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by Anang Wahyu Sejati

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***In situ* urbanization-driven industrial activities: the Pringapus enclave on the rural-urban fringe of Semarang Metropolitan Region, Indonesia**

Imam Buchori^a, Lintang Rahmayana^b, Pangi Pangi^c, Angrenggani Pramitasari^d, Anang Wahyu Sejati^a, Yudi Basuki^a and Chely Novia Bramiana^c

^aFaculty of Engineering, Department of Urban and Regional Planning, Diponegoro University, Semarang, Indonesia; ^bCentre of Geomatics' Applications for Sustainable Development, Central Laboratory and Services, Diponegoro University, Semarang, Indonesia; ^cSchool of Vocation, Diponegoro University, Semarang, Indonesia; ^dDepartment of Urban and Regional Planning, Podomoro University, Jakarta Barat, Indonesia

ABSTRACT

This study observed the dynamics of the local communities' spatial patterns and socio-economic conditions in the Pringapus enclave industrial area, a rural-urban fringe of the Semarang Metropolitan Region (SMR). It applied a quantitative approach through descriptive statistical analyses of a questionnaire for 120 respondents and satellite image analyses using the Geographic Information System (GIS). The results showed that the urbanization was *in situ*, causing spatial and socio-economic impacts. Despite the worrying indications of declining environmental quality that can threaten sustainable development, the local people benefitted from the urbanization process. Excellent interaction between the local community and migrants was unique to the study area's enclave location, allowing skills to be transferred, which made the locals more resilient to urbanization. In this regard, this study recommends the local government strengthen new community organizations' role to optimize the mutually beneficial relationship between locals and migrants.

HIGHLIGHTS:

- *In situ* urbanization in enclaved areas causes changes in land use, economic, and social and environmental conditions.
- *In situ* urbanization in the case study has caused unusual yet positive interactions between the migrants and the locals.
- The transfer of knowledge in this enclave area made the locals more resilient to urbanization.
- The beneficial relationships between the locals and the migrants should be optimized by strengthening the role of community organizations.

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1. Introduction

Urbanization is a natural evolutionary process (Zhou et al., 2018) involving various physical, economic, social, and cultural traits (Chen, Gao, & Chen, 2017; Wu & Zhang, 2012; Zhang, Jiang, & Zhang, 2019; Zhou et al., 2018). The urbanization of a city usually

CONTACT Imam Buchori  i.buchori@live.undip.ac.id

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spreads to surrounding areas (McGee, 1991), due to the high pressure of urban growth impacting on the city's peripheral areas, which in turn, form peri-urban areas (Sejati, Buchori, & Rudiarto, 2019; Sridhar & Narayanan, 2016; Zasada, 2011).

The urbanization process in peri-urban areas may differ depending on its driving factors. In some cases, it has been due to the inability of the central region to meet the needs of community settlements (Sridhar & Narayanan, 2016), while in other cases, the stimulus has been industrial development in rural areas on the periphery (Legates & Hudalah, 2014; Long, Zou, & Liu, 2009; Ma et al., 2018). Urbanization cases in Indonesia in relation to McGee (1991) theory have also been previously explored by other researchers (Buchori, Pangi, Pramitasari, Basuki, & Wahyu, 2020; Buchori, Sugiri, Hadi, Wadley, & Liu, 2015; Buchori, Sugiri, Maryono, Pramitasari, & Pamungkas, 2017; Firman, 2004, 2009; Firman, Surbakti, Idroes, & Simarmata, 2011; Legates & Hudalah, 2014; Sugiri, Buchori and Ma'rif, 2015; Sugiri, Buchori, & Soetomo, 2011; Winarso, Hudalah and Firman, 2015).

The development of industrial activities in the peri-urban areas of SMR, a growing metropolitan region in Central Java, Indonesia, is the kind of urbanization defined by McGee (1991). This development has been influenced by Semarang City (*Kota*)'s role and function as its core city since the city's Spatial Plan (*Rencana Tata Ruang Wilayah/RTRW*) for 2011–2031 stipulates that industrial activities are no longer the focus of the development. As a result, the expansion of industrial activities outside the core of the city has been accelerating. This phenomenon was in accordance with Walker and Lewis (2001) concept regarding the emergence of typical industrial estates within a multi-nodal metropolitan area.

The SMR area witnessed a rapid growth in industrial activities is the arterial road corridor of Semarang-Bawen that administratively belongs to Semarang Regency (*Kabupaten*). The opening of the Semarang-Bawen toll road in 2016, as part of the national toll road project connecting Jakarta and Surabaya, has accelerated this development. In line with Walker and Lewis (2001) statement, transport accessibility seemed to be the reason for this industrial location. In addition to following the arterial road corridor, however, an independent industrial estate remote from the arterial road was also emerging as an enclave in the Pringapus sub-district (*kecamatan*).

Previous studies have discussed how industrial growth influences the process of urbanization in suburban and peri-urban areas (Al-sharif and Pradhan, 2016; Fahmi et al., 2014; Han, Wu and Dong, 2012; Tian, Ge, & Li, 2017; Zhou et al., 2018). However, studies on urbanization in this kind of enclave within rural-urban fringe areas were relatively limited. Distinct from the city-centred urbanization, the new form of urbanization in peri-urban areas tended to be *in situ* (Zhu, 2003), as in many cases of urbanization in Central Java (Setyono, Yunus, & Giyarsih, 2016); that was, the rural to urban changes in the local area were not due to population migrations to larger urban areas but the people's lifestyle becoming more urbanized. Referring to Dick and Rimmer (1998), this process was also known as *desakotasi*, representing an urbanization process in rural hinterlands.

The industrial development in Pringapus is unique due to its location, a rural-urban fringe area relatively remote from other urban activities. Certain factories' activities became an enclave in the middle of rural settlements, where agricultural activities are still dominant (Figure 1). The road to the area is a relatively narrow local road that

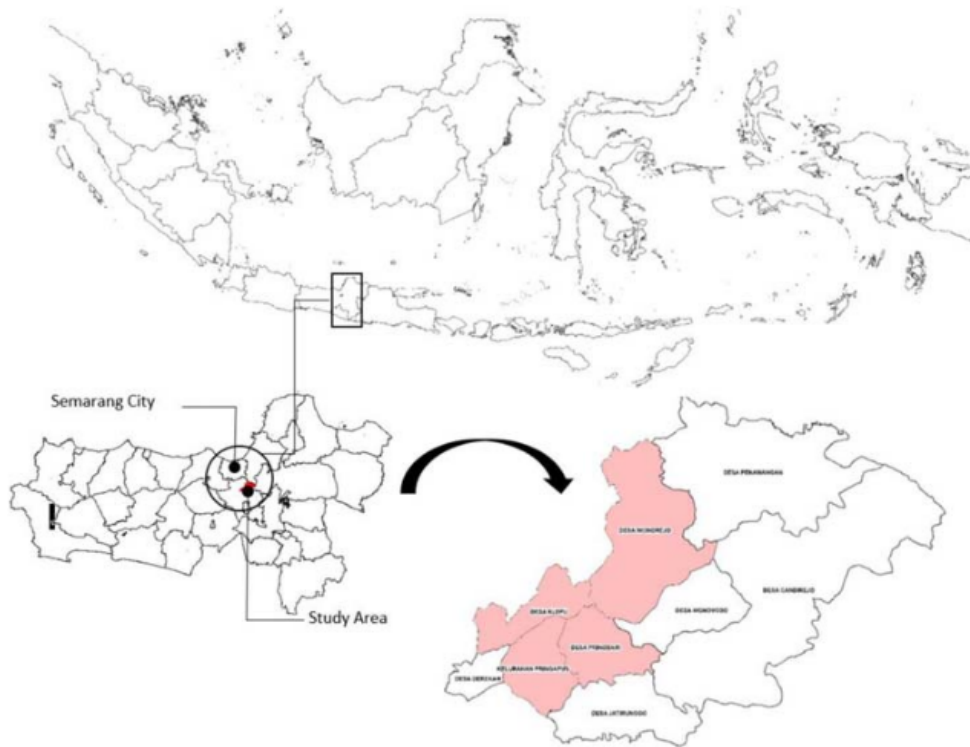


Figure 1. Study Area.

passes through cultivated forest and plantation areas, before reaching the site. The term enclave in this study was due to its location, rather than an enclave from economic perspective, as a physically, administratively, or legally bounded territory that is usually based on one or few big industries, such as mining (Phelps, Atienza, & Arias, 2015).

The growth of this enclave industrial estate has certainly had positive and negative impacts on local people, the majority of whom are farmers, and is thus interesting for further investigation. By looking at these phenomena and problems, the arising question is how the urbanization phenomenon in an enclave rural area through an industrialization process empirically results in the changes of land use and livelihoods of the rural communities. Thus, this study is expected to enrich the literature relating to *in situ* urbanization in an enclave affected by fast-growing industrial activities, particularly the spatial dynamics and impact on the local people's socio-economic circumstances. In addition, local governments can use its result as one of considerations in handling the similar cases.

2. *In situ* urbanization and its socio-economic impacts

As a global phenomenon, urbanization is an ongoing process in almost all countries, affecting their urban development (Salvati, Sateriano, & Bajocco, 2013; Walcott & Pannell, 2006; Zhou et al., 2018). It is currently an essential part of urban and regional planning (Banzhaf, Reyes-Paecke, Müller, & Kindler, 2013; Buchori, Sugiri, Maryono, Pramitasari, & Pamungkas, 2017; Jiang, Ma, Qu, Zhang, & Zhou, 2016; Malaque & Yokohari, 2007). Besides being defined as a process of population migration from villages to

cities, urbanization has also been interpreted as the urbanizing process of an area (Bunnell, Parthasarathy, & Thompson, 2013; Ma et al., 2018; Rahayu, Rini, & Soedwihajono, 2019; Wu & Zhang, 2012). In other words, it is a social process in which formerly rural dwellers become urban (Leaf, 2002; Liu, Zhang, & Lo, 2014; Soh, 2012). In this way, urbanization occurs in both cities and villages, as rural communities adopted more urban lifestyles. The process usually starts with a change in original work from agricultural to non-agricultural sectors (Benjamin, 2004; Winarso, Hudalah, & Firman, 2015). However, the urbanization occurring in the suburban areas did not reduce the city centre's economic function, where the living condition and job opportunities were still more prominent (Lin, 2014).

