Urbanization Pattern in Indonesia’s Secondary Cities: Greater Surabaya and Its Path toward a Megacity

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Abstract. In the past few decades, many countries had single primate city dominating the national economy and functioning as the country’s social and political center. This was also the case of Indonesia in that Jakarta occurred as the first city with its economic dominance and a population of over one million inhabitants reached within 30 years (between 1950s-1980s). Together with the surrounding area Jakarta become megacity since 1980s (commonly referred to as the Jakarta metropolitan area or JMA). The liberalization measures of the late 1980s and the decentralization policy since the early 2000s have provided opportunities for other cities and urban regions in Indonesia to grow. In this paper, we focus on Greater Surabaya, the fast-growing secondary city of Indonesia that has greatly benefited from the changing global and national politico-economic landscapes. Our aims is to explore its urbanization pattern in the last three decades. This study exhibits that urbanization pattern in Greater Surabaya is characterized by a relatively higher growth of annual population and economic development in the surrounding area compare to the core city. This rapid sub-urbanization seems to follow the JMA’s experience. This paper therefore, has important implications for urban scholarship and planning practice: how this rapid sub-urban development process does not lead to the same unsustainable problems experience by the JMA.

1. Introduction

Over one or two last decades, the attention of urban studies has been greatly focused on certain cliques of cities, i.e. world/global cities, metropolitan regions, mega-urban regions and megacities. These rosters of cities mostly mirror their dominance and contribution of economic, demography, and/or political facets at the national and/or global level. Up to recent, some scholars have indeed challenged the dominant discourses of urban studies. Robinson, for instance, criticizes the elitist perspective of world/global cities which have made many other cities fall off the map [1,2]. Robinson and also Amin and Graham [3] proposed the ‘ordinary cities’ to emphasize the natural feature of cities to link with the global without any excluding their status based on the hierarchy. In a similar vein, Bell and Jayne [4] described the under-researched ‘small cities’ and how this tier of cities should be discussed in stand-alone fashion. Fahmi et al. [5] provided further empirical evidence that smaller cities have experienced extended urbanization and claimed that the future of urban living is not solely resided in mega-cities.

Recalling the work of Rondinelli [6], ‘secondary cities’ seem to have been studied less often. Secondary cities were originally defined as cities positioned at the second-tier of national urban hierarchy system in developing countries [6]. These cities are essential for regional and national development, given their function as the alternative nodes of urban dispersal vis-à-vis primate/primary cites’. In addition, recent studies showed the growing importance of secondary cities in the era of global economy which lead to the greater opportunities to benefit from the global capital circuits [7,8]. The existence of secondary cities in the present era of interconnected world has been shaped by more complex factors, consisting of the progress of information and communication technology, intensified competition of trade and investment, and decreasing role of nation-state in the era free market [8]. The
present situation also reflects different assumptions from the original roots, e.g. by classifying ‘secondary city’ to have population at least ‘just’ 100,000 [6]. The overall urban development is particularly rapid in developing countries [9,10] and smaller cities tend grow faster than the larger ones [11]. Consequently, the rapid pace of secondary cities’ development has been evidence in the transition economies of Asia, several of them resulted in the emergence of megacities [12]. Guangzhou, Wuhan, Tianjin, Shenzhen in China and Hyderabad in India are several examples of the new megacities: they function as the new global hubs, blossoming together with the ‘traditional national cities’. Evidences in the secondary cities in Asia, and particularly in Southeast Asia indicated that the immense development of export-oriented manufacturing has been the underlying force of this upsurge [7]. Moreover, the improvement of transportation networks, the wide-spreading tendency of decentralization policies, and the specific country’s historical roots are among the most important internal factors standing as basis for further development.

The emergence of secondary cities as megacities in developing economies of Asia has opened up a discussion about their changing role and function in the urban system, not to mention the potential problems caused by their rapid urbanization processes. As megacities are mostly perceived to have complex problems, studies on secondary cities having potentialities to be the next megacities will provide distinct perspective of recent urbanization. Against this background, this paper aims to trace the urbanization process and pattern of secondary cities through the lens of demography, economy and physical aspects. The case of Surabaya, Indonesia is a suitable representation of aforementioned particular situation. Surabaya is a typical example of secondary city in Southeast Asia [7,13].

