

Urbanization and Changing Settlement Patterns in Peri-urban Bangkok

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ABSTRACT

This article presents findings from a research on 'Urbanization and Changes of Settlement Patterns in the Peri-urban Areas of Bangkok Metropolis' completed in mid 2008. The research objectives were to investigate population dynamics, and changes of economic base and settlement patterns in peri-urban Bangkok; and to obtain an understanding on existing conditions of urbanization. To analyze how the peri-urban areas have transformed over the year 1988 – 2007; statistical data on population and Gross Provincial Products were used together with direct field observations and interpretation of satellite images from Landsat TM 5.

The empirical evidences gathered in 2008 highlighted that peri-urban Bangkok has been in 'urbanization' stage whereas the metropolitan region as a whole was in the stage of 'suburbanization' indicating by the high rate of population growth in peri-urban areas, by transforming economic base to non-farming economy, and by rapid expansion of built-up areas. The expansion of built-up areas reflects the changes of settlement patterns being characterized as 'concentration' by increasing density in the eastern side of the Chao Phraya River; and as 'de-concentration' to new areas by clustering around provincial centers, along major roads and rivers, and sprawling in agricultural areas. So far, these changes have generated a number of problems in the peri-urban areas of the Bangkok Metropolis.

Recommendations were to encourage planning agencies to use urban planning strategies in promoting agglomeration of settlements that would help alleviating problems from insufficient provision of basic services. The need to improve local government staffs' coordination skills regarding urban management and administration was also suggested. Moreover, each province should develop database system for urban development planning so that decisions on the prioritization of problems, problem solving and spatial planning strategies can be made in an efficient way.

Key words: urbanization; changing settlement pattern; peri-urban Bangkok

บทคัดย่อ

บทความนี้เป็นการนำเสนอผลจากการวิจัยเรื่อง “การกลายเป็นเมืองและการเปลี่ยนแปลงแบบรูปการตั้งถิ่นฐานในเขตชานเมืองของกรุงเทพมหานคร” ซึ่งแล้วเสร็จในช่วงกลางปี 2551 งานวิจัยนี้มีวัตถุประสงค์

เพื่อสำรวจพัฒนาการและเปลี่ยนแปลงฐานเศรษฐกิจและแบบรูปการตั้งถิ่นฐานในเขตชานเมืองในช่วงปี 2531 – 2550 ทั้งนี้เพื่อให้เกิดความเข้าใจในสภาพการณ์ปัจจุบันของการกลายเป็นเมืองในเขตชานเมืองของกรุงเทพมหานคร การศึกษาใช้วิธีการวิเคราะห์ข้อมูลสถิติประชากรและมูลค่าผลิตภัณฑ์

มวลรวม และการสังเกตการณ์โดยตรงจากภาคสนาม ประกอนการแปลภาพถ่ายจากดาวเทียม Landsat TM 5

ผลการวิจัยเชิงประจักษ์พบว่า พื้นที่ชานเมืองกรุงเทพมหานครอยู่ในสภาวะของการกลยุทธ์เป็นเมืองอันส่งผลให้ภูมิภาคมหานครในภาพรวมตกลงอยู่ในขั้นตอนที่เรียกว่า 'suburbanization' ซึ่งบ่งชี้ด้วยสภาวะที่พื้นที่ชานเมืองมีการเติบโตของประชากรในอัตราที่สูง การเปลี่ยนแปลงฐานเศรษฐกิจไปสู่สَاชาنةกภาคเกษตร และการขยายตัวของพื้นที่ปลูกสร้างอาคารในเขตชานเมืองอย่างรวดเร็ว การขยายตัวของพื้นที่ปลูกสร้างอาคารสะท้อนให้เห็นถึงการเปลี่ยนแปลงