The impact of land use changes in the Banjarsari village, Cerme district of Gresik Regency, East Java Province

Dian Ayu Larasati1 and Bambang Hariyanto1
1Geography Education Department, Faculty of Social Sciences and Law, Universitas Negeri Surabaya, Ketintang Street, 60231, Surabaya, East Java, Indonesia phone: +6231 8280009, Fax: +6231 8281466
dianlarasati@unesa.ac.id

Abstract. High population growth, and development activities in various fields will lead to join the growing demand for land. Cerme is a district close to the city of Surabaya, therefore a lot of agricultural land in Cerme used as housing and industry in order to support the growth of the population whose land in Surabaya city could not accommodate more. Based on this fact the research be did. The aim of this research is: determine the pattern of land use changes in the last year and to analyze the socio economic changes in the Banjarsari village, Gresik Regency. To determine the socio economic changes in the area of research is required: a). population change data from 2010 to 2015, b). Google Earth Imagery 2010 to 2015. The population data and the type of work changes are described by the time series and land cover change analysis. To analysis the land use conversion we also use Google Earth imagery with ArcGIS applications. For astronomical layout correction based on GPS field checks and RBI Map. The goal of this study is 1). Farmland change into residential/ settlements in 2004-2014 is 12%; 2). Peoples who changing their livelihood is 39%. In occupational changes affect the population income ranges from 500,000 IDR -. 1.000,000 IDR per month/per capita.

1. Introduction
High population growth, and development activities in different areas of the course will lead to join the growing demand for land. The demand for land is growing, and currently available land is limited. This has encouraged the conversion of agricultural land to non-agricultural. The limited agricultural land from the conversion will affect economic, social and environmental. It can be seen from the increase in land requirements, particularly in urban areas. Conversion of land use is now evident, especially land as a place to accommodate human activity as well as a place for living. This is due to the increasing population in urban areas is not only influenced by natural population growth alone but is also influenced by the new arrivals from both rural and urban areas around it[1].

District of Cerme is a district close to the city of Surabaya, therefore a lot of agricultural land in the district Cerme used as housing and industry in order to support the growth of the population whose land in Surabaya city could not accommodate more. In the Cerme district, there are 25 villages, including the village Banjarsari. Banjarsari villages including the village closest to the urban areas, leaving plenty of agricultural lands converted into non-agricultural land.

Based on data from the Central Statistics Agency (BPS) Gresik, the total population in the District of Cerme in 2014: 71,665 people ( 60,500 in 2004 ). This situation certainly causes an influence on the needs of the population in place to resettle residents and all its activities. The result was the construction of settlements will increase. The development activities in the district Cerme settlements...
will, of course, lead to the use of agricultural land. Changes in land use can also be seen from the decrease land farm, such as in the following table:

| Year | Lands (Ha) |
|------|------------|
| 2004 | 2.880      |
| 2006 | 2.860      |
| 2008 | 2.773      |
| 2010 | 2.666      |
| 2013 | 2.386      |
| 2014 | 2.371      |

Source: BPS district. Cermein Years 2004-2014

This condition can be seen followed by a decline of agricultural productivity gains in the last 5 years. It can be concluded from the following data is that agricultural productivity has fallen by 3,474 tone grain in the last 5 years currently.

This phenomenon may follow the growth pole theory is based on the belief that governments of developing countries can induce economic growth and welfare by investing heavily in capital-intensive industries in large urban centers or regional capitals. This growth is supposed to spread to the rural areas in a process of regional development. It is meant to put together various economic forces, creating a virtuous cycle that spreads economic growth from urban to rural areas.