2. Methods
Greater Surabaya commonly abbreviated in the national policy context as Gerbangkertosusila, consists of the regencies of Gresik, Bangkalan, Mojokerto, Sidoarjo and Lamongan and the cities of Surabaya and Mojokerto. Within this urban agglomeration, Surabaya functions as the core city and it is equipped with more advanced urban facilities and infrastructure networks compared to its surrounding areas, such as Tanjung Perak seaport, the second largest seaport in the country after Jakarta’s Tanjung Priok.

This research is descriptive-analytic, largely based on secondary data. National population censuses data of year 1990, 2000, 2010 [14,15,16] were used to analyze the dynamic of population pattern, while, gross domestic regional products (GDRP) data from East Java in Figures of year 1995, 2000, 2005, 2010, 2015 [17] were used to measure the regional economic change. The analysis of land use change was performed through re-interpreting the results of previous studies, most notably conducted by Dhartaredjasa and Hartono [18]: this study provides multi-temporal satellite imagery analysis for land use change in Surabaya, Gresik and Sidoarjo in 1994, 2003, and 2012. To clarify our results and discussion, we use regency or city level as our smallest unit of analysis.
3. Results and Discussion

This part comprises four main aspects of urbanization processes, each of which was analyzed based on specific data set as previously mentioned: population growth, level of urbanization, economic development, and land use change.

3.1 Population Growth

In 1970 Greater Surabaya already joined the million city ranks, with a population reaching nearly 5 million inhabitants. Subsequently, the industrial development that started to occur in Greater Surabaya since 1970s (e.g., the establishment of Surabaya Industrial Estate Rungkut in 1974) has in many ways affected its urbanization process. This includes the increasing influx of migrants coming from other regions. By 2000, Surabaya’s official municipal population was still only 2.6 million, and the population of Gerbangkertosusila reaches 9.12 million inhabitants in 2010. However, compared to the Jakarta metropolitan area (JMA), the population growth and density of Gerbangkertosusila is still less significant. With the continuous development of industrial activities and properties, diversifying and increasing complexity of urban-regional activities, and improvement of infrastructures quality, Greater Surabaya continues to have the opportunity to maintain its urbanization process, even at larger scale and faster speed.
Table 1. Population and Population Growth Rate (PGR) in Gerbangkertosusila 1990-2010

| Gerbangkertosusila       | 1990 Population | PGR (%) 1990-2000 | 2000 Population | PGR (%) 2000-2010 | 2010 Population | PGR (%) 1990-2010 |
|--------------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| Surabaya City            | 2,473,272       | 0.49              | 2,595,359       | 0.66              | 2,765,908       | 0.59              |
| Gresik Regency           | 856,430         | 1.74              | 1,005,445       | 1.71              | 1,177,201       | 1.87              |
| Bangkalan Regency        | 750,740         | 0.72              | 805,048         | 1.27              | 907,255         | 1.04              |
| Mojokerto City           | 99,707          | 0.91              | 108,814         | 1.04              | 120,132         | 1.02              |
| Mojokerto Regency        | 786,943         | 1.54              | 908,004         | 1.27              | 1,023,526       | 1.50              |
| Sidoarjo Regency         | 1,166,972       | 3.39              | 1,563,015       | 2.45              | 1,945,252       | 3.33              |
| Lamongan Regency         | 1,143,344       | 0.34              | 1,181,660       | (0.02)            | 1,179,770       | 0.16              |
| Gerbangkertosusila       | 7,277,408       | 1.22              | 8,167,345       | 1.17              | 9,119,044       | 1.27              |

Source: National Population Census 1990, 2000 and 2010.

As can be gleaned from Table 1, the number of population in Surabaya from 1990 to 2010 continues to increase. However, its population growth rate (PGR) is less than the rate of its surrounding areas. Surabaya’s rate is also recorded to have less than the rate of the national population growth. In short, the suburban areas are growing faster, which may suggest the continuous expansion of economic activities beyond Surabaya’s administrative boundary. For instance, the PGR of Surabaya between 1990-2000 is 0.49%, while the rate of all suburban areas is relatively higher. The highest rate during this period is recorded by Sidoarjo (3.39%). However, Lamongan Regency is the only suburban area that has the PGR lower than Surabaya. This is due to the fact that Lamongan is located as the farthest suburban area to Surabaya compared to other regencies: arguably, the spillover of economic activities from Surabaya may become weaker following the “distance decay” function. From a land use perspective, it can be also observed that Lamongan is still dominated by non-e built up areas. Not surprisingly perhaps, this regency has the lowest population density among the other areas in Greater Surabaya. Table 2 shows that the density of Lamongan is 631 people/km2, while the density of Surabaya is 7.426 people/km2 in 1990.

Table 2. Density in Gerbangkertosusila 1990, 2000 and 2010 (person/Km2)

| Gerbangkertosusila       | Areas (km2) | Density 1990 | Density 2000 | Density 2010 |
|--------------------------|-------------|--------------|--------------|--------------|
| Surabaya City            | 333.06      | 7,426        | 7,792        | 8,305        |
| Gresik Regency           | 1,192.00    | 718          | 843          | 988          |
| Bangkalan Regency        | 1,144.00    | 656          | 704          | 793          |
| Mojokerto City           | 16.46       | 6,058        | 6,611        | 7,298        |
| Mojokerto Regency        | 835.93      | 941          | 1,086        | 1,224        |
| Sidoarjo Regency         | 591.59      | 1,973        | 2,642        | 3,288        |
| Lamongan Regency         | 1,812.80    | 631          | 652          | 651          |
| Gerbangkertosusila       | 5,925.84    | 1,228        | 1,378        | 1,539        |

Source: National Population Census 1990, 2000 and 2010 and Municipality/City in Figures 2015.
The 2010 population census shows that PGR of Surabaya City was 0.66%, well below the national PGR of 1.49%. This trend continues to the present, where the city of Surabaya has the lowest PGR, but still above that of Lamongan (0.16%). Meanwhile, two regencies, i.e., Sidoarjo and Gresik, have the highest PGR at 2.45% and 1.71%, respectively, which are above the rate of Surabaya and the national level. The high PGR in these regencies could be ascribed to the large-scale residential housing development that has taken place in the last decades. Geographically, both regencies are located directly adjacent to the city of Surabaya and, therefore, have become the hotspots for new residential development. Similar situation can also be found in the JMA where Jakarta has gradually experienced lower population growth compared to its surrounding areas of Bogor, Depok, Tangerang, and Bekasi.

Taken together, the population in the core city, Surabaya, continues to increase at a rate that is lower than the national average rate and its surrounding areas. The periphery areas are hosting various economic activities which are still closely related to the core city, most notably large industrial and residential activities. Large-scale housing in these suburban areas is largely inhabited by people working in Surabaya; these people have thus formed commuting communities. Firman [19] has put forwarded that one particular feature of a large urban area such as the JMA and Greater Surabaya is the growth of commuters. The increasing rise of land price in the core city has gradually led many activities, such as manufacturing industries and residential development, to shift to the periphery. Jones et al. [20] call such a phenomenon as "metropolitan turnaround", i.e., a decline in the rate of population growth in the core city and the simultaneous higher population growth in the periphery. It should be noted, though, similar situation is also taking place in other large cities in Indonesia, such as Bandung, Medan, Semarang, and Makassar.

From an urban-regional perspective, Greater Surabaya generally exhibits a high rate of population growth, i.e., 1.22% during 1990-2000 and 1.17% during 2000-2010. The population of Greater Surabaya in 2010 was 9,119,044 people or increase of about 20% since thirty years ago (1980). Current Greater Surabaya’s population number is relatively similar to the JMA’s situation forty years ago, i.e., 8.54 million inhabitants. Between 1970 and 2010, the JMA’s population increased dramatically about three times from 8.54 million to 28.01 million inhabitants. Although the current population of Greater Surabaya (based on 2010 census data) has not met a megacity minimum threshold (i.e., 10 million inhabitants according to the UN Habitat), Greater Surabaya may potentially become the new megacity of Indonesia as its population continues to grow.

3.2 Level of Urbanization

The level of urbanization of an area is seen from the proportion of urban population to the entire population. Referring to Gardiner & Gardiner [21] in the Indonesian context, there are two definitions of a city: First, an administrative city in which an area (city) has an official urban status (autonomous city). Second, a functional city, where a village can be defined as a city in accordance with predetermined criteria. For the second type of city, three criteria used to determine a village-level city are: (1) population density; (2) the percentage of settlements to the agricultural sector; and (3) urban facilities and regional accessibility. The Central Bureau of Statistics (BPS) uses scoring techniques in determining this urban and rural village-level classification. The scores use a range from 1 to 8 for population density and the percentage of farming to settlements. For population density, score 1 is given for population density with less than 500 persons/kilometer and 8 for density greater than 8,500 people/kilometer. For percentage of farming against settlements (or built-up areas), score 1 is given for percentages greater than 70% and 8 for percentages below 5%. Meanwhile, scores for access to public facilities are a dummy score of 0 and 1. For example, school facilities score 1 if closest school facilities are available less than 2.5 kilometers away, 0 if no school is available or it is located more than 2.5 kilometers away. For market and store facilities, the score is 1 if the facility is available less than 2 kilometers away. As for cinema facilities and health facilities, the score is 1 for the availability of these facilities within a distance of less than 5 kilometers.
20.74%) Regency. Both areas are located farthest to the core city. On the contrary, the immediate border areas have the largest proportion of urban population, i.e., Sidoarjo (91.10%) and Gresik (59.80%). In addition, Sidoarjo Regency has also experienced the most rapid urban share increase in urban area has gradually progressed, while that in the core city has begun to slow.

**Table 3. Level of urbanization in Gerbangkertosusila**

| Kabupaten/Kota            | 1990 Population | Share (%) | 2000 Population | Share (%) | 2010 Population | Share (%) |
|---------------------------|-----------------|-----------|-----------------|-----------|-----------------|-----------|
| Surabaya City             | 2,473,272       | 100.00    | 2,595,359       | 100.00    | 2,765,908       | 100.00    |
| Gresik Regency            | 221,180         | 25.83     | 500,960         | 49.82     | 703,912         | 59.80     |
| Bangkalan Regency         | 109,546         | 14.59     | 173,566         | 21.56     | 214,875         | 23.68     |
| Mojokerto City            | 99,707          | 100.00    | 108,814         | 100.00    | 120,132         | 100.00    |
| Mojokerto Regency         | 170,483         | 21.66     | 379,984         | 41.85     | 495,402         | 48.40     |
| Sidoarjo Regency          | 586,107         | 50.22     | 1,339,311       | 85.69     | 1,772,043       | 91.10     |
| Lamongan Regency          | 103,435         | 9.05      | 195,122         | 16.51     | 244,642         | 20.74     |
| Surabaya Metropolitan Area| 3,763,730       | 51.72     | 5,293,116       | 64.81     | 6,316,914       | 69.27     |

Source: National Population Census 1990, 2000 and 2010

Based on the latest population census data in 2010, the level of urbanization of Gerbangkertosusila reached 69.27%, of which the lowest urbanization rate is found in Bangkalan Regency (23.68%) and Lamongan (20.74%) Regency. Both areas are located farthest to the core city. On the contrary, the immediate border areas have the largest proportion of urban population, i.e., Sidoarjo (91.10%) and Gresik (59.80%). In addition, Sidoarjo Regency has also experienced the most rapid urban share within twenty years, from 50.22% in 1990 to 91.10% in 2010. In general, it could be argued that the increase in urban share is inseparable from the region’s progressive economic development. As noted by some in the context of developing economies [22], higher level of urbanization of a region can occur insofar as the region’s economic structure shifts from agriculture (primary) to a secondary or tertiary sector. The following sub-section will briefly shed further light on this particular aspect.

### 3.3 Economic Development

Gerbangkertosusila is the economic heartbeat of East Java Province. This can be seen, among other aspects, from its high GRDP’s proportion to East Java GRDP. In 2005, the contribution of this urban region’s GDRP was 62.67%. However, this contribution has decreased to 44.12% in 2010 and slightly increased to 45.46% in 2015. At the national level, the GRDP of Gerbangkertosusila accounted for 14.84% of Indonesia's GDP in 2010. Its considerable economic contribution illustrates this urban region’s economic strategicness on the national level.

