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# Urban Expansion and its Impact on Local Communities: A Case Study of Seberang Perai, Penang, Malaysia

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## ABSTRACT

Urbanization is a major planning and policy concerning all spatial scales. This is due to more than half of the world's current population live in urban areas and overwhelming majority emerges in developing countries. The adoption of industrialization policy has led to rapid growth of urban population in the Asian countries including Malaysia. For an example, in Penang State, urban population growth causes cities to be spreading into the countryside, transforms non built-up areas into built-up areas and creates remarkable changes on the physical landscape as well as on the socio-economic condition of the local community. Thus, it is timely to investigate the impact of urban expansion at the peri-urban areas of Penang State on the local communities. This study gathers data using both quantitative and qualitative methods with 192 respondents, 12 in-depth interviews with senior citizens and village leaders living within areas experiencing intense urban development. The study finds that the local communities have more employment opportunities in both formal and informal sectors and also experience better livelihood generated from urban development. However, the expansion of built-up areas has put pressure on land and caused significant loss of agriculture land affecting the likelihood of the farming communities at the peri-urban area. Agriculture land size diminishes and becomes unprofitable. Consequently, farmers are willing to sell their land in the hope for quick return. The findings from this study show that appropriate planning policy needs to be devised in order to protect agriculture land at the peri-urban areas and ensure that the local communities benefit from the urban development.

*Keywords:* Peri-Urbanization,Socio-economic impact, Malaysia, urban expansion

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## INTRODUCTION

Currently, more than half of the world's population resides in urban areas and the majority is in the developing countries. The number of urban population has increased

dramatically from 200 million in 1900 to about 2.9 billion in 2000. It is estimated to reach 5 billion by 2030 (Ademola and Takashi, 2007). According to the United Nations (2008), urbanization of the Asian and Pacific region will continue and a majority of the region's population will live in urban areas by the year 2025. Furthermore, in the Pacific sub-region, over 70 % of the population already lives in urban areas, while in the East and South-East Asia, urban population is expected to reach the 50 % level before the year 2015 (UN, 2008; McGee, 2011). Urbanization brings economic development with substantial improvement in the provision of social services to various communities in many countries. Apart from the urban expansion or physical increase of built environment, urbanization also brings ecological and socio-economic effects. Conversion of farmland and vegetation land cover into urban built-up areas reduces the amount of lands available for food and crop production (Raddad *et al*., 2010). For example, the total area of cropland, pastureland and rangeland in the United States has decreased by 76 million acres in the lower 48 states between 1982 and 2003; while the total area of developed land has increased by 36 million acres or 48% (Wu, 2008). Similarly, China also experiences a drastic decrease of farmland due to urban expansion. For example, between 1996 and 2002, cultivated land has been reduced from 130.03 million hectares to 125.93 million hectares (Qi *et al*., 2005). Urban expansion has created high pressure on the agricultural land. Subsequently, it brings negative impacts on socio-economic conditions to the communities and environment.

In many developing countries, including Malaysia, urban expansion resulting from industrialization policy adopted since 1970s has attracted large group of young people to move to urban centres in the hope for greener pastures (Ghazali, 1999; Abdul Samad Hadi *et al*., 2010). This massive migration has put high pressure on the existing social services and become a challenge for the state to meet the demand of continuous growing urban population (McGee, 1989; Ghazali, 2011). The demand for housing and related services from growing population has pushed built-up areas towards the peri-urban areas and encroached into the hinterland (McGee, 2009; van Ginkel, 2010). Many studies have been conducted investigating the impact of urbanization and land used changes on the environment, forest and agricultural land (Petterson *et al*., 1999; Sathiamurthy, 2008; Gossop, 2011). However, little attention is paid to its impact on the socio-economic and livelihood of the local communities living within the areas experiencing intense urban development pressure except those undertaken by Ghazali (1999); Ghazali (2011). This study aims to fill such gap by focusing on the evaluation of urban development and its socio-economic impacts on the local communities living at peri-urban areas of Seberang Perai, Penang, Malaysia. The study evaluates the economic opportunities that the local communities experienced, both in formal and informal sectors, as to investigate the positive impact

of urbanization. Furthermore, this study also examines the negative impact of urban expansion on agriculture activities and landownership among the local communities living within the areas dealing with intense urban development.

## BACKGROUND OF THE STUDY

Urbanization, the consequence of migration from rural to urban, and natural population growth cause the spread of built-up areas towards the fringes or peri-urban areas (McGee, 1989; McGee, 2011). This process is often termed as 'peri-urbanization'. It connotes the confluence of urban and rural spaces, in particular the stretches of land connecting two city centres (UNFPA, 2007). Peri-urban area refers to a transition or interaction zone where urban and rural activities are juxtaposed, and landscape features are subjected to rapid modification, induced by human activities (McGee, 1989; Simon *et al*., 2004). This area might include areas of sensitive landscape, valuable agriculture areas, or important wetlands which provide important component of urban eco-systems. Furthermore, this area also contributes to a number of environmental and geo-political changes such as changes in land-use, sub-urban development and diversification in livelihoods (Tacoli, 2003; UNFPA, 2007; Ghazali, 2011). Since peri-urban area is very important in providing linkages between urban and rural areas, there is an urgent need to strategically plan and manage the spread of urban spatial growth (Simon *et al*., 2004; McGee, 2009). Likewise, uncontrolled economic growth and urbanization can cause adverse environmental impacts and pressurize the likelihood of the local communities (Mandere *et al*., 2010; Gossop, 2011). Therefore, proper planning control and management should be in place in order to ensure the local communities are also benefitting from urban development (Van Ginkel, 2010)

However, lack of rigorous policy on managing and planning of urban expansion aggravates the negative impact of urbanization in many developing countries. During the last three decades, many cities in the developing nations have shifted from a mainly agriculture-based economy to one of industrialization in order to foster economic growth (McGee, 1989; Choguill, 1994; Samat, 2002). This shift induces large group of the rural people, who lose their major source of livelihood, land, to flee to the urban centres (Elhadary and Samat, 2012). Rural-urban migration is considered as one of the major driving forces behind the rapid urban growth. This massive migration has placed high pressure on the existing social services, pollution increase, social problems: it has become a challenge for the state to meet the demand of continuous growing urban population (German and Pyne, 2010). According to the World Bank (2007) around 300,000 to 400,000 new migrants, mostly the poor, arrive in Dhaka, Bangladesh annually. Its current population is approximately 12 million and projected to reach 20 million in 2020; making it the fastest growing mega-city in the world (German and Pyne, 2010).

More than half of its total population lives in deprivation (Moral, 2010). The migrants' high demand for low price housing causes more farmlands at the peri-urban areas to be converted to housing and related facilities (Samat *et al*., 2011). To exemplify further, Liu *et al*., (2010) confirms that urban sprawl in China encroaches into farmland costing farmers the most important resource which they have depended and lived on for generations. Furthermore, urban expansions cause more than 40 million farmers to lose their farmland at the rate of 2 million acres per year. Similarly, due to the rapid increase in the residential and commercial developments in the capital-Hanoi, Vietnam, the rural communities lose their main source of livelihood of fresh food such as fish, pork and vegetables for the city's residents (Tacoli, 2003).

Likewise, urban expansion in the African nations affects the agricultural production and land use in the areas surrounding urban centres (Simon *et al*., 2004). For example, Mandere *et al*., (2010) finds that there was a sharp decline in farming activities at the peri urban area of the capital, Nairobi, Kenya, where the number of full time farming households declined from 90% in the 1960s to 49% in 2010. It is an indication of the declining economic significance of agriculture. The declining of household agricultural activities is mainly due the sale of land for residential or business premises and also the bequest of land to the next generation. The rapid conversion of agriculture land to non-farming purposes jeopardizes the farming activities that have been considered as a major source of livelihood for people living in the peri urban areas. As a result, peri-urban areas become exposed to all sources of vulnerability leading to negative impacts on the livelihoods of the local communities (Simon *et al*., 2004; Elhadary and Samat; 2011).

Similarly, Malaysia also experiences rapid urbanization primarily as a result of the adoption of industrialization policy in the 1970s. The industrialization in our country has managed to increase the economic growth turning Malaysia to be a country difficult to surpass in terms of economic growth. The Gross Domestic Product (GDP) of the country has increased from 45,392 million in 1970 to 100,375 million in 1980 and 356,401 million in 2000 and continue to increase to 519,218 million in 2009 (Malaysia Economy, 2010). The manufacturing sector becomes an engine of development and plays the vital role in solving problems like poverty, low income, unemployment and lack of services. As a result, Malaysia managed to reduce the percentage of poor population in both urban and rural area from 49% in 1970 to only 6% in 2000 (Salfarina *et al*., 2007). However, economic opportunities obtained from the industrial sector attract influx of people from within and outside of Malaysia to migrate and reside in urban centres. The average annual growth rate of urban population in the country was more than 4.9% between 1970 and 2000 as compared to only about 2.3% for the country's population as a whole. In 2000,

more than 60% of Malaysia's population lived in urban areas with population above 10,000 (Rostam *et al*., 2010). While urbanization creates various opportunities for people living within the peri-urban area, a few negative consequences accompany the development. Urbanization leads to significant reduction of agricultural land and green space and becomes potential threat of resource depletion due to rivers contamination from industrial discharge (Peterson, 1997; Sathiamurthy, 2008).

The Second National Physical Plan (NPP-2), approved in August 13, 2010, guides the urban development at the national level in Malaysia. It is aimed to achieve efficient, equitable and sustainable national spatial framework to guide the overall development of the country towards achieving developed and high-income nation status by 2020 (JPBD, 2010). The development strategies in the NPP-2 also emphasizes on the inclusive development through the physical relationship between urban and rural areas with the intentions that Malaysians can enjoy a development that is sustainable, whole, fair and balanced. It is timely that such a plan being adopted and used as guidelines to manage and plan the expansion of built environment since uncontrolled growth can cause environmental problems and jeopardize people (Simon *et al*., 2004; Gossop, 2011).

Penang is one of the Malaysian states that has experienced rapid expansion of urban areas mainly due to industrialization since 1970s. Six industrial estates and two free trade zones have been developed over 2464 hectares of land (Ghazali, 1999; Samat, 2002). Such development leads to increase of incoming migration to the area. Unsurprisingly, it places more pressure on public services and creates housing problems. In order to meet the need of the fast growing number of urban population, large productive rice growing areas have been turned into industrial and housing estates (Abdullah and Nakagoshi, 2006; Rostam *et al*., 2010; Ghazali, 2011; Samat *et al*., 2011). Consequently, land at the peri-urban areas become scarce and large group of people who depend on agriculture for their livelihood need to search for employment outside of agriculture. Corresponding to the people migration, the rice production declines tremendously (Ghazali, 1999).

## METHODOLOGY AND DATA

This study aims to evaluate the impact of land use changes on the socio-economic conditions in the local communities. According to Pearsall (1999), a *community* is defined as a group of people living together in one place or in a common environment, while the term *local* adds spatial element that narrows down the definition to include small geographical space. This paper defines local community as a group of people living together in a common environment with affects from urban development pressure surrounding their houses in Seberang Perai. A field survey is conducted in order to get representative data on the positive and negative impacts of urbanization on the local communities. Two major peri-urban areas in the central part of Seberang

Perai, namely Bukit Mertajam and Juru are selected (refer to Fig.1). Based on the study by Samat (2002) and Samat *et al.* (2010), that monitors land use transformation from non built-up to built-up areas and calculates the urban expansion intensity index within 1km x 1km cell grid from 1990 to 2007, shows that Bukit Mertajam and Juru areas experience intense land use transformation. Therefore, the local people living within these areas are chosen as respondents for both quantitative and qualitative surveys. A total of 196 respondents have been selected using convenience sampling and interviewed using questionnaires designed to investigate economic opportunities and challenges experienced in the local community. Convenience sampling is used due to homogeneousness of the area and the unknown number of population living within the area experiencing intense urban development (Troachim, 2006). Out of the 196 respondents, 113 or 58% are from Bukit Mertajam and 83 or 42% are from Juru area. To further support the study and to supplement the findings obtained from the questionnaires and get clear picture about the development and its implication on the local communities, 12 in-depth interviews are conducted involving village leaders, government officers, villagers and senior citizens, (Ghazali, 1999). Quantitative data is analyzed using statistical package for social science (SPSS) version 17.0 and qualitative data is analyzed using content analysis.

*Study Area*

Bukit Mertajam and Juru area, located in the Seberang Perai Tengah district are chosen as study areas. Seberang Perai, the mainland part of Penang, is located in the northwest coast of Peninsular Malaysia between 5$^{o}$ 05' N and 5$^{o}$ 35' N latitude and 100$^{o}$ 20'E and 100$^{o}$ 40'E longitude. The area is approximately 738.4 square kilometers (Fig.1). Seberang Perai has experienced significant urban development since the early 1970. It is planned to be a regional growth centre of the Northern Region of Peninsular Malaysia where rapid urban development primarily resulted from industrialization (Goh, 1991; Samat, 2002; Sathiamurthy, 2008). Various infrastructures such as North Butterworth Container Terminal, North-South Expressway and Butterworth-Kulim Expressway have been developed to support industrial sectors and promote economic growth of the state (JPBD, 2007; Sathiamurthy 2008). Furthermore, this area is located within the Northern Corridor Economic Region (NCER) which is planned to be one of the growth centers and achieve a world-class economic region status by the year 2025 (Kharas *et al*., 2010). Hence, this area stands out as a potential local centre for population growth and economic development for the northern region (JPBD, 2007).

In 2010, Seberang Perai population has reached 838,999. The population rate has been estimated to reach 990,000 and 1.1 million people in 2015 and 2020; respectively (DOS, 2010; JPBD, 2007; Kharas *et al*., 2010). The increase in

population will have substantial impact on resources, particularly land, in order to satisfy the demand for housing and other related facilities. For example, it is also projected that between 2011 and 2015 another 32,930 units of houses are required to meet the demand from the growing population (JPBD, 2007). Table 1 below shows the increase of urban built-up area between 1990 and 2007. It shows that built-up areas has increased nearly 20 % between 1990 and 2001. In fact, it has further increased by 12% between 2001 and 2007 (Samat *et al*., 2010).

The increase of urban built-up area is at the expense of agriculture land in the study area. Evidently, Table 2 illustrates five types of main agriculture activities that are affected by urbanization. The size of paddy field has been severely affected where its size has been reduced from 27,580.0 acres to 12,293 acres between 2000 and 2003, equivalent to a reduction of 124.4%. After year 2001, stricter zoning plan has been implemented where paddy field is zoned under Irrigated Agricultural Development Project (SPMC, 1998; Samat, 2002). The zoning plan compels the conversion of paddy fields to other classifications of land more difficult if not impossible. Ironically, there are cases where farmers independently convert their land into single unit of a family house or use their land for swiftlet[1] farming (Respondent 1, Male, Government Officer, 45 years old, In-depth interview, 2011).

[1]Edible bird nest farming, which is popular in the Southeast Asian Countries

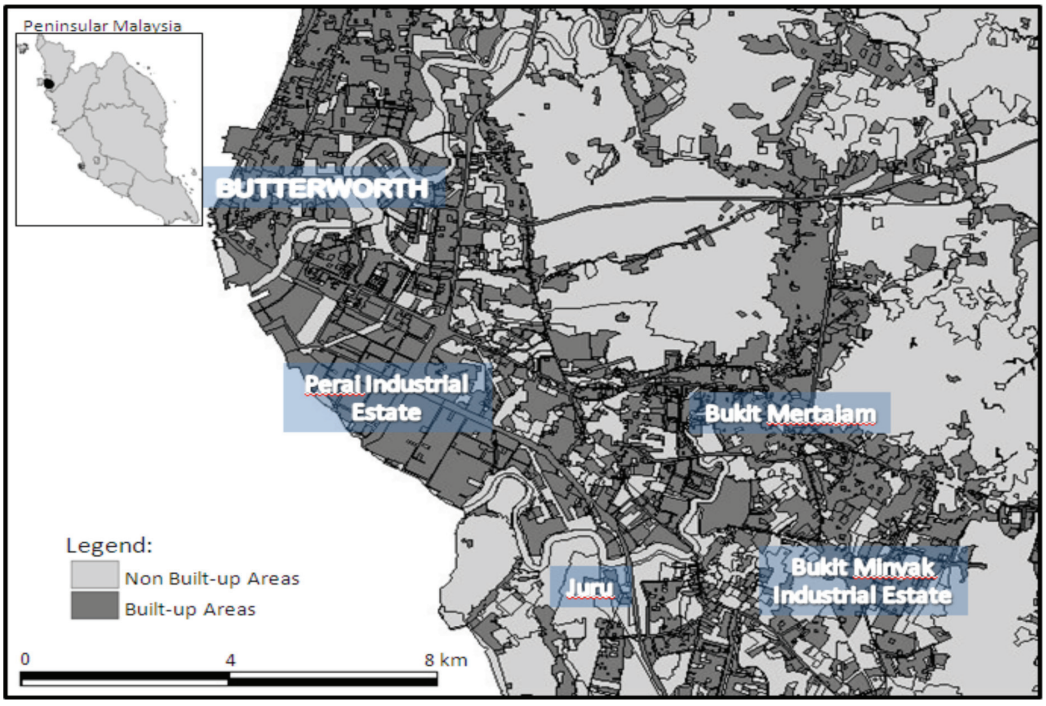


Fig.1: The study area

TABLE 1
Land transformation in the Seberang Perai region between 1990 and 2007

| Year | Built-up areas (Hectares) | Non Built-up areas (Hectares) | % increase of Built-up areas | Agricultural Land (Hectares) |
|---|---|---|---|---|
| 1990 | 15590.464 | 58126.633 | - | 51880.427 |
| 2001 | 18701.675 | 55015.422 | 19.95 | 42738.489 |
| 2007 | 21020.959 | 52696.138 | 12.40 | 42038.228 |

*Source:* Samat *et al.* (2011)

TABLE 2
Size (in Acre) and Percentage Transformation of Land Used for Five Major Agriculture Activities in Seberang Perai.

| Year | Paddy (acres) | Change (%) |
|---|---|---|
| 2000 | 27582 | |
| 2003 | 12293 | -124.37 |
| 2005 | 12472 | 1.44 |
| 2008 | 12472 | 0.00 |

(a) Paddy fields

| Year | Palm Oil (acres) | Change (%) |
|---|---|---|
| 2000 | 12750 | |
| 2003 | 12720 | -0.24 |
| 2005 | 12992.6 | 2.10 |
| 2008 | 13195.9 | 1.54 |

(b) Palm oil

| Year | Rubber (acres) | Change (%) |
|---|---|---|
| 2000 | 10391 | |
| 2003 | 10141 | -2.47 |
| 2005 | 9137.6 | -10.98 |
| 2008 | 9511.6 | 3.93 |

(c) Rubber

| Year | Coco (acres) | Change (%) |
|---|---|---|
| 2000 | 1931 | |
| 2003 | 2088 | 7.52 |
| 2005 | 1591.7 | -31.18 |
| 2008 | 384.8 | -313.64 |

TABLE 2 (*continue*)
(d) Coconut

| Year | Coconut (acres) | Change (%) |
|---|---|---|
| 2000 | 3481.2 | |
| 2003 | 3968.9 | 12.29 |
| 2005 | 3359.2 | -18.15 |
| 2008 | 3282.1 | -2.35 |

(e) Coconut

| Year | Total (acres) | Change (%) |
|---|---|---|
| 2000 | 56135.2 | |
| 2003 | 41210.9 | -36.21 |
| 2005 | 39553.1 | -4.19 |
| 2008 | 38846.4 | -1.82 |

(f) Total agriculture land size

*Source:* State Department of Agriculture (2009).

Significant increase of its population will lead to physical transformation of many areas especially at the fringe of existing built-up areas. It is appropriate to investigate the socio-economic benefits that the people experienced and the threats resulted from urban development in view of the direct impact of urban transformation on the people living in the surrounding areas. Such information is useful for planners and decision makers to gain understanding and assist in formulating appropriate policies on land use planning and management of urban and peri-urban areas.

*Demographic and Socio-Economic Profile of the Respondents*

Socio-economic survey is conducted at the fringe of Bukit Mertajam and Juru where 113 respondents, equivalent to 57.7 %; and 83 respondents, equivalent to 42.3 %; are interviewed respectively (Refer to Table 3). The respondents comprised of 83 heads of households or 42.3%, 90 wives or 45.9 % and 23 family members or 11.8%. The age of respondents ranges from 17 to 86 years old, with mean age of 48 years old. The respondents are matured and able to understand the questions given. They have seen the physical and land use transformation surrounding their areas. The distribution of gender among the respondents is with 71 of respondents or 36.2% are male and 125 of respondents or 63.8% are female. In the aspect of income level among the respondents, a majority of 162 respondents or 82.7% are from the middle income family, 18 respondents or 9.2% are from low income family and 9 respondents or 4.6 % are from high income family. Based on socio-economic conditions of the respondents, the study investigates the awareness of the respondents on urban development and its impact on the communities. Majority of the respondents or 171 respondents, representing 87.2% ,are aware of urban encroachment into their surrounding areas. However, 25 respondents or 12.8% are unaware of the situation. The type of built-up activities in Bukit Mertajam and Juru areas are housing, commercial, industrial and infrastructure.

TABLE 3
Demographic and Socio-Economic Profile of the Respondents

| Areas Surveyed | Frequency (n = 196) | Percentage (100%) |
|---|---|---|
| Bukit Mertajam | 113 | 57.7 |
| Juru | 83 | 42.3 |
| Respondent's Status | Frequency (n = 196) | Percentage (100%) |
| Head of Household | 83 | 42.3 |
| Wife | 90 | 45.9 |
| Other Family Member | 23 | 11.8 |
| Sex | Frequency (n = 196) | Percentage (100%) |
| Male | 71 | 36.2 |
| Female | 125 | 63.8 |
| Socio-Economic Status | Frequency (n = 196) | Percentage (100%) |
| High Income Family | 9 | 4.6 |
| Middle Income Family | 162 | 82.7 |
| Low Income Family | 18 | 9.2 |

*Urban Expansion and Socio-Economic Opportunities Experienced by the Local Communities*

Urban development brings socio-economic opportunity to the local communities. As an example, the development creates job opportunities in formal sector, generates informal job sectors and opens bigger market for local produce. The development of various infrastructures in the peri-urban areas gives better accessibility for these areas to the urban centres. The distance to the largest town, Butterworth, is less than 15 km, and to Bukit Mertajam and

Juru is 23km. Evidently, it provides more opportunities and convenience for the people to get access to their jobs. Table 4 illustrates the accessibility of the respondents to workplace. Most of the respondents that comprise of 67 respondents or 76.1% can reach their workplace in less than 10 minutes, while 15 respondents or 17.1% can access to their workplace between 10 and 25 minutes. Only 6 respondents or 6.8% have to travel between 25 and 50 minutes to get to their workplace.

TABLE 3
Accessibility of the respondents to workplace

| Time Travel (Minutes) | Frequency | Percentage |
|---|---|---|
| 0 – 10 | 67 | 76.1 |
| 10 – 25 | 15 | 17.1 |
| 25 - 50 | 6 | 6.8 |
| Total | 88 | 100.0 |

Most of the respondents that comprise of 139 people or 70.9% feel that urban development bring economic benefits to the communities, while only 57 respondents or 29.1% disagree to that. As depicted from an in-depth interview:

> *"Young people prefer to work in factories. They can easily get employed. Furthermore, they earn steady monthly salary, receive various benefits and access to the workplace easily since the factories provide transportation to their workers"(Respondent 2, Male, Pensioner, 65 years old, in-depth interview, 2011).*

The young generation prefers to work in the industrial sector since they can easily get employed and earn enough money to have a good living. Advertisement of job vacancies offering high monthly salary and various benefits including Employee Provident Fund, medical benefit, yearly bonus and free transportation to the factories in Perai Industrial Estate and Kulim High Tech Park can be seen in the study area. Based on the survey conducted, 30 respondents or 34.1% are involved in manufacturing related such as operators, transporters, and labours; 10 respondents or 11.4% are in professional, technical and similar job categories; 6 respondents or 6.8% are in administrative and management (refer to Table 4 below). Table 4 also shows the respondents' earning income from their main job. This table shows that 16 respondents or 18.2%, mostly from professional, technical and related category, earn between RM2500.00 to RM5,000.00 monthly from their main job. While 26 respondents or 29.5% earn between RM1,500.00 to RM2,499.00 per month. However, 19 respondents or 21.6% earn less than RM720.00, below poverty income line (Salfarina *et al*., 2007). Ironically, even though urban development brings employment opportunities for the community, there are still people whose monthly salary is slightly lower than national poverty income line.

In addition to main employment, the local communities also have the opportunity to participate in secondary income generating activities. For example, majority of the respondents have secondary

TABLE 4
Cross tabulation of Income and Occupational Category of the Respondents.

| Job Category | Income from Main Job (RM) | | | | Total/ Percentage |
|---|---|---|---|---|---|
| | 0-720.00 | 721.00-1,499.00 | 1,500.00-2,499.00 | 2,500.00-5,000.00 | |
| Professional, technical and related | 0 | 1 | 2 | 7 | 10<br>11.4% |
| Administration and management | 0 | 2 | 2 | 2 | 6<br>6.8% |
| Clerical and related | 0 | 5 | 4 | 1 | 10<br>11.4% |
| Sales | 2 | 3 | 7 | 2 | 14<br>15.9% |
| Services | 3 | 1 | 1 | 1 | 6<br>6.8% |
| Agriculture, rearing, forestry, fisheries and hunting | 3 | 5 | 0 | 1 | 9<br>10.2% |
| Manufacturing and related, operator, transportation and labour | 8 | 10 | 10 | 2 | 30<br>34.1% |
| Others | 3 | 0 | 0 | 0 | 3<br>3.4% |
| Total/Percentage | 19<br>21.6% | 27<br>30.7% | 26<br>29.5% | 16<br>18.2% | 88<br>100.0% |

*Source:* Field survey (2011)

job. A total of 86 respondents or 97.7 % earn up to RM500.00 per month. In fact, one respondent earn between RM500.00 to RM1500.00, and another from RM1500.00 to RM3500.00 from secondary job. For example, the location of industrial estate at the peri-urban areas (refer to Fig.1) provides opportunities for the communities to work in non-agriculture sectors and simultaneously involve in agriculture activities. Based on an in-depth interview in 2011, Respondent 3, a male rubber tapper aged 48 years old, expresses the following:

*"I work as a security guard at the factory near my village and earn RM1300.00 monthly and also make RM150.00 every two days through selling rubber tapped in the land rented from the local people. "*

Similarly, an in-depth interview is conducted with Respondent 4, a male, Government Officer aged 55 years old, in 2011). As a part time work, he grows paddy in 5 acre rented paddy field from an owner who lives in Selangor. In view of good quality of road network provides easy access to urban centres, he can work in the paddy field after coming back from his office.

*He says "The work in the paddy fields is a good exercise; I can get healthy as well as earn an extra income. I earn about RM6000.00 net after deducting all expenses on every harvesting season. Furthermore, I hire people from the village to spray pesticides and fertilizers, plough the land and harvest the paddy"*

The local community living at the peri-urban areas has the opportunities to participate in agriculture sector, at the same time, earn stable monthly income from working in formal job sectors. The study by Madsen *et al*. (2010) in Denmark also finds that urbanization at the rural and peri-urban areas allows farmer to participate in service or manufacturing sector while continue being farmers. Other types of secondary jobs include working as technicians, mechanics and security guards at the factory near the study area (Ghazali, 1999).

In addition to generating opportunities for the local communities to participate in formal job sector, urban development at the peri-urban areas also opens the market for an informal job sector. The expansion of good network infrastructure coupled with the increase of population with its purchasing power trigger many people, particularly in area close to the cities, to set up small stalls selling food and restaurants along both sides of paved road. This study discovers that women also participate in this informal sector. Respondent 5, a female housewife aged 43 years old, shares in an in-depth interview in 2011 as below:

*"I quit my job as an operator at a factory in Penang Island to open a small stall selling banana fritters and curry puffs. I earn about RM200.00 daily. My time is quite flexible that I still have time to look after my children. I start my business from 2:00pm to 6:00pm only. This is better than working at the factory, where I had to travel to Penang Island as early as 6:00am. I also provide opportunities for my friends to leave their homemade cakes or local chips to be sold in my store. I only charge small commission rate where they pay me RM0.30 for every RM1.00 items sold".*

Besides, opening food store near their homes, women also participate in providing childcare services. Based on an in-depth interview in 2011, Respondent 6, a female housewife aged 40 years old reveals the following:

*"I look after three of my neighbours' children whose parents work as teachers. The age of the children ranges between one to five years old. They pay me monthly fees of RM200 for each child. While looking after the children, I can also do other housework. It helps to contribute to my family income".*

As more middle income and high income families move to the peri-urban areas, the market for food and services such as childcare and sewing clothes increase. Therefore, villages located close to urban and along the main roads are benefiting from the development compared to those who lack such facilities (Mandere *et al*., 2010; Ghazali, 2011).

As well as creating more job opportunities in informal sectors, development at the peri-urban areas also generate bigger market for rural produce. Below depiction from an in-depth interview with Respondent 7, a male dairy farmer aged 57 years old, in 2011, supports the concept that good network infrastructure and high purchasing power of urban people is an advantage for farmers living at the peri-urban areas

> *"My land is 45 minutes' drive from Georgetown and 15 minutes' drive from Butterworth. It is easily accessed through good road network. I used to distribute the milk to urban dwellers with motorbike. Now, I have expanded my business and use a car to get to my clients. Due to increasing demand for fresh milk, my business has become lucrative. My customers are mostly foreigners living in the urban centers".*

Similarly, Respondent 8, a female housewife aged 55 years old, grows eggplants, lemongrass, and chillies near her house at the fringe of Butterworth. She sells the produce to vegetable sellers at the local wet markets. Below is depicted from an in-depth-interview with her in 2011:

> *"Considering my land is very small, I only get an average income of RM25.00 per day. However, this is quite good money where I can contribute to my family".*

The demand for local produce is very high that she manages to make a good living through selling vegetables.

Similarly, Respondent 9, a male pensioner aged 60 years old, rears goat for local market and opens a restaurant in his farm serving mutton as the main dish. The following is depicted from an in-depth interview in 2011:

> *"In the early days, I had problems with marketing goat milk. I used to take goat milk in my car and sold it at the local market. However, due to the fact that the product is perishable, I start to think of ways to sell it fast. Then, I open the restaurant in my farm, specializing in dishes made from mutton and goat milk. Now, I need at least 600 – 700 goats monthly to cater for the demand from the restaurant. People come here not only for food but also to get away from urban life. This place offers them a relaxing environment for meals and their children will have the opportunity to see goats, ostrich and rabbit or feed the fish in our fish ponds. Most of the customers are from urban*

*areas with higher purchasing power than the locals".*

The findings from this study reveal that the with developments of good infrastructures bring more opportunities to the local communities to be involved with formal job sector, provide services and market local produce to urban dwellers. Similarly, Mandere *et al*. (2010) states that commercial activities along the road in the periphery of the urban core in Kenya provide farmers with outlets to sell products or to purchase what is needed for farming. It also gives peri-urban dwellers access to food supplies and other basic necessities without travelling to the urban core. Although urban development at the peri-urban areas benefit the local communities, most of the opportunities are limited to the financially constraint informal sectors. Therefore, it is unable to provide sufficient high income opportunities to lift the majority of the population from hardship (Simon *et al*., 2004; Mandere *et al*., 2010). .

*The Negative Impacts of Urban Expansion at the Peri-Urban Areas*

The discussion above concentrated on the economic benefits that the local communities at the peri-urban areas experienced. However, urban development also brings negative consequences. Although industrialization opens more job opportunities in non-agriculture sector, most of the local communities are involved in low job category. For example, only 88 respondents that is equivalent to 44.9% work and earn monthly salary. However, most of the respondents involved in low income job categories. As shown in Table 4 above, most respondents are factory workers, operators, transporters, and labours. These occupational categories are translated into income earned by the respondents. Based on Table 4, about 19 respondents equivalent to 21.6% earn monthly income of RM720 and below. They are classified as poor, based on Malaysia's poverty income. Furthermore, only 16 respondents equivalent to 18.2% earn more than RM2500.00 per month. Similarly, the study by Mandere *et al* (2010) in Kenya and Ghazali (1999; 2011) and Salfarina *et al*., (2007) in Penang, Malaysia find that urban development brings more economic opportunities to the areas experiencing land use transformations. However, the local communities are involved in low skills and low paying job such as working as housekeepers, garbage collectors, cleaners, babysitters, hawkers, landlords and food stall operators and food traders.