Rapid urbanization is inseparable from the interaction between urban areas and their surroundings. Numerous studies on various sub-topics have addressed this problem, including the relationship between town and rural areas in the vicinity (Allen, 2003; Braun, 2007; Douglass, 1998; Long et al., 2009); the development of industrial zones in the context of metropolitan areas (Firman & Fahmi, 2017; Hudalah & Firman, 2012; Hudalah, Viantari, Firman, & Woltjer, 2013; Wu & Zhang, 2012); spatial dynamics in the metropolitan area (Buchori et al., 2017, 2020; Hudalah, Winarso, & Woltjer, 2016; Puertas, Henríquez, & Meza, 2014; Sugiri et al., 2011); and, the mobility of industrial workers in the metropolitan area (Black, Bennett, Thomas, & Beddington, 2011; Hugo, 1982; Zhao, 2010; Zia, Farrahi, Riener, & Ferscha, 2013). Physically, urbanization is characterized by the spatial dynamics of the region. Several previous studies have shown that the spatial changes over time represent spatial dynamics in an area (Korah, Nunb¹⁷, & Akanbang, 2018; Tian et al., 2017¹⁷). Satellite imagery can detect these changes in terms of land cover and use (Korah et al., 2018; Tian et al., 2017). However, spatial dynamics concern spatial aspects, demographics, and the economics of the industrial activities that influence them (Fahmi, Hudalah, Rahayu, & Woltjer, 2014; Han, Wu, & Dong, 2012; Yang, Liu, Li, & Li, 2018; Zhang, Yue, Liu, Fan, & Wei, 2018; Zhou et al., 2018).

As one of the drivers of an area's economy, industrial activity is often considered the embodiment of the urbanization process (Fahmi et al., 2014; Wu & Zhang, 2012). Urbanization in peri-urban areas usually leads to an increase in settlement density, commercial functions and industry, the rise of land conversion, and the presence of commuters (Budiyantini & Pratiwi, 2016). However, although industrial estates' growth in a metropolitan region will boost its economy, there are potentially negative effects, especially the decline of living comfortability and the potential for environmental degradation (Rukmana & Rudiarto, 2016; Wu & Zhang, 2012). Urban expansion to the periphery potentially influences the characteristics of the region, especially the sustainability of agricultural activities in rural areas, farm production, and the socio-economic characteristics of farmers; it also increases the spatial gap due to the presence of large industries in the suburbs (Duvernoy, Zambon, Sateriano, & Salvati, 2018; López-Goyburu & García-Montero, 2018). In the case of the Israeli urban fringe (IUF), this expansion has shifted the agricultural sector to a more diverse economic base and improved the condition of settlements in rural areas (Bittner & Sofer, 2013).¹⁸ In this case, accurate identification of rural-urban fringe areas' characteristics is useful to measure the level of urbanization and its environmental effects from a rural-urban perspective (Chen, Wang, Li, Ma, & Zhang, 2018; Peng, Hu, Liu, Ma, & Zhao, 2018).

Exemplifying the case of *in situ* urbanization in China, rural areas' changes had been driven by two factors, namely the development of industrial activities in rural areas and foreign investment facilitated by the government (Zhu, 2000). These two factors transformed rural areas in different ways. In Jinjiang, the first factor was the cause of changes in the villagers' livelihood structure. In contrast, in Funqing area, the second factor provoked changes in the area's physical landscape (Zhu, 2000). In general, however, it is the process of *in situ* urbanization in China, which has encouraged changes in the settlement patterns and represented the difference between villages and cities (Zhu, 2003). The *in situ* urbanization process instigates a variety of effects, both positive and negative. On the one hand, it can increase the diversity of livelihoods, per capita income, and public facilities development. On the other, it can accelerate environmental degradation, uncontrolled land conversion, and the level of inequality (Harold, Abdul Samad, & Zaharah, 2012). In the latter case, according to Harold et al. (2012), the negative impacts of economic and environmental changes can be minimized by government interventions.

Industrial development in peri-urban areas can generate an enclave region of interest to industrial workers as it provides many benefits, especially related to socio-economic aspects due to the generated spill-over effects (Bi, Fan, Gao, Lee, & Yin, 2019). The arrival of immigrant workers in turn increases the housing concentration (Hudalah, Nurrahma, Sofhani, & Salim, 2019). Such urbanization in an enclave area often develops into independent cities (Bi et al., 2019; Ouyang, Wang, Tian, & Niu, 2017; Wissink, 2013), as initially, the workers are migrants from villages in the surrounding area. Over time, this population increase raises various problems related to public service needs (Ouyang et al., 2017). For example, in the suburbs of Shanghai, some restrictions had limited the rights of migrant residents to access public services (Ouyang et al., 2017).

The existence of an enclave area also influences changes in the socio-economic structure of the local people, primarily due to the changing status of the area from rural to urban (Wissink, 2013). Such changes can increase the gross regional domestic product (GRDP) and income per capita (Wu & Zhang, 2012). Some previous studies showed that economic changes due to urbanization had an impact on the diversity of livelihoods, the size of the non-agrarian population, and primary economic activities (Benjamin, 2004; Puppim de Oliveira et al., 2013). The economic changes are not simply based on visible economic activities (Firman, 2004; Leaf, 2002; Modai-Snir & van Ham, 2018). It also has broader impacts, such as changes in economic structure and regional economic development strategies, and regional economic growth. Thus, local people's socio-economic transformation can be measured by changes in economic activity and more detailed calculations of regional economic growth and changes to the diversity of a community.

Good economic growth instigates an increase in income per capita (Hugo, 1982; Leaf, 2002), although this is not automatically followed by the expected quality of life (Scott et al., 2013), as the change from rural to urban living does not always make locals more prosperous (Ma et al., 2018; Taubenböck et al., 2012). Whether or not there is an improvement of quality of life depends on the location and other factors, such as the local community's characteristics, government policies, the level of inequality, and the tightness of competition (Hart, 2018; Puppim de Oliveira et al., 2013; Zasada, 2011). Moreover, rural to urban change can increase a community's diversity because

the presence of migrants attracted by work in the enclave area can change the local social structure (Bunnell et al., 2013). Thus, changes in social structure are reflected in changes in the population's diversity (Grazuleviciute-Vileniske & Urbonas, 2014). Moreover, social change due to urbanization can also be seen in culture (Long et al., 2009). Indeed studies have shown that changes in the social structure of the local community are evident in aspects of culture, expertise, and skills, as well as patterns of kinship (Bunnell et al., 2013; Guo, Zhu, & Liu, 2018; Winarso et al., 2015). Following on from this discussion of the current literature and the issues it raises, this paper will now proceed to presenting the methodology for examining the *in situ* urbanization of the Pringapus enclave industrial area, concentrating on the dynamics of spatial change, and the impact on, and changes to, the socio-economic characteristics of the local people.

3. Methods and data

This study used quantitative methods. The primary analytical tool was a descriptive analysis of statistics, supported by satellite imagery analysis and Geographic Information System (GIS) that have been widely applied in other studies, such as Buchori et al. (2017), Adjei Mensah, Kweku Eshun, Asamoah, and Ofori (2019), and Sejati et al. (2019). In addition to the data collection survey of several relevant agencies, a primary survey was conducted by questioning certain respondents selected from the local population. The study area is a part of the Pringapus sub-district, covering one urban and three rural villages. These are the rural villages of Klepu, Pringsari, and Wonorejo, and the urban village of Pringapus, the capital of the sub-district (Figure 1).

The first of the two main study stages analysed the land use changes of the last 30 years using satellite imagery from 1990, 2006, and 2018. The 1990 area map shows the area was still rural. The 2006 map was chosen because, at that time, industrial activities began, in 1997, to be marked by the establishment of Ungaran Sari Garment factory in Pringapus, whereas the 2018 map shows the most recent conditions of the region at the time of writing. This analysis produced information about changes in land use and patterns, the diversity of settlements, and the spatial gap in land use intensity. The analysis was based on the land use maps derived from supervised satellite imagery classification using QGIS, an open-source software, and ArcGIS.

The second stage was the analysis of local socio-economic and environmental changes in the region, based on information from sampling local people living in the area. The sample consisted of residents over the age of 30 who had lived in the area for over 15 years. According to the statistical data for 2018 (sub-district in numbers), the four study villages in the Pringapus sub-district had a combined total of 27,274 inhabitants, 51.8% of whom were aged >30. Assuming that 50% had been living in the area for >15 years, the observed population was therefore 7,064 persons. Based on Slovin's formula, if $\alpha=5\%$, the minimum sample required was 100 respondents; this was extended by 20% in anticipation of potential errors, and so the final total was 120. The sample was randomly selected using cluster random sampling. The study area was divided into seven clusters, and the spatial distribution of the respondents is as shown in Figure 2.

The respondents' general characteristics are shown in Figure 3, which reveals that 65.2% of the 120 respondents were born in the study area, while the rest (34.8%) were migrants who had been living there for >15 years. The dominant ethnic group was

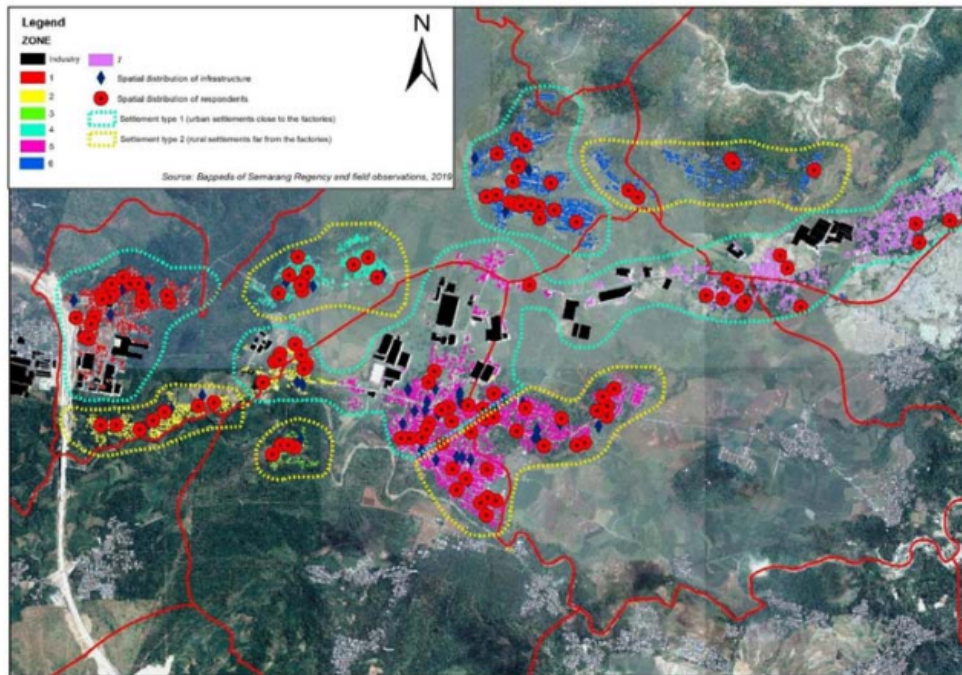


Figure 2. Spatial distribution of respondents.

Javanese, as only 1.5% of the sample were not. The average number of family members per household was 3–4 persons (62.9%). The other households contained, respectively, 5–6 (25%), 1–2 (9.8%), and more than six persons. Only 3% of the respondents had not finished elementary school. The majority had completed elementary (27.3%), junior (34.8%), and senior high schools (26.5%). About 8% had continued their education beyond high school with diploma, undergraduate, and graduate studies.

The respondents were asked to answer a total of 62 questions relating to urbanization in the study area. The question¹² covered information about changes in land use, and the respondents' perceptions of economic, social, and environmental aspects. The results provide a comprehensive overview of the regional spatial dynamics and how the community dealt with the changes.

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4. Results

4.1. Land use change

Figure 4 reveals the spatial dynamics of the Pringapus sub-district based on the data from 1990, 2006, and 2018. It shows that the development of the built-up areas followed those factories representing the industrial activities in this area, which started with the food factories located in the western part of the Pringapus sub-district. In 2006, large factories began to be established. One of them was PT Ungaran Sari Garment 3 (PTUSG), a garment factory located close to the previously developed food industries, and the toll road's planned route. This factory was built after its first and second factories had already been established on the arterial road. Following PTUSG, other kinds of factories

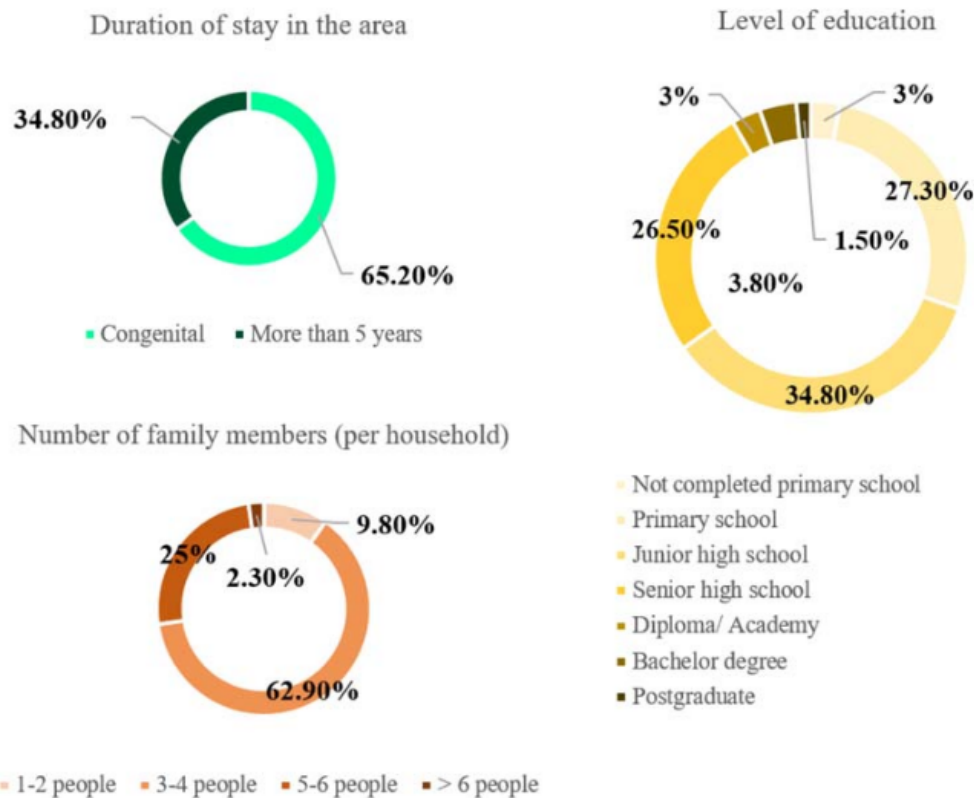


Figure 3. Characteristics of respondents.

appeared and formed an enclaved urbanized area, separate from the urban activities of Semarang City.

During the period under study, the industrial activities expanded from the western part, where the early factories were established, to the central part of the Pringapus sub-district.²⁶ The built-up areas also grew following these industrial activities. The change in land use in the west of the area was faster than in the east, and the speed of change seems to have been influenced by the arterial road and construction of toll roads connecting Semarang and Surakarta.¹⁵ Based on the field survey, the average land price in the west was relatively higher than in the east, and the closer the property was to the arterial road, the higher the price. The development of these industrial activities had received support from³⁸ the local government of Semarang Regency, indicated by the determination of industrial areas in the Spatial Plan of Semarang Regency 2011–2031, shown in Figure 5.

Table 1. Land use in 1990, 2006, and 2018.

Land use	Area (Ha)			Increase (Decrease)/Year (Ha)	
	1990	2006	2018	1990–2006	2006–2018
Built-up non-industrial area	217.53	338.82	422.70	7.58	6.99
Industrial area	5.84	22.36	51.89	1.03	2.46
Non built-up area	8047.71	7910.20	7794.85	−8.59	−9.61
Total	8271.08	8271.38	8269.44		

Source: Own compilation.

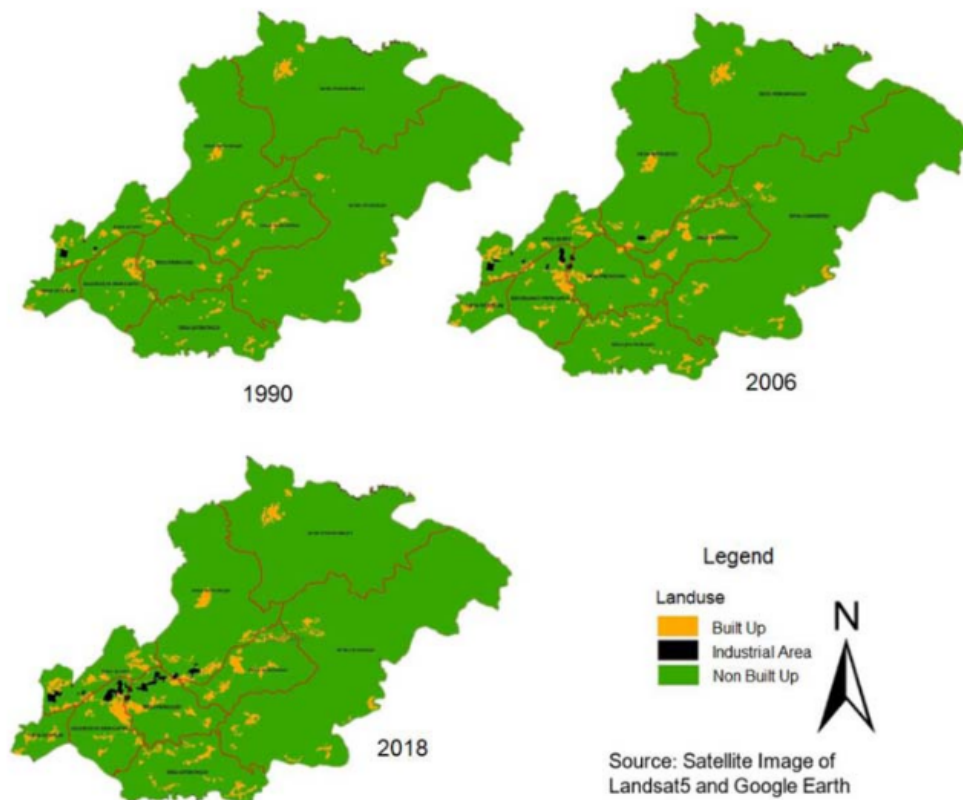


Figure 4. Spatial dynamics of the study area.

Table 1 shows the shift in land use based on the land use maps for 1990, 2006, and 2018, revealing an average annual increase in the industrial regions. Between 1990 and 2006, the industrial area comprised just 1.03 Ha/year, but this more than doubled between 2006 and 2018 (2.46 Ha/year). Simultaneously, while the average annual increase in built-up areas slowed slightly from 7.58 to 6.99 Ha/year, there was an accelerated yearly average fall in non-built-up areas. Land use converted from rural to either industrial or other urban activities, primarily residential areas. Following the development of these new residential areas, trading facilities such as kiosks, shops, and modern retail stores were established, as well as other facilities for education and health. Surprisingly, few flats were built to meet the industrial workers' housing needs, which is unusual because in Indonesia, flats are typically built in densely populated areas, particularly large cities.

According to the questionnaire survey results of the 120 respondents, the proportion of landowners decreased from 75.8% to 68.9% because their land was sold for factories. This decrease was relatively slight due to the village head's policy urging the community to avoid such sales. Alternatively, they were encouraged to use their land themselves for business, settlements, or rent. Of these landowners, 92.4% still used their land for family or personal needs, with a small percentage (5.3%) renting it to other parties.

In general, the community has shifted their land use pattern from agricultural activities to settlements. For example, while only 4.5% still used their land for agriculture,

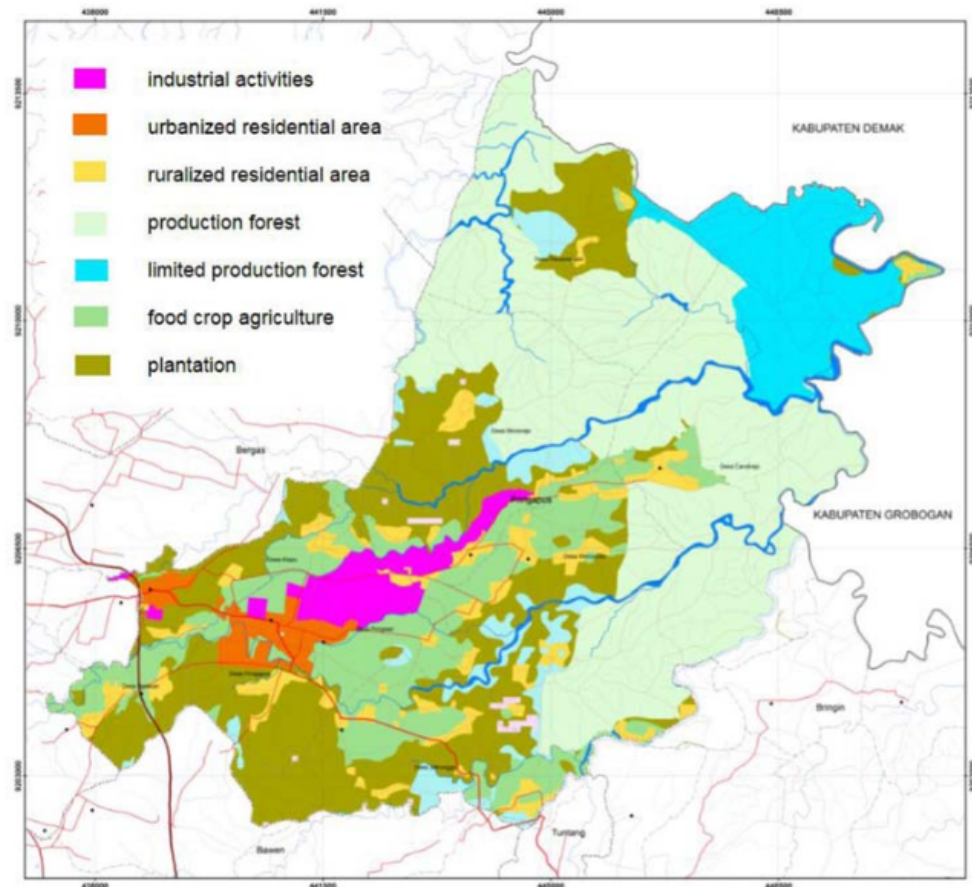


Figure 5. Spatial Plan of Semarang Regency 2011–2031, Pringapus sub-district.

81.1% of the landowners used their land for housing/shelter, because of the increasing demand for shelter over time. In recognition of this fact, half of the respondents felt that there had been a significant change in land use from agriculture to settlement. Additionally, about 18% and 15.6% of the respondents respectively thought that the move was from agriculture to industry, and from vacant land to settlements. Regarding these changes in land use, only 28% of respondents felt concerned, citing negative impacts such as difficulties in gardening or farming, and declining agricultural production, which had caused some residents to switch jobs in agriculture to industry or trade. However, the community could still tolerate these conditions, and considered the positive impacts to be more dominant than the negative (Figure 6).

Land prices more than quadrupled compared to before the development of industries, increasing from IDR 250,000–700,000 to IDR 1,500,000–2,000,000 per m². There were two classes of land prices: Block A1 located close to the main road, at a price of around two million rupiahs per m², and Block A2, comprised of small roads (alleys), at a price of approximately one and a half million rupiahs per m². The difference was about five hundred thousand rupiahs. Based on these data, proximity to main roads was the paramount factor affecting the study area's land price. The questionnaire

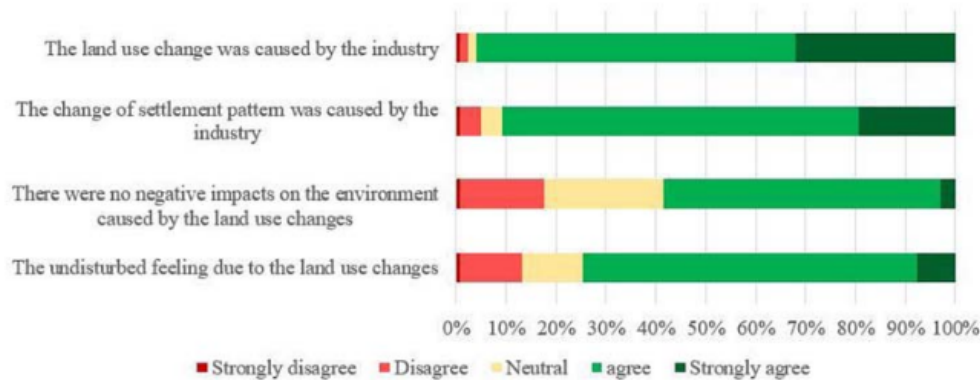


Figure 6. The Community's opinions on land use change.

survey results and field observation showed that the land price had changed due to the development of industrial activities and the toll road's construction. However, most people (97%) considered that industries' development was more influential than the toll road's construction. According to the community, other factors that also played a role were the national inflation rate and the development of property businesses in this area, especially housing and flats.

Most respondents (83.3%) considered that industrial development has changed the settlement pattern, and indeed the satellite image analysis of land use change confirmed this finding. The twin factors of the increasing need for shelter and the community's willingness (especially the migrants) to live close to the factories have changed the existing settlement pattern, from initially dispersed to more centralized. Living close to the factories was due to economic considerations and convenience, and as a result this accelerated the formation of the centralized pattern.

4.2. Economic change

With the industrial development described above, the types of community employment changed, especially from agriculture to non-agriculture. Figure 7 shows how there were more entrepreneurs and businesspersons than farmers, due to several factors, one of

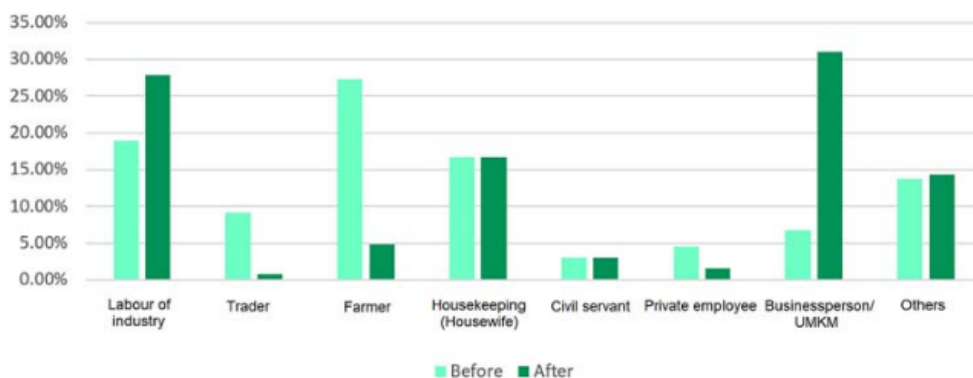


Figure 7. Change in employment.

which was local government policy. In cooperation with local stakeholders, the local government encouraged people to take the opportunities represented by these industrial activities. The change in employment type and the diversity of employment also increased, with several new job opportunities arising, such as cleaning services, security, property workers, and parking attendants (Table 2).

Furthermore, the results of the questionnaire survey showed that the new job opportunities had reduced the crime rate. Potential crime by unemployed persons has diminished or even stopped. In line with the change of employment, the diversity of economic activity has also increased. However, the decline in agricultural activities is characterized by a decrease in farmers due to the lack of agricultural land availability. Former farmers had tried to adapt by changing their occupation. Because of capital and expertise limitations, they began, for example, opening a restaurant, laundry, shop, or boarding house as an alternative source of employment.

Figure 8 shows the changes in public income. Apart from the effect of inflation, there has generally been an increase. The highest increase was in the community group earning between IDR 2,500,000–3,500,000, which can be considered an indication of improved social welfare in this area.

In the study area, the number of public facilities increased along with the population, mainly affected by the increase of migrants. As for economic facilities, the number of grocery stores/stalls also dramatically increased, following the tendency of local people to switch jobs from agriculture to trade or business. Taking advantage of the industrial activities, many who did not work for industries were self-employed as traders.

In the decade from 2008 to 2018, the roads leading to and within the study area significantly improved because the industrial activities, especially the delivery of goods, made accessibility to and from this area very essential. The comparison of the road conditions in 2008 and 2018 (Figure 9) shows that the length of paved roads has increased, and that of rocky and dirt roads has decreased. This fact indicates that the existence of industries has improved the quality of infrastructure in this area.

Furthermore, the respondents confirmed that several road sections were built with financial assistance from the industries, who also provided other financial assistance, such as clean water access and bridges. To receive this assistance, the community had to submit funding proposals. With this condition, 94.7% of respondents stated that industries' existence had improved the quality of public facilities. However, even though most residents (61.4%) approved, 38.6% worried about negative impacts, particularly about the decline of people's interest in shopping at traditional kiosks. Many people had begun to prefer shopping at small-modern retail stores or minimarkets than conventional kiosks.

Table 2. Types of work area.

Before		After	
1. Agriculture	80.3%	1. Trade (wholesale/retail)	29.5%
2. Trade (wholesale/retail)	9.8%	2. Industry	20.4%
3. Others	9.9%	3. Lodging and food service	15.4%
		4. Repair service	13.6%
		5. Property	7.8%
		6. Agriculture	7.0%
		7. Others	6.3%

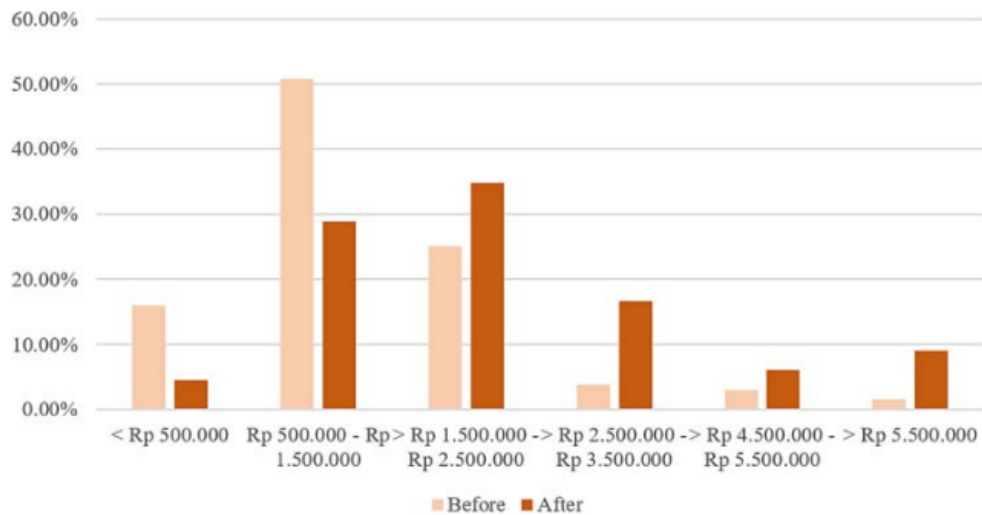


Figure 8. Income change.

The emergence of famous branded minimarkets in Indonesia like Indomaret and Alfamart has indirectly reduced the demand for traditional, locally owned stores. These minimarkets have more advantages such as air conditioning, more excellent cleanliness, and a better selection of goods, and therefore the community preferred these to the traditional stores. The respondents confirmed that the owners of the conventional stores had attempted several strategies to maintain customers, for example, competitive prices and selling more varied items, but with little success.

The local community felt positive effects about the development of industrial activities, such as an increase of income, convenience in fulfilling daily needs, a greater variety of available goods and services, improvements in the regional economy, and the development

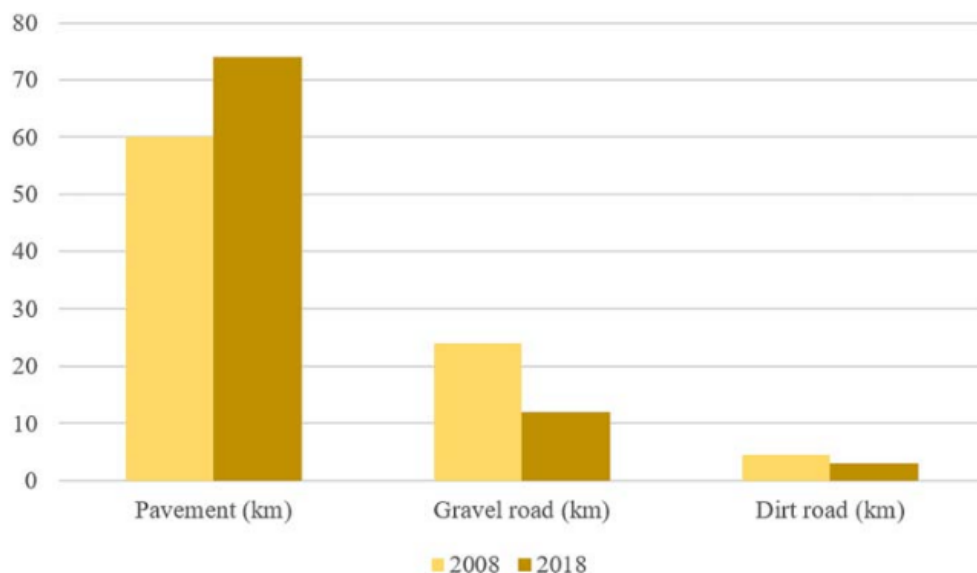


Figure 9. Length of road according to type.

of lodging services (boarding rooms, renting houses, hotels, etc.) and food providers (restaurant, food stall, etc.). However, they also felt several negative impacts, such as increasing prices of food, vegetables and meat; undistributed benefits, which in this case were concentrated on the landlords; and growing disparity between areas, as some areas were more advanced than others. Despite the perceived negative impacts, most respondents (84.9%) agreed that industrial development had improved their living conditions and welfare. They were satisfied with the ease of meeting their daily needs, as they did not have to go to the city because the supply of goods and services was sufficient in the region.

4.3. Social change

The questionnaire survey results showed that economic change had encouraged a social change in the study area. One change was the increase in the number of community organizations, usually driven by similar community group goals (Table 3), mainly due to the rise in the variety of employment types. The new societal organizations were established based on the latest expertise developing in this area. Another change was that some community organizations that had previously existed became less active, or even disappeared, such as youth groups and farming communities. This is closely related to the decreasing number of farmers. However, this phenomenon did not occur in areas where agricultural activities were still dominant and remote from industrial activities.

Before the development of industrial activities, the local communities were agricultural societies. They passed on farming skills from generation to generation but were not formal education like training or schools. Industrial activities have forced most of them to switch jobs from agriculture to industry, trade, or services. Because the developing industries were predominantly garment factories, the local people who worked for them were mostly women. The local people who became traders did not feel they had learned a new skill because, they had often traded when they were farmers, although on a smaller scale. However, those who moved into work in the industrial or service sector felt that they did have a new skill different from their previous job.

The presence of migrants has also influenced the skills of the local communities. The emergence of service needs such as workshop and electronic services has encouraged them to learn new skills. The questionnaire survey results showed that many local people who worked in the services sector had gained expertise from migrants (Figure 10). Thus, this industrial activity's development has indirectly added to the diversity of the community's expertise.

The questionnaire survey results showed that 74.2% of respondents agreed, and 5.3% strongly agreed, with the statement that they have close relationships with the migrants. Most respondents (72%) agreed, 6.8% strongly agreed, 4.5% disagreed, and the rest doubted the statement that the relationship between community members had become

Table 3. Changes to community organizations.

New community organizations	Lost and diminished community organizations
1. Entrepreneur community (micro, small and medium enterprises/ <i>Usaha Mikro Kecil dan Menengah-UMKM</i>)	1. Organization of Youth Community, famously known as <i>Karangtaruna</i>
2. Labour community	2. Peasant community
3. Merchant community	

more distant since the industrial development. The remote and separated location from the city centre acted as a restricting factor on the local people's kinship, even though the industrial development gave the local communities access to a broader range of kinship relationships.

4.4. Environmental change

The Spatial Plan of Semarang Regency 2011–2031 promulgated through Local Regulation no. 6/2011 regulates that some areas in Pringapus sub-district are planned as industrial areas. This plan was changed from the previous one (Local Regulation no. 4/2002 on the Spatial Plan of Semarang Regency), which had determined the study area as residential and agricultural land use patterns. Thus, the current industrial development is following the new Spatial Plan. The questionnaire survey results showed that the local people did not perceive changes due to the environmental impact of the development of industrial activities (Figure 11). They also thought that the land use change had not generated natural disasters, such as landslides and floods. Only about 3.8% felt that the change had increased the threat of natural disasters, and only to a limited extent.

Most people (84.1%) felt that industrial activities' development had not affected the availability of clean water in their environment. However, some people, especially those living close to the industries/factories, felt that the streams and water quality had decreased. Therefore, they avoided consuming shallow well water, even if it had no smell, because they were afraid of the water pollution. They preferred to buy a so-called "refill water" to meet their daily drinking water needs.

Overall, most respondents stated that they were comfortable living in the study area. The results of the questionnaire showed that 90.1% respondents had no intention of leaving their current residence. The few respondents who wanted to leave had specific reasons for doing so, such as the intention to live with their family or being forced to move for work reasons.

5. Discussion

The urbanization process in the study area was *in situ*, namely, urbanization happening in rural areas (Bunnell et al., 2013; Ma et al., 2018; Rahayu et al., 2019; Wu & Zhang, 2012) in the context of *desakota* region, where the distinction between urban and

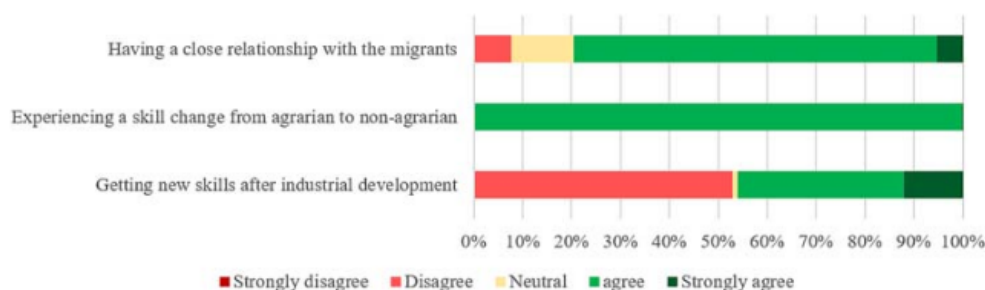


Figure 10. Opinions on social changes.