Rapid economic growth in Gerbangkertosusila occurred from the mid-1990s to the mid-2000s. Since this time, the region's economic growth has exhibited a declining trend. Between 2010 and 2015, the growth of Surabaya City was relatively stagnant compared to the previous period. At the same time, economic growth in Surabaya’s surrounding areas is relatively high. Two regencies particularly stand out, i.e., Gresik (76.64%) and Sidoarjo (65.63%). This implies that the economic activity in suburban areas has gradually progressed, while that in the core city has begun to slow.

**Table 4. GRDP Gerbangkertosusila 1995-2015**

| Kabupaten/Kota      | GRDP at 1990, 2000 and 2010 Constant Market Prices (Billion rupiah) | Growth rate of GRDP at 1990, 2000 and 2010 Constant Market Prices (%) |
|---------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|
|                     | 1995 | 2000 | 2005 | 2010 | 2015 | 1995-2000 | 2000-2005 | 2005-2010 | 2010-2015 |
| Surabaya City       | 13,092.95 | 35,526.79 | 101,433.86 | 231,204.74 | 324,227.84 | 34,27 | 37,10 | 25,59 | 8,05 |
| Gresik Regency      | 2,997.83 | 7,894.79 | 15,572.53 | 16,837.44 | 81,359.36 | 32,67 | 19,45 | 1,62 | 76,64 |
| Bangkalan Regency   | 667.32 | 1,532.43 | 3,512.45 | 15,881.13 | 16,907.13 | 25,93 | 25,84 | 70,43 | 1,29 |
| Mojokerto City      | 283.72 | 481.83 | 1,248.24 | 2,987.16 | 3,991.12 | 13,96 | 31,81 | 27,86 | 6,72 |
| Mojokerto Regency   | 1,196.15 | 2,534.07 | 6,486.25 | 34,147.05 | 46,792.76 | 22,37 | 31,19 | 85,29 | 7,41 |
| Sidoarjo Regency    | 3,804.37 | 9,627.88 | 27,776.64 | 26,161.61 | 112,012.49 | 30,61 | 37,70 | 1,16 | 65,63 |
| Lamongan Regency    | 991.26 | 2,808.42 | 4,638.17 | 16,275.24 | 22,316.83 | 36,66 | 13,03 | 50,18 | 7,42 |
| Gerbangkertosusila  | 23,033.59 | 60,406.21 | 160,668.13 | 343,494.65 | 607,607.53 | 32,45 | 33,20 | 22,76 | 15,38 |

Source: East Java Province in Figures 1995, 2000, 2005, 2010, 2015
As can be observed from Table 5, the dominance of Surabaya City is seen in almost all economic sectors except for the primary sector: agriculture and mining. In particular, excluding the primary sector, almost all of Surabaya’s economic sectors contribution are greater than 50%. This re-affirms Surabaya’s position as a core city and its function as the service center within Gerbangkertosusilo and beyond. Meanwhile, agricultural sector in the urban region is mostly supplied by Lamongan Regency, while the mining sector is dominated by Gresik Regency.

Table 5. Contribution of Each Industrial Origin to GRDP Gerbangkertosusila 2010

| Industrial Origin                  | Surabaya | Gresik | Bangkalan | Mojokerto C | Mojokerto R | Sidoarjo | Lamongan | Gerbangkertosusila |
|------------------------------------|----------|--------|-----------|-------------|-------------|----------|----------|-------------------|
| 1 Agriculture                      | 0.92     | 16.73  | 14.04     | 0.58        | 20.74       | 10.40    | **36.60** | 100.00            |
| 2 Mining and Quarrying             | 0.64     | 73.13  | 5.27      | 0.90        | 11.40       | 7.76     | 0.90     | 100.00            |
| 3 Manufacturing Industry           | **44.39**| 19.72  | 0.31      | 0.36        | 6.64        | 27.83    | 0.75     | 100.00            |
| 4 Electricity, Gas and Water Supply| 69.61    | 11.36  | 0.89      | 1.43        | 2.47        | 11.87    | 2.36     | 100.00            |
| 5 Construction                     | 85.97    | 3.02   | 3.22      | 0.16        | 1.52        | 3.80     | 2.31     | 100.00            |
| 6 Trade, Hotel & Restaurant        | 69.66    | 6.75   | 1.73      | 0.84        | 3.74        | 14.24    | 3.04     | 100.00            |
| 7 Transport and Communication      | 68.54    | 3.86   | 1.71      | 1.30        | 1.80        | 22.04    | 0.75     | 100.00            |
| 8 Financial, Ownership & Business Services | 78.07 | 8.28   | 2.15      | 1.32        | 1.68        | 5.33     | 3.16     | 100.00            |
| 9 Services                         | 65.91    | 7.06   | 4.13      | 2.01        | 4.98        | 11.35    | 4.56     | 100.00            |
| **Total**                          | **58.71**| 11.25  | 2.30      | 0.83        | 5.28        | 17.49    | 4.14     | 100.00            |