The general move towards dispersal and location of growth on the peripheries or fringes of cities is becoming a worldwide phenomenon. Recently, evidence of strong empirical regularities in the patterns of metropolitan development in market-oriented economies of both industrial and developing countries, this movement towards the fringes as follows:

1. a dispersal process from the center to the periphery of both population and employment, with the largest metropolitan areas converging to decentralize and multiple sub-center areas, (cities in developing countries tend to have higher population densities, but the difference is narrowing);
2. highly decentralized manufacturing employment and emerging especially of the central business district in-service employment;
3. increased reliance on road-based transport for both passengers and freight (industrial countries have experienced decreases in transit level as automobile ownership rises; developing countries have higher transit-ridership levels and a mix of options in terms of vehicle sizes and levels of services);
4. land-markets are strong determinants of this outward movement, land rents being closely related to development densities;
5. urban housing demand patterns are similar across cities in industrial and developing countries, but the supply side varies, as does the efficiency of the public infrastructures provision.

Following McGee and Watters have recently stated that the evolution mentioned above can be divided into two main features that are “changing the face of the world geography”: globalization, “which assumes the increasing integration of national economies into global systems of production, distribution and consumption” and space-time collapse which is the consequence of the technological improvements in transport, communication and computer technology[2].

McGee further argues that the globalization process is followed by an inevitable increase in urbanization and the emergence of global and sub-global systems of highly linked cities. If current patterns of urban concentration persist, the developing world is expected to experience the emergence of mega-urban regions as major components of their urban systems[3].
One of the consequences of the first wave of “globalization” had been the creation of large primate cities dominating the urban hierarchies of their countries which were administrative centers and conduits for the flows of raw materials for the developing world. At the same time, dualistic societies were created, with much of the rural population living in poverty, foreign entrepreneurs and indigenous oligarchy [2]. The major conclusion from this analysis is that macro-trends do not necessarily indicate a concentration of urban settlement or counter-urbanization. In fact, while changing the scale and the definition of the urban agglomeration, these processes are actually occurring in a larger zone, where one can find at the same time residential outward movement, changing the land use of the inner cores, industrial decentralization into new industrial states and the creation and amelioration of transportation networks. This larger zone is the Extended Metropolitan Region. Following Rigg and McGee, the features of Southeast Asian EMRs are 1). large and dense population engaged in wet rice cultivation; 2). good transport networks; 3). highly mobile population; 4). an increase in non-farm (non-agricultural) activities; 5). a mosaic of interlocking land uses; 6). increased female participation in the labor force; 7). lack of planning controls”[3].

Within the Asian context, Ginsburg and McGee have challenged the conventional view accepting that the distinction between rural and urban would persist as the urbanization process advances; distinctive areas of agricultural and non-agricultural activity are emerging adjacent to and between urban cores, which are a direct response to pre-existing conditions, time-space collapse, economic change, technological developments, and labour force change occurring in a different manner and mix from the operation of these factors in the Western countries in the nineteenth and early twentieth century[3].

Ginsburg’s description of these new areas characterized them as complex and compound regional systems consisting of central cities, fringe areas of those cities, exurbs, satellite towns, and extensive intervening areas of dense population and intensive traditional agricultural land uses in which wet paddy tends to dominate[2]. McGee has proposed a territorial model named desakota, and a word to describe the process that leads to the formation of such territorial patterns: Dakotas. Following[4], in McGee’s model, five main regions are identified:
1. the major cities (in the Asian context this is generally an extremely big city);
2. the peri-urban regions: those areas surrounding the cities within a daily commuting distance from the core and characterized by high interaction with it;
3. the desakota regions, often lying along the corridors connecting a large city core to smaller town center;
4. densely populated rural regions;
5. sparsely populated frontier regions.

In order to understand the potential for change in the periurban, in a forthcoming paper, Hudalah & De Roo suggest to consider ruralurban transition as a multilayered process with three dimensions: functional, organization and institutional at the macro, meso, and microlevel. Functional changes are ranging from physical changes (such as land use and infrastructural changes) and urban and regional dynamics (for example, population, economy, and employment changes), to catastrophic events (such as war and disasters)[5]. Organization changes concern changes of actions, cooperation and coordination influencing stakeholders/actors. They consist of economic actors (including real estate developers), political actors and governments, and nongovernment actors such as environmental organizations. Finally, institutional changes comprise altering frameworks of meaning and rules of conduct. They consist of shifts in cultural values, formal and informal rules (including new legislation and policy frameworks), and ideological forces.

Following Deka et al. show that Land use activities were more towards agricultural encroachments and built-up expansions at the cost of forest cover and wetlands. The results indicated that severe land cover changes occurred in built-up areas (+45.82%), wetlands (~39.45%) and scrublands (+30.70%) areas have been common. Relative to highest area cover and increase of +4.16% in croplands over the period indicated that agriculture is an age-old practice in the district[6]. Factors Influencing Land Use and Land Cover Changes is a culmination of the interactions between physiographic, demographic and socio-economic factors[7]
Based on the above background, the research interest to do with the title "the impact of land use changes in the banjarsasivillage, the gresik district, east java province ".The purpose of this study is 1). To determine the pattern of land use changes that occurred in the village Banjarsari Cerme District of Gresik based maps of land use in the last year .2). To analyze the socio-economic changes that occurred in the village of Banjarsari, Cerme District of Gresik.

2. Methodology
The local Area of research: Banjarsari Village is a village in the Cerme district of Gresik. Banjarsari consists of two hamlets namely Banjarsari and Betiring with the following boundaries: North: Dahan Rejo village; South: Tambak Beras and Semampir; East: Village Kedanyang; and West: Padeg and Watang Rejo village.To determine the socio-economic change in the area of research is required:

a. Data of population changes from 2010 to 2015
b. resident employment changes data from 2010 to 2015 from the interview.
c. Google Earth image of 2010 to 2015

Data processing of population and the type of work change is described on analysis of time series of land cover changes base.

3. Results and discussion
The research area has a height of almost uniformly to an average altitude of this area is from 5 to 12.5 meters above sea level. Size Banjarsari village was 407,59 hectares, 66 % of which is paddy.Socio-Economic Changes following the land use change can see in some sectors i.e :

a. Land Price Changes
Prices of agricultural land owned by the respondent each place is different and every year more expensive land prices, closer to urban areas, roadside relative more expensive than the price of land far to the urban and roadside. The average price in 2004, land prices. 100000-200000 IDR /m2 and in 2014 the average price of land reached 350000-580000 IDR/m2.

b. Income
Following Mc Gee increasing income in this area have relation with the land use change process [3].From Table 1 above it can be seen that the respondents who earn monthly income prior to selling the highest agricultural land are between 1500000-2000000 IDR at 50% and lowest income of between> 3,000,000 at or 22%. While respondents revenue after selling agricultural land is highest among 2500000-3000000 IDR amounted to 42% and the lowest income of between 500,000 -1,000,000 IDR and >. 3,000,000 IDR respectively 17%. Income residents before and after selling the farm. For more details can be seen in the following table:

| Income (IDR) | Before Land Sale | Before Land Sale |
|--------------|------------------|------------------|
|              | Sum of           | (%)              | Sum of           | (%)              |
| <500.000     | -                | -                | -                | -                |
| 500.000 – 1.000.000 | -          | 6                | 17               |
| 1.500.000 – 2.000.000 | 18         | 50               | 9                | 25               |
| 2.500.000 – 3.000.000 | 10         | 28               | 15               | 47               |
| >3.000.000   | 8                | 22               | 6                | 16               |
| **Σ Sum of** | **36**           | **100**          | **36**           | **100**          |

Sources: Primary data are processed 2014

c. Changes livelihood
Changes livelihoods go hand in hand with the process of changing the land use from agricultural land to non-agricultural land use. According Hudalah & De Roo [5] and Rigg & McGee [3] After selling his
farm formerly principal livelihood as farmers are now switching function livelihood becoming non-farming. Livelihood changes can be seen in Table 2 as follows:

| Livelihood changes        | Sum of | Percentage (%) |
|---------------------------|--------|----------------|
| Farmer to traders         | 6      | 43             |
| Farmer to construction worker | 2    | 14             |
| Farmer to Massage         | 1      | 7              |
| Farmer to labor           | 1      | 7              |
| Trader to Farmer          | 1      | 7              |
| Labour to farmer          | 3      | 21             |
| **Total**                 | **14** | **100**        |