Furthermore, the conversion of rural land into settlement or built-up areas reduces the amount of land available for agricultural activities and housing. For example, large productive agriculture areas in Penang have been transformed for industrial development and its related activities (Ghazali, 1999; Samat, 2002). Thus, land becomes scarce on the island and many people move to Seberang Perai. Rapid urban expansion consumes approximately 14.2 sq. km / year of farm land which has been converted to other use on Penang Island and Seberang Perai between 1989 and 1995 (SPMC,

1998; Sathiamurthy 2008). The study conducted also reveals that considerable productive land at the peri-urban area has been converted to either built-up areas or service related activities (Samat *et al*., 2011). Table 5 shows the size of land owned by the respondents in the study area. Only 29 out of 196 respondents interviewed have land. However, the size of land owned is slightly small. The average size of land is approximately 4.414 relong or 2.94 acres. For example, more than 80% of the respondents own less than 4 acres of land, 10% of them own between 6 to 7 acres of land, and only 6 % of them or 2 respondents own the land with the size of more than 10 acres.

The finding shown in Table 5 clearly reflects that most of the respondents in the study area do not have land or only own small piece of land. It might be true to say that the low returns from the agriculture compared to the high income from built-up areas compels many people to sell their land or in some cases convert it to commercial activities. Based from an in-depth interview with Respondent 10, a male pensioner aged 59 years old, reveals that he is willing to sell his paddy fields if he receives appropriate compensation. Below is depicted from the interview in 2011:

> *"I could use the money to start a business or buy property elsewhere. Moreover, the size of my land is very small; only one acre. Thus, the yield from this land is very small whereby planting paddy is sufficient to have a decent living. It needs at least 20 relong or 13 acres to make a good living from planting paddy"*.

On the whole, the respondents who disagree selling their land are afraid of losing source of livelihood or not receiving appropriate compensation in view of the increasing value of land.

TABLE 5
Land Size Owned by The Respondents In The Study Area

| Land size (Relong) | Land size (Acres) | Frequency | Percentage |
|---|---|---|---|
| 1 | 0.67 | 9 | 31.03 |
| 2 | 1.33 | 4 | 13.79 |
| 3 | 2.00 | 4 | 13.79 |
| 4 | 2.67 | 5 | 17.24 |
| 6 | 4.00 | 2 | 6.90 |
| 10 | 6.67 | 2 | 6.90 |
| 11 | 7.33 | 1 | 3.45 |
| 16 | 10.67 | 1 | 3.45 |
| 20 | 13.33 | 1 | 3.45 |
| Total | | 29 | 100.00 |

*Note:* 1 relong is equivalent to 0.28 hectares.
Average land size is 4.414 relong or 2.944 acres.
*Source:* Field survey (2011)

This nationwide phenomenon threatens the existence of agriculture that provides stable food mainly rice to large communities in both rural and urban areas. According to Wu (2008) more than half the value of total farm production in the United States is derived from counties facing urbanization pressure. As urbanization intensifies, agricultural and non-agricultural land use conflicts become more severe (Mandere

*et al*., 2010). Consequently large group of farmers and related farming employment have to seek other source of income digress from farming production.

Furthermore, the finding also shows that farming or subsistence economy, the major source of livelihood of the Malays up to the early 1970's, has been profoundly transformed (Ghazali, 1999; Thompson, 2004). Although it has not been completely eliminated, it seems that most of these lands shall be most likely be converted to other use. It may be argued that farming and related activities might disappear in the near future if planners and policy makers do not take serious measures. Thompson (2004) states that by 1987, rural households in Peninsular Malaysia would derive only a quarter or 25.7% of their annual income from agricultural activities. Non agricultural income is derived from social services equivalent to 24.2%, manufacturing equivalent to 13.7%, trading equivalent to 13.2% and a variety of other sources equivalent to 23.2%. Based on such finding, only 0.7% of the households derive their main income from farming. If this trend continues, farming activity will be eliminated completely from Penang by year 2025 (Sathiamurthy, 2008).

The rate of land conversion occurred in a relative manner depends on the distance to the urban centre, development schemes as well as in areas that are highly affected by the spread of urban culture (Samat *et al*, 2010; Ghazali, 2011). Therefore, it is sufficient to conclude that once the human landscapes surround or border the natural landscape, the probability that it will be converted to human landscape is high (Thompson, 2004; Abdullah and Nakagoshi, 2006). Declining in agricultural activities not only threaten the situation of food security but also place a great deal of pressure on the ecological condition at the micro and macro level. In this regard, Wu (2008) and Raddad *et al*., (2010) place the blame on planners for unable to foresee the hidden advantage of farming in ensuring food security and protecting the environment. In most cases, agricultural land has been strategized as reserved land for future urban growth.

## CONCLUSION

Rapid urban expansion causes built environment to spread into the peri-urban areas, resulting in sharp decrease of agriculture land. Although urban expansion brings improvement in the infrastructure and generates economic opportunity both in formal and informal sectors, it also causes reduction of land size that the local communities owned. Subsequently, it threatens the livelihood of farming communities. There is an imperative need for rigorous policies at a local level to control or direct the urban development into specific region in order to reduce the negative impact of urban development on the society and the environment. As a whole, the rigorous policies shall promote equitable and sustainable urban development.

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