Source: Municipalities and cities in Figures 2010

Table 6 encloses the regional economic structures of Gerbangkertosusila. Each regency/city has its own economic specialization. Bangkalan and Lamongan are the most “non-urbanized” areas, in that their economic structure is dominated by agricultural sector. Meanwhile, the economic skeleton of Surabaya and Mojokerto City are shaped by trade and services. Ultimately, as also found in many large urban areas of East Asian emerging economies, manufacturing industries are largely pronounced in the surrounding areas of a core city. In this respect, Gresik, Sidoarjo, and Mojokerto Regency are the urban region’s major industrial mainstays.

Table 6. Distribution of GRDP by use of Industrial Origin 2010 in Gerbangkertosusila

| Industrial Origin                  | Surabaya | Gresik | Bangkalan | Mojokerto C | Mojokerto R | Sidoarjo | Lamongan |
|------------------------------------|----------|--------|-----------|-------------|-------------|----------|----------|
| 1 Agriculture                      | 0.09     | 8.51   | **34.89** | 3.98        | 22.50       | 3.41     | 50.65    |
| 2 Mining and Quarrying             | 0.01     | 4.32   | 1.52      | 0.72        | 1.44        | 0.30     | 0.15     |
| 3 Manufacturing Industry           | 21.89    | 50.73  | 3.86      | 12.70       | **36.39**   | **46.07**| 5.24     |
| 4 Electricity, Gas and Water Supply| 2.34     | 1.99   | 0.76      | 3.42        | 0.92        | 1.34     | 1.12     |
| 5 Construction                     | 6.74     | 1.24   | 6.43      | 0.87        | 1.32        | 1.00     | 2.57     |
| 6 Trade, Hotel & Restaurant        | 42.16    | 21.32  | 26.67     | **36.01**   | 25.15       | 28.94    | 26.13    |
| 7 Transport and Communication      | 11.48    | 3.37   | 7.31      | 15.44       | 3.36        | 12.39    | 1.77     |
| 8 Financial, Ownership & Business Services | 6.54   | 3.62   | 4.59      | 7.86        | 1.57        | 1.50     | 3.76     |
| 9 Services                         | 8.76     | 4.90   | 13.97     | 19.00       | 7.36        | 5.06     | 8.61     |
| **Total**                          | **100.00**| 100.00 | 100.00    | 100.00      | 100.00      | 100.00   | 100.00   |

Source: Municipalities and cities in Figures 2010
3.4 Land Use

A study conducted by Dhartaredjasa and Hartono [18] in Surabaya, Gresik, and Sidoarjo reveals the land use change (mostly from non-build up areas, such as paddy field, fishponds, body of water, to settlement) from 1994 to 2012. During this period, land use for settlement has increased dramatically by 68.64% in Surabaya, by 77.31% in Gresik, and by 137.41% in Sidoarjo. This substantial settlement growth, particularly in the adjacent surrounding areas, indicates the expansion of urban activities beyond the core city (Surabaya). This physical pattern is in line with the dynamics of population growth, where the largest population growth also takes place in these two regencies (Gresik and Sidoarjo).

