthly income (%) | Max. number of shared persons (person) |
|--------------------------|-----------------------------|-----------------------------------------------|----------------------------------|----------------------------------------|
| < 1 USD                  | Qualified                   | -                                             | -                                | -                                      |
| 1-42 USD                 |                             | 8.19%                                         | 0.35-3.17%                       | 2                                      |
| 42-85 USD                |                             | 20-24%**                                     | 3-4%                             | 3                                      |
| 85-170 USD               | ≥ USD 167/month is not qualified | 7%                                             | 6%                               | 3                                      |
| >170 USD                 |                             | -                                             | -                                | -                                      |

* Public rental housing rent equals to USD 28 per month
** From other family members’ income
+ Accumulated amount with no specific allocating period
Table 3. Profile of non-contractual workers who afford to pay the monthly rent of accommodation in the Northern Cikarang *.

| Income group (USD/month) | Qualification for Rusunawa | Renting room expenditure to monthly income (%) | Remittance* to monthly income (%) | Max. number of shared persons (person) |
|--------------------------|----------------------------|-----------------------------------------------|----------------------------------|--------------------------------------|
| < 1 USD                  | -                          | -                                             | -                                | -                                    |
| 1-42 USD                 | Qualified                  | 15-27%                                        | 0.00**-23%                       | 4                                    |
| 42-85 USD                | Not verified               | -                                             | 13-22%                           | 20                                   |
| ≥ USD 85-170/month       |                             | 21%                                           | 143%                             | 3                                    |
| >170 USD                 | not qualified              | 63%                                           | 23%                              | 4                                    |

* Public rental housing rent equals to USD 28 per month
** From the family members’ income
+ Accumulated amount with no specific allocating period

There are two types of migrant workers: (i) contractual workers, usually work in formal sectors and (ii) non-contractual workers, usually work in informal sectors. Table 1 shows that in contractual workers (n = 14), 92% of workers are categorized as affordable renters for the Rusunawa program since they can provide rent expenditures that are equal to or more expensive than the Rusunawa tariffs. Income group of USD 42-85 spends 20-24% of monthly income which closes to monthly credit payment (25-30% monthly income) in the homeownership program. Further, contractual workers are still able to save their income as indicated in saving proportions for the purpose of remittances. Further, contractual workers are still able to provide savings, as indicated in remittances. Table 2 shows that, in non-contractual workers (n = 16), only 46% of them are able to provide rent expenditures which are equal to or more expensive than the Rusunawa tariffs.

5.2. Correlation between internal-migration and ALC

One possible way to find the relationship between internal migration and ALC, indicated by a private supply of rental rooms/houses, is through a correlation analysis. Table 4 finds that two types of private supplies are owned houses and rental rooms/houses; both created a total supply of private accommodations.

Table 4. Migrants and Non-governmental Accommodation Supply in Northern Cikarang.

| Year | Migrant Workers | Non-Governmental Housing Supply | Supply of Private Accommodations |
|------|-----------------|---------------------------------|----------------------------------|
|      | Owned Houses*   | Rental Rooms/Houses*            |                                  |
| 1980 | 1               | 1                               | 0                                | 1                                    |
| 1990 | 1               | 0                               | 0                                | 0                                    |
| 1992 | 1               | 0                               | 1                                | 1                                    |
| 2002 | 1               | 1                               | 0                                | 1                                    |
| 2003 | 2               | 1                               | 1                                | 2                                    |
| 2006 | 1               | 0                               | 1                                | 1                                    |
| 2007 | 1               | 0                               | 1                                | 1                                    |
| 2008 | 1               | 0                               | 1                                | 1                                    |
| 2009 | 1               | 0                               | 0                                | 0                                    |
| 2011 | 1               | 0                               | 1                                | 1                                    |
| 2012 | 1               | 0                               | 1                                | 1                                    |
| 2013 | 5               | 0                               | 4                                | 4                                    |
| 2014 | 3               | 2                               | 1                                | 3                                    |
| 2015 | 2               | 1                               | 0                                | 1                                    |
| 2017 | 5               | 0                               | 3                                | 3                                    |
| n=   | 30              | 6                               | 15                               | 21                                   |

* Defined by (i) floor size ≥ 36 sqm and (ii) plot size ≥ 72 sqm
Table 5. Correlational Analysis between internal migrations and Non-Governmental Accommodation Supply.

| Year | Migrant  | Own    | Rent   | Private   |
|------|----------|--------|--------|-----------|
| Spearman's rho | 1.000     | .727(**) | -.037  | .469      | .495      |
| Sig. (2-tailed) | .002      | .897    | .078   | .061      |
| N | 15        | 15      | 15     | 15        |
| Migrant | Correlation Coefficient | .727(**) | 1.000     | .151     | .567(*) | .757(**) |
| Sig. (2-tailed) | .002      | .591    | .027   | .001      |
| N | 15        | 15      | 15     | 15        |
| Own | Correlation Coefficient | -.037   | .151    | 1.000     | -.383    | .289      |
| Sig. (2-tailed) | .897      | .591    | .159   | .297      |
| N | 15        | 15      | 15     | 15        |
| Rent | Correlation Coefficient | .469    | .567(*) | -.383    | 1.000    | .748(**) |
| Sig. (2-tailed) | .078      | .027    | .159   | .001      |
| N | 15        | 15      | 15     | 15        |
| Private | Correlation Coefficient | .495    | .757(**) | .289    | .748(**) | 1.000    |
| Sig. (2-tailed) | .061      | .001    | .297   | .001      |
| N | 15        | 15      | 15     | 15        |

Table 5 shows that (i) internal migrations correlate with owned houses at the value of 0.151 (very weak), (ii) internal migrations correlate with rental rooms/houses at the value of 0.567 (strong), and internal migrations correlate with total private accommodations at the value of 0.757 (very strong).

5.3. ALC Schematic Model

Section 5.1 of rent affordability among migrant workers (92% contractual workers and 46% non-contractual workers were affordable accordingly) and section 5.2 of correlational strength (internal migrations and ALC) may reconstruct a mechanism or propagation which interlink both variables in the schematic model. Within that model, flows and nodes are visually composed to explain the stage and behaviors of the system (Figure 3).

Figure 3. Schematic model of land conversion (supply) due to internal migrations (demand).
6. Conclusion

According to some data and analysis in the previous sections, a number of conclusions can be obtained as follows:

- The profile of migrant workers in relation to rental ability can be concluded that 92% of workers in the formal sector (n = 14) and 46% of workers in the informal sector (n = 16) were able to rent the private rental room with equal to or more expensive price than the Rusunawa tariffs. This condition can be the basis of the local government to provide more additional Rusunawas.

- There are strong indications (correlation of 0.567) that the conversion of agricultural land, which is measured through the presence of private rental rooms, is triggered by the accommodation needs of migrant workers who are not accommodated by the program of Rusunawa. If the supply-demand schematic model is applied, hence the issue of accommodation of migrant workers is a critical point that should be considered to determine the balance between the agricultural, industrial, and housing land: if the multi-sector issue is not properly responded, then the agricultural land conversion will continuously occur without the maximum limit.

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