Sources: Primer Data 2014

It can be seen from the above description that there are 6 changes in the livelihood of respondents, for more details can be described like this:

1). Farmers become traders

In this case the respondent livelihood as farmers move into the merchant market or open a shop at home with a percentage of 43% higher than most occupational changes are more Farmers turned into traders driven by agricultural land narrowed, they are buying a market stall or open a shop in order to earn more definite and earn a more profit. Trading is not too demanding expertise specific skills but needs more time to do.

2). Farmers become construction worker

In this case, the respondent livelihood as farmers moves to become a construction worker with 14%. Farmers who move to become a construction worker is due to the need for a construction worker to build houses. Income as a construction worker was very helpful in meeting daily needs. Livelihood as construction workers also does not require special skills.

3). Farmers become massage

In this case, the respondent livelihood as farmers moves into the massage with 7 %. The farmer who moves into this job is the women who no longer have agricultural land.

4). Employees farmers into factory

In this case, the respondent livelihood as farmers moves to become a factory worker with 7 %. They changed livelihood as factory workers bolstered by growing industrial development. Farmers who turned into factory workers driven by a definite revenue for each month in order to fulfill daily needs.

5). Traders became Farmers

In this case, the respondent livelihood as traders moved into the farmers with 7 %. Trader displaced subsistence farmers due to land held larger than the land area owned before the farm was converted and driven by the income more.

6). Factory employee becomes Farmers

In this case, the respondent livelihood as farmers moves to become a factory worker with a 21 %. Factories worker move to subsistence farmers is also due to the land held larger than the land area owned before the farm was converted.

4. Conclusion

Based on the analysis performed on the data collected, it can be concluded as follows: Changes in agricultural land use into residential / settlements in 2004-2014 11.49%; and residents who experienced a change of livelihood 38.89%. In occupational changes affect the population income per month per capita before selling the farm, there is nothing to earn 500,000 - 1,000,000 IDR per month, but after selling the farm there are respondents who find income of 500,000 - 1,000,000 IDR per month.
5. References

[1] Firman T 1996 Urban development in Bandung Metropolitan Region: a transformation to a Desa-Kota region *Third World Plann. Rev.* **18**

[2] McGee 1997 *Globalization, Urbanization and the Emergence of Sub-Global Regions* (London: Asia Pacific: New Geographies of the Pacific Rim, Hurst, and Company)

[3] McGee T 1991 The Emergence of Desakota Regions in Asia: Expanding a Hypothesis (Honolulu: University of Hawaii Press)

[4] Firman T, Ayu I DA and Dharmapatni I 1990 The Challenges to Sustainable Development in Jakarta Metropolitan Region *IX* 79–94

[5] Mohan R 1997 *Industrial Location Policies and Their Implications for India*, *in Jones and Visaria. Urbanization in Large Developing Countries: China, Indonesia, Brazil, and India* (Oxford: Clarendon Press)

[6] Jyotishman Deka, Om Prakash Tripathi and Mohamed Latif Khan 2014. *Study on Land Use/Land Cover Change Dynamics through Remote Sensing and GIS – A Case Study of Kamrup District, North East India*. *Journal of Remote Sensing & GIS* 03 Apr.2014 ISSN: 2230-7990. 55-62p.

[7] Maurice Onyango Oyugi, Victor A. O. Odenyo, Faith N. Karanja 2017 *The Implications of Land Use and Land Cover Dynamics on the Environmental Quality of Nairobi City, Kenya*. American Journal of Geographic Information System. p-ISSN: 2163-1131 e-ISSN: 2163-114X 2017; **6**(3): 111-127