As a consequence of this rapid urbanization, previously agricultural land has been massively converted into built-up areas. In 1994, the largest land use in Gresik was paddy field (37.64%). However, it has gradually declined to 28.23% in 2003 and to 20.03% in 2012. As a result, by 2012 the settlement became the largest land use in the Gresik (35.26%). Similarly, in 1994 most of the land in Sidoarjo was used for agricultural activities: fishponds (23.49%), rain-fed rice field (21.25%), and paddy field (20.86%). Due to a massive land use conversion, settlement became the dominant land use of Sidoarjo by 2012 (18.36%), while various types of agricultural lands have continuously disappeared. Meanwhile, settlement in Surabaya has continued to dominate and convert other land uses.

| Penggunaan Lahan     | Surabaya | Gresik | Sidoarjo |
|----------------------|----------|--------|----------|
|                      | 1994     | 2003   | 2012     | 1994     | 2003   | 2012     | 1994     | 2003   | 2012     |
| Forest               | 702.43   | 813.00 | 708.39   | 72.26    | 75.22  | 76.58    | 71.826.60| 71.82660| 71.82660 |
| Swamp forest         | 642.35   | 1.050.59| 866.44   | 804.59   | 1.292.88| 1.357.52 | 71.826.60| 71.82660| 71.82660 |
| Plantation           | 737.09   | 1.346.07| 1.021.04 | 3.566.00 | 4.122.85| 4.762.10 | 71.826.60| 71.82660| 71.82660 |
| Settlement           | 14.178.21| 17.338.02| 23.910.78| 14.283.61| 19.766.68| 25.326.06| 71.826.60| 71.82660| 71.82660 |
| Swamp                | 109.11   | 68.94  | 19.70    | 158.09   | 129.29  | 79.01    | 71.826.60| 71.82660| 71.82660 |
| Grassland            | 3.763.04 | 3.076.26| 2.718.40 | 1.920.25 | 1.522.72| 1.680.74 | 71.826.60| 71.82660| 71.82660 |
| Paddy field          | 1.035.41 | 630.35 | 361.14   | 27.034.58| 20.276.65| 14.386.87| 71.826.60| 71.82660| 71.82660 |
| Rain-fed rice fields | 2.347.10 | 1.717.06| 1.122.82 | 705.96   | 639.26  | 481.24   | 71.826.60| 71.82660| 71.82660 |
| Shrubs               | 456.20   | 912.70 | 407.10   | 171.31   | 179.57  | 165.2    | 71.826.60| 71.82660| 71.82660 |
| Salt ponds           | 1.928.57 | 1.096.55| 32.83    | 213.05   | 208.3   | 179.57   | 71.826.60| 71.82660| 71.82660 |
| Fishponds            | 4.333.72 | 3.030.30| 383.97   | 17.796.58| 18.983.77| 19.026.96| 71.826.60| 71.82660| 71.82660 |
| Land moor            | 2.877.84 | 2.537.83| 1.933.74 | 4.209.00 | 3.835.54| 3.663.16 | 71.826.60| 71.82660| 71.82660 |
| Body of water        | 422.30   | 26.26  | 22.98    | 963.58   | 869.1   | 718.27   | 71.826.60| 71.82660| 71.82660 |
| Total                | 32.830.94| 32.830.93| 32.830.94| 71.826.60| 71.826.61| 71.826.60| 104.174.60| 104.176.00| 104.174.61|

Source: Dhartaredjasa and Hartono, 2013

4. Conclusion

All aspects discussed in the previous section have encapsulated a similar pattern: rapid urban development towards the surrounding areas of Surabaya City. However, this social, economic, and physical expansion cannot be separated from the general urban dynamism experienced and spurred by Surabaya. It could be argued that the urban development taking place around Surabaya represents the Surabaya’s economic expansion. In particular, while Surabaya has gradually specialized as the urban region’s services center, its surrounding areas have become Surabaya’s “supporting nodes”, providing land for population and industrial decentralization. Urban development in these areas, most notably Gresik and Sidoarjo, has thus benefited from lower land price compared to and geographical proximity to Surabaya. As a result, this suburbanization process has created a commuting pattern, where some residents living in the suburbs work in Surabaya. Further research is needed to understand the inter-city relations and networks within Gerbangkertosusilo.

The dynamics of urbanization processes and the pattern of suburbanization occurring in Surabaya seem to resemble the experience of the JMA. Many studies [22,23] have highlighted the un-sustainable threats caused by JMA’s rapid urban development and expansion. In general, these threats correspond...
to the complex problems faced by many Asian megacities. This paper, therefore, has important implications for urban scholarship and planning practice: how this rapid sub-urban development process does not lead to the same un-sustainable problems experienced by the JMA.

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