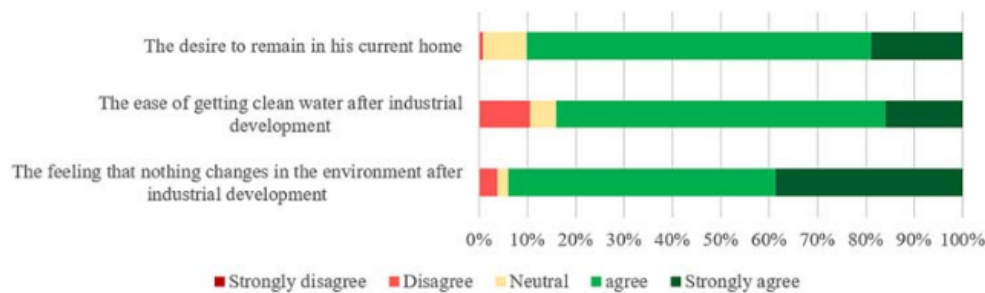


Figure 11. Public opinion on environmental change caused by industry.

rural became blur (Zhu, 2003). The urbanization process was unique due to the location being an enclave and far from the city centre. Slightly different from Walker and Lewis (2001) concept, the industrial activities grew in the area without support of transport access. In fact, it was not formally planned, and neither was supported by adequate infrastructure in the beginning. The development of these industrial activities then affected the local (indigenous) people, both positively and negatively, in social, economic, cultural, and environmental ways. Moreover, the development of industrial activities also triggered the arrival of migrants, who were mostly industrial workers, and their interaction with the local people brought about various changes, especially related to social pattern and lifestyle.

Usually, *in situ* urbanization brings changes in settlement patterns that give rise to the differences between rural and urban lifestyles (Zhu, 2003). In the study area, the changes in the architectural design of house buildings began to appear. The architectural design in *kampung* settlements started to imitate that in urban areas. The pattern of housing dispersion has also changed from being scattered into a more compact pattern, especially in nearby the factories.

The arrival of many migrant workers has increased the demand for accommodations and housing in this area. In some locations, the emergence of developer-style housing was perceived to be on a fair scale. Flat-type housing estates, which in Indonesia are usually only found in densely populated cities, began to appear in the study area and intended for both married and single industrial workers. Also, many local people with houses having a large enough yard provided rooms for rent and boarding houses for migrant workers. This development created segregated settlement patterns, namely the urban settlements close to the factories, and the rural settlements further away (Figure 2).

This change in settlement patterns was related to the development of industrial activities, particularly the demand for housing and shelters. The more compact settlement close to the factories and the flats establishment were considered a response to the increase in land prices. On the one hand, the compact settlement has helped the local government manage these areas, especially in the provision of urban infrastructures. On the other, the change could cause social problems due to the displacement of the local people, especially older farmers who are unable to adapt to the new, more urbanized, lifestyle. To avoid such issues, the local government should consider how to empower the local people to avoid the emergence of social segregation between the local people and the migrants.

Furthermore, the excellent relationship and social closeness ¹⁴ between the local people and the migrants were positive impacts arising from the location being far from the city centre and should be encouraged. For this, the role of community organizations such as of entrepreneurs, labourers, and merchant communities should be optimized. Another impressive benefit of the association with the migrants is that many local people claimed to have learned new skills and expertise. This fact reinforces previous studies that note ¹⁹ that social culture changes include expertise, skill, and kinship patterns (Bunnell et al., 2013; Guo et al., 2018; Winarso et al., 2015).

The presence of industries in this enclave area showed a different picture to those which characterize most urbanized areas. Because the local community living in this area received economic opportunities without losing kinship, the local people felt comfortable with the new environment. The increase in their average income also indicated an improvement in economic activities and welfare due to the industrial development, in line with Puppim de Oliveira et al. (2013), who stated that industry is the driving force of the economic development of a region.

Regarding the changes to the environment, although most people stated that they had not perceived negative impacts in their environment, some living close to the factories claimed to feel negative effects, especially related to difficulties in obtaining drinking water. For this, they were forced to buy drinking water. This issue should be considered quickly by the local government because it could worsen in future without early ²⁷ intervention. Another problem like the increase of urban heat island caused by the land use change in the study areas, as found in the study of Sejati et al. (2019), was also essential to be considered. As mentioned by Harold et al. (2012), the role of local government is essential to minimize the negative impacts of environmental changes within *in situ* urbanization.

Furthermore, as Wu and Zhang (2012) and Rukmana and Rudiarto (2016) stated, the people who experience social and economic benefits due to industrial development will be insensitive ¹² to the issues of environmental degradation. In the study area, people preferred to remain in their current home, as long as they were able to obtain the social and economic benefits arising from the existence ²⁹ of the industry. In this regard, environment seemed to be a less considerable issue. As Lopez-Goyburu and García-Montero (2018) and Duvernoy et al. (2018) have noted, this issue could also generate a spatial gap between the areas where the large-scale factories exist and the surrounding areas that are still rural.

³¹ In terms of the sustainability of the agricultural activities in the study area, the increase of built-up areas has eliminated significant agricultural areas. In addition to the decline of agricultural areas (Table 1), the decreasing number of farmers (Table 2) was an important issue that requires special attention. The reduction of youth community organizations like *Karangtaruna* and peasant communities replaced by organizations of entrepreneurs, labour, and merchant communities might indicate that the younger generations are less interested in working as farmers. If this continues, it is not impossible that, in the future, there will be a shortage of farmers, which may in turn endanger national food security.

The improvement in the quantity and quality of public facilities is one characteristic of urbanization. Most communities felt an increase in the quality of public facilities positively impacted the development of industrial activities in the study area. Likewise, the change in the quality and length of roads since industrial activities was also positive.

The communities considered that these improvements were positive contributions from the development of industrial activities. Also, they felt it was easier to meet their daily needs, albeit at a higher price.

The same benefits also occurred in terms of meeting public service needs. The local community felt that they had various new facilities, such as shopping areas, banking facilities, repair shops, and other services. The potential conflicts in meeting public service needs, as indicated by Ouyang et al. (2017), ²⁴ did not occur in the study area. With the changes in physical, economic, social, and environmental aspects, as well as the negative and positive impacts, the presence of industrial activities made the community more comfortable living in the study area.

Another essential aspect considered by some respondents as a negative impact was the decline of people's interest in shopping at traditional kiosks. Many people preferred to shop at small modern retail stores or minimarkets than conventional kiosks. The trading competition changes with many new minimarkets forced the local community to become more creative to survive. Usually, the relationship between local people and migrants in a new urban area is quite weak because they are individualistic (Joko & Haryono, 1999; Walcott & Pannell, 2006; Yang et al., 2018). However, what happened in the study area was quite different. Located in an enclave area, the interactions between the local people and the migrants were more intense. This helped them form a new social pattern with a more heterogeneous composition of society, but closer inter-relations. Thus, the harmonious relationship between the local people and the migrants was locally appreciated in the study area and should be preserved.

6. Conclusion

This study has proven the urbanization and industrial movement pattern in changing the quality of the economy and community life in Pringapus, Semarang Regency. It has also successfully observed the spatial and socio-economic impacts of *in situ* urbanization in an enclave area affected by industrial activities' development. To some extents, the effects were relatively the same as the process of *in situ* urbanization in other places. Physically, built-up and industrial areas have increased significantly in the last two decades. Visually, the growth of flats and developer-style housing, a characteristic of urban settlements, has confirmed the urbanization process in this area. The emergence of shopping areas, services, and other urban facilities, especially in the areas close to the factories, was also the same. However, some interesting findings appeared related to the process of social and economic changes.

From the social and economic perspective, local people felt an increase in income, welfare, and convenient access to various public facilities and other services/shops to meet their daily needs. As for accessibility, they stated that the quality of the road was much more improved than before. In terms of employment, many local people switched jobs from agrarian to non-agrarian sectors. Some, particularly women, began to work for the garment factories. To gain additional income, some local people decided to turn their house and yard for business and services as a response to the village head's policy advising local people not to sell their land to the factories. This policy made people more resilient to the process of urbanization. However, many older people found it difficult to adapt, especially related to the possibility of changing their job.

The uniqueness arising from the study area's enclave location was the strength of the interaction and the formation of a kinship atmosphere between the local community and the migrant workers. Through these interactions, the transfer of skills from the migrants to the local people took place. It was also helpful for local people to adapt to significant changes. Some new jobs carried out by the local people, such as the home industry and services, were resulted from this transfer of skills. Thus, fewer social conflicts occurred between the local people and the migrants.

Even though, most people felt that they were not bothered by some indications of a decline in environmental quality, this issue should be considered because this study has not yet observed the impact of industrial development on the environment. From the initial indications of the decline in the quality of drinking water around the factories, this issue may lead to more environmental problems in the future. If not immediately addressed, it could endanger the sustainable development of the region. Therefore, conducting further study on environmental impacts in the study area is strongly encouraged.

Generally, the process of urbanization can bring positive impacts to the community. The results of this study have confirmed that, in the case of *in situ* urbanization in Pringapus sub-district of Semarang Regency, the local community has received many positive impacts, even though they were less aware of potential environmental damage. Moreover, their interaction with migrants has also provided benefits regarding business opportunities and the transfer of skills. However, whether these positive interactions are due to the enclave location needs to be tested in other study locations.

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ORCID

Imam Buchori  <http://orcid.org/0000-0001-7306-2956>

References

- Adjei Mensah, C., Kweku Eshun, J., Asamoah, Y., & Ofori, E. (2019). Changing land use/cover of Ghana's oil city (Sekondi-Takoradi Metropolis): implications for sustainable urban

- development. *International Journal of Urban Sustainable Development*, 11(2), 223–233. doi:10.1080/19463138.2019.1615492
- Al-sharif, A. A. A., & Pradhan, B. (2016). Spatio-temporal prediction of urban expansion using bivariate statistical models: Assessment of the efficacy of evidential belief functions and frequency ratio models. *Applied Spatial Analysis and Policy*, 9(2), 213–231. doi:10.1007/s12061-015-9147-1
- Allen, A. (2003). Environmental planning and management of the peri-urban interface: Perspectives on an emerging field. *Environment and Urbanization*, 15(1), 135–148. doi:10.1177/095624780301500103
- Banzhaf, E., Reyes-Paecke, S., Müller, A., & Kindler, A. (2013). Do demographic and land-use changes contrast urban and suburban dynamics? A sophisticated reflection on Santiago de Chile. *Habitat International*, 39, 179–191. doi:10.1016/j.habitatint.2012.11.005
- Benjamin, S. (2004). Urban land transformation for pro-poor economies. *Geoforum; Journal of Physical, Human, and Regional Geosciences*, 35(2), 177–187. doi:10.1016/j.geoforum.2003.08.004
- Bi, L., Fan, Y., Gao, M., Lee, C. L., & Yin, G. (2019). Spatial mismatch, enclave effects and employment outcomes for rural migrant workers: Empirical evidence from Yunnan Province, China. *Habitat International*, 86, 48–60. doi:10.1016/j.habitatint.2019.02.008
- Bittner, C., & Sofer, M. (2013). Land use changes in the rural-urban fringe: An Israeli case study. *Land Use Policy*, 33, 11–19. doi:10.1016/j.landusepol.2012.11.013
- Black, R., Bennett, S. R. G., Thomas, S. M., & Beddington, J. R. (2011). Migration as adaptation. *Nature*, 478, 447–449. <https://www.nature.com/articles/478477a>
- Braun, J. V. (2007). 'Rural-Urban Linkages for Growth, Employment, and Poverty Reduction', in *Fifth International conference on the Ethiopian Economy*. Addis Ababa: Ethiopian Economic Association, pp. 1–21. <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll5/id/1086/filename/1087.pdf>
- Buchori, I., Pangi, P., Pramitasari, A., Basuki, Y., & Wahyu, S. A. (2020). Urban expansion and welfare change in a medium-sized suburban city: Surakarta, Indonesia. *Environment and Urbanization ASIA*, 11(1), 78–101. doi:10.1177/0975425320909922
- Buchori, I., Sugiri, A., Hadi, S. P., & Wadley, D., & Liu, Y. (2015). Developing a geographic information system-based assessment model for sustainable metropolitan development: The case of the Semarang Metropolitan Region, Indonesia. *American Journal of Environmental Sciences*, 11(2), 62–75. doi:10.3844/ajessp.2015.62.75
- Buchori, I., Sugiri, A., Maryono, M., Pramitasari, A., & Pamungkas, I. T. D. (2017). Theorizing spatial dynamics of metropolitan regions: A preliminary study in Java and Madura Islands, Indonesia. *Sustainable Cities and Society*, 35, 468–482. doi:10.1016/j.scs.2017.08.022
- Budiyantini, Y., & Pratiwi, V. (2016). Peri-urban typology of Bandung Metropolitan area. *Procedia - Social and Behavioral Sciences*, 227, 833–837. doi:10.1016/j.sbspro.2016.06.152
- Bunnell, T., Parthasarathy, D. and Thompson, E. C. (2013) *Cleavage, connection and conflict in rural, urban and contemporary Asia, cleavage, connection and conflict in rural, urban and contemporary Asia*. Edited by T. Bunnell, D. Parthasarathy, & E. C. Thompson. Dordrecht: Springer Netherlands. doi:10.1007/978-94-007-5482-9.
- Chen, C., Gao, J., & Chen, J. (2017). Institutional changes, land use dynamics, and the transition of rural settlements in suburban China: A case study of Huishan District in Wuxi city. *Habitat International*, 70, 24–33. doi:10.1016/j.habitatint.2017.09.011
- Chen, L., Wang, L., Li, G., Ma, F., & Zhang, Z. (2018). Understanding treescape changes as the basis of urban forest planning in fringe areas. *Ecological Indicators*, 95, 117–126. doi:10.1016/j.ecolind.2018.07.031
- Dick, H. W., & Rimmer, P. J. (1998). Beyond the third world city: The new urban geography of South-East Asia. *Urban Studies*, 35(12), 2303–2321. doi:10.1080/0042098983890
- Douglass, M. (1998). A regional network strategy for reciprocal rural-urban linkages: An agenda for policy research with reference to Indonesia. *Third World Planning Review*, 20(1), 1. doi:10.3828/twpr.20.1.f2827602h503k5j6
- Duvernoy, I., Zambon, I., Sateriano, A., & Salvati, L. (2018). Pictures from the other side of the fringe: Urban growth and peri-urban agriculture in a post-industrial city (Toulouse, France). *Journal of Rural Studies*, 57, 25–35. doi:10.1016/j.jrurstud.2017.10.007

- Fahmi, F. Z., Hudalah, D., Rahayu, P., & Woltjer, J. (2014). Extended urbanization in small and medium-sized cities: The case of Cirebon, Indonesia. *Habitat International*, 42, 1–10. doi:10.1016/j.habitatint.2013.10.003
- Firman, T. (2004). New town development in Jakarta Metropolitan Region: A perspective of spatial segregation. *Habitat International*, 28(3), 349–368. doi:10.1016/S0197-3975(03)00037-7
- Firman, T. (2009). The continuity and change in mega-urbanization in Indonesia: A survey of Jakarta–Bandung region (JBR) development. *Habitat International*, 33, 327–339.
- Firman, T., & Fahmi, F. Z. (2017). The privatization of metropolitan Jakarta's (Jabodetabek) urban fringes: The early stages of “post-suburbanization” in Indonesia. *Journal of the American Planning Association*, 83(1), 68–79. doi:10.1080/01944363.2016.1249010
- Firman, T., Surbakti, I. M., Idroes, I. C., & Simarmata, H. A. (2011). Potential climate-change related vulnerabilities in Jakarta: Challenges and current status. *Habitat International*, 35(2), 372–378. doi:10.1016/j.habitatint.2010.11.011
- Grazuleviciute-Vileniske, I., & Urbonas, V. (2014). Urban regeneration in the context of post-Soviet transformation: Lithuanian experience. *Journal of Cultural Heritage*, 15(6), 637–643. doi:10.1016/j.culher.2014.01.002
- Guo, Y., Zhu, J., & Liu, X. (2018). Implication of rural urbanization with place-based entitlement for social inequality in China. *Cities*, 82, 77–85. doi:10.1016/j.cities.2018.05.007
- Han, X., Wu, P. L., & Dong, W. L. (2012). An analysis on interaction mechanism of urbanization and industrial structure evolution in Shandong, China. *Procedia Environmental Sciences*, 13 (2011), 1291–1300. doi:10.1016/j.proenv.2012.01.122
- Harold, B., Abdul Samad, H., & Zaharah, M. (2012). The village in the city. *Economic & Political Weekly*, 47(52), 17–19.
- Hart, K. (2018). The suburbanization of rural life in an arid and rocky village in western Turkey. *Journal of Arid Environments*, 149, 73–79. doi:10.1016/j.jaridenv.2017.03.011
- Hudalah, D., & Firman, T. (2012). Beyond property: Industrial estates and post-suburban transformation in Jakarta Metropolitan Region. *Cities*, 29(1), 40–48. doi:10.1016/j.cities.2011.07.003
- Hudalah, D., Nurrahma, V., Sofhani, T. F., Salim, W. A. (2019). Connecting fragmented enclaves through network? Managing industrial parks in the Jakarta-Bandung urban corridor. *Cities*, 88, 1–9. doi:10.1016/j.cities.2019.01.005
- Hudalah, D., Viantari, D., Firman, T., & Woltjer, J. (2013). Industrial land development and manufacturing deconcentration in greater Jakarta. *Urban Geography*, 34(7), 950–971. doi:10.1080/02723638.2013.783281
- Hudalah, D., Winarso, H., & Woltjer, J. (2016). Gentrifying the peri-urban: Land use conflicts and institutional dynamics at the frontier of an Indonesian metropolis. *Urban Studies*, 53(3), 593–608. doi:10.1177/0042098014557208
- Hugo, G. J. (1982). Circular migration in Indonesia. *Population and Development Review*, 8(1), 59. doi:10.2307/1972690
- Jiang, G., Ma, W., Qu, Y., Zhang, R., Zhou, D. (2016). How does sprawl differ across urban built-up land types in China? A spatial-temporal analysis of the Beijing metropolitan area using granted land parcel data. *Cities*, 58, 1–9. doi:10.1016/j.cities.2016.04.012
- Joko, T., & Haryono, S. (1999). Dampak Urbanisasi Terhadap Masyarakat Di Daerah Asal. *Masyarakat, Kebudayaan dan Politik*, (4), 67–78. journal.unair.ac.id/download-fullpapers-07-Trijoko.pdf%0A%0A.
- Korah, P. I., Nunbogu, A. M., & Akanbang, B. A. A. (2018). Spatio-temporal dynamics and livelihoods transformation in Wa, Ghana. *Land Use Policy*, 77, 174–185. doi:10.1016/j.landusepol.2018.05.039
- Leaf, M. (2002). A tale of two villages. *Cities*, 19(1), 23–31. doi:10.1016/S0264-2751(01)00043-9
- Legates, R., & Hudalah, D. (2014). Peri-urban planning for developing east Asia: Learning from Chengdu, China and Yogyakarta/Kartamantul, Indonesia. *Journal of Urban Affairs*, 36(Suppl. 1), 334–353. doi:10.1111/juaf.12106
- Lin, S. (2014). A comparative study of suburbanization in United States and China. *Journal of Geography and Geology*, 6(4), 132–139.

- Liu, S., Zhang, P., & Lo, K. (2014). Urbanization in remote areas: A case study of the Heilongjiang reclamation area, Northeast China. *Habitat International*, 42, 103–110. doi:10.1016/j.habitatint.2013.11.003
- Long, H., Zou, J., & Liu, Y. (2009). Differentiation of rural development driven by industrialization and urbanization in eastern coastal China. *Habitat International*, 33(4), 454–462. doi:10.1016/j.habitatint.2009.03.003
- López-Goyburu, P., & García-Montero, L. G. (2018). The urban-rural interface as an area with characteristics of its own in urban planning: A review. *Sustainable Cities and Society*, 43, 157–165. doi:10.1016/j.scs.2018.07.010
- Ma, W., Jiang, G., Wang, D., Li, W., Guo, H., & Zheng, Q. (2018). Rural settlements transition (RST) in a suburban area of metropolis: Internal structure perspectives. *Science of The Total Environment*, 615(19), 672–680. doi:10.1016/j.scitotenv.2017.09.152
- Malaque, I. R., & Yokohari, M. (2007). Urbanization process and the changing agricultural landscape pattern in the urban fringe of Metro Manila, Philippines. *Environment and Urbanization*, 19(1), 191–206. doi:10.1177/0956247807076782
- McGee, T. G. (1991). The emergence of desakota regions in Asia: Expanding a hypothesis. In N. Ginsberg, B. Koppel, & T. G. McGee (Eds.), *The extended metropolis: Settlement transition in Asia* (pp. 3–26). Honolulu: University of Hawaii Press.
- Modai-Snir, T., & van Ham, M. (2018). Neighbourhood change and spatial polarization: The roles of increasing inequality and divergent urban development. *Cities*, 82, 108–118.
- Ouyang, W., Wang, B., Tian, L., & Niu, X. (2017). Spatial deprivation of urban public services in migrant enclaves under the context of a rapidly urbanizing China: An evaluation based on sub-urban shanghai. *Cities*, 60, 436–445. doi:10.1016/j.cities.2016.06.004
- Peng, J., Hu, Y., Liu, Y., Ma, J., & Zhao, S. (2018). A new approach for urban-rural fringe identification: Integrating impervious surface area and spatial continuous wavelet transform. *Landscape and Urban Planning*, 175, 72–79. doi:10.1016/j.landurbplan.2018.03.008
- Phelps, N. A., Atienza, M., & Arias, M. (2015). Encore for the enclave: The changing Nature of the industry enclave with illustrations from the mining industry in Chile. *Economic Geography*, 91(2), 119–146. doi:10.1111/ecge.12086
- Puertas, O. L., Henríquez, C., & Meza, F. J. (2014). Assessing spatial dynamics of urban growth using an integrated land use model. Application in Santiago Metropolitan area, 2010–2045. *Land Use Policy*, 38, 415–425. doi:10.1016/j.landusepol.2013.11.024
- Puppim de Oliveira, J. A., Doll, C. N. H., Balaban, O., Jiang, P., Dreyfus, M., Suwa, A., Moreno-Peñaranda, R., & Dirgahayani, P. (2013). Green economy and governance in cities: Assessing good governance in key urban economic processes. *Journal of Cleaner Production*, 58, 138–152. doi:10.1016/j.jclepro.2013.07.043
- Rahayu, P., Rini, E. F., & Soedwihajono. (2019). Domestic water adequacy of Surakarta, Indonesia: Is it prone to vulnerability? *Environment and Urbanization ASIA*, 10(1), 81–98. doi:10.1177/0975425318821807
- Rukmana, S. N., & Rudiarto, I. (2016). Land Use change in suburban area: A case of Malang City, East Java province. *Geoplanning: Journal of Geomatics and Planning*, 3(1), 23–32. doi:10.14710/geoplanning.3.1.23-32
- Salvati, L., Sateriano, A., & Bajocco, S. (2013). To grow or to sprawl? Land cover relationships in a Mediterranean city region and implications for land use management. *Cities*, 30, 113–121. doi:10.1016/j.cities.2012.01.007
- Scott, A. J., Carter, C., Reed, M. R., Larkham, P., Adams, D., Morton, N., ... Coles, R. (2013). Disintegrated development at the rural-urban fringe: Re-connecting spatial planning theory and practice. *Progress in Planning*, 83, 1–52. doi:10.1016/j.progress.2012.09.001
- Sejati, A. W., Buchori, I., & Rudiarto, I. (2019). The spatio-temporal trends of urban growth and surface urban heat islands over two decades in the Semarang Metropolitan Region. *Sustainable Cities and Society*, 46, 101432. doi:10.1016/j.scs.2019.101432
- Setyono, J. S., Yunus, H. S., & Giyarsih, S. R. (2016). The spatial pattern of urbanization and small cities development in Central Java: A case study of Semarang-Yogyakarta-Surakarta Region.

- Geopanning: Journal of Geomatics and Planning*, 3(1), 53–66. doi:10.14710/geopanning.3.1.53-66
- Soh, M. B. C. (2012). Crime and urbanization: Revisited Malaysian case. *Procedia - Social and Behavioral Sciences*, 42, 291–299. doi:10.1016/j.sbspro.2012.04.193
- Sridhar, K. S., & Narayanan, P. (2016). Suburbanization of Indian cities. *Environment and Urbanization ASIA*, 7(1), 93–112. doi:10.1177/0975425316629836
- Sugiri, A., Buchori, I., & Ma'rif, S. (2015). Towards participatory spatial policy: Facilitating rural non-farm activities in Susukan suburb of Semarang Metropolitan Region. *The International Journal of Civic, Political, and Community Studies*, 13(4), 1–17. doi:10.18848/2327-0047/CGP/v13i04/43588
- Sugiri, A., Buchori, I., & Soetomo, S. (2011). Sustainable metropolitan development: Towards an operational model for Semarang Metropolitan Region. *International Journal of Environmental, Cultural, Economic and Social Sustainability*, 7(5), 301–323. <http://ijs.cgpublisher.com/product/pub.41/prod.876>
- Taubenböck, H., Esch, T., Felbier, A., Wiesner, M., Roth, A., & Dech, S. (2012). Monitoring urbanization in mega cities from space. *Remote Sensing of Environment*, 117, 162–176. doi:10.1016/j.rse.2011.09.015
- Tian, L., Ge, B., & Li, Y. (2017). Impacts of state-led and bottom-up urbanization on land use change in the peri-urban areas of Shanghai: Planned growth or uncontrolled sprawl? *Cities*, 60, 476–486. doi:10.1016/j.cities.2016.01.002
- Walcott, S. M., & Pannell, C. W. (2006). Metropolitan spatial dynamics: Shanghai. *Habitat International*, 30(2), 199–211. doi:10.1016/j.habitatint.2004.02.005
- Walker, R., & Lewis, R. D. (2001). Beyond the crabgrass frontier: Industry and the spread of North American cities, 1850–1950. *Journal of Historical Geography*, 27(1), 3–19. doi:10.1006/jhge.2000.0266
- Winarso, H., Hudalah, D., & Firman, T. (2015). Peri-urban transformation in the Jakarta metropolitan area. *Habitat International*, 49, 221–229. doi:10.1016/j.habitatint.2015.05.024
- Wissink, B. (2013). Enclave urbanism in Mumbai: An actor-network-theory analysis of urban (dis)connection. *Geoforum; Journal of Physical, Human, and Regional Geosciences*, 47, 1–11. doi:10.1016/j.geoforum.2013.02.009
- Wu, K., & Zhang, H. (2012). Land use dynamics, built-up land expansion patterns, and driving forces analysis of the fast-growing Hangzhou metropolitan area, eastern China (1978–2008). *Applied Geography*, 34, 137–145. doi:10.1016/j.apgeog.2011.11.006
- Yang, Y., Liu, Y., Li, Y., & Li, J. (2018). Measure of urban-rural transformation in Beijing-Tianjin-Hebei region in the new millennium: Population-land-industry perspective. *Land Use Policy*, 79, 595–608. doi:10.1016/j.landusepol.2018.08.005
- Zasada, I. (2011). Multifunctional peri-urban agriculture—A review of societal demands and the provision of goods and services by farming. *Land Use Policy*, 28(4), 639–648. doi:10.1016/j.landusepol.2011.01.008
- Zhang, L., Yue, W., Liu, Y., Fan, P., & Wei, Y. D. (2018). Suburban industrial land development in transitional China: Spatial restructuring and determinants. *Cities*, 78, 96–107. doi:10.1016/j.cities.2018.02.001
- Zhang, R., Jiang, G., & Zhang, Q. (2019). Does urbanization always lead to rural hollowing? Assessing the spatio-temporal variations in this relationship at the county level in China 2000–2015. *Journal of Cleaner Production*, 220, 9–22. doi:10.1016/j.jclepro.2019.02.148
- Zhao, P. (2010). Sustainable urban expansion and transportation in a growing megacity: Consequences of urban sprawl for mobility on the urban fringe of Beijing. *Habitat International*, 34(2), 236–243. doi:10.1016/j.habitatint.2009.09.008
- Zhou, T., Jiang, G., Zhang, R., Zheng, Q., Ma, W., Zhao, Q., & Li, Y. (2018). Addressing the rural in situ urbanization (RISU) in the Beijing-Tianjin-Hebei region: Spatio-temporal pattern and driving mechanism. *Cities*, 75, 59–71. doi:10.1016/j.cities.2018.01.001
- Zhu, Y. (2000). In situ urbanization in rural China: Case studies from Fujian province. *Development and Change*, 31(2), 413–434. doi:10.1111/1467-7660.00160

- Zhu, Y. (2003). Changing urbanization processes and in situ rural-urban transformation: Reflections on China's settlement definitions. In T. Champion & G. Hugo (Eds.), *New forms of urbanization: Beyond the urban-rural dichotomy* (pp. 207–228). Aldershot: Ashgate Publishing.
- Zia, K., Farrahi, K., Riener, A., Ferscha, A. (2013). An agent-based parallel geo-simulation of urban mobility during city-scale evacuation. *SIMULATION*, 89(10), 1184–1214. doi:[10.1177/0037549713485468](https://doi.org/10.1177/0037549713485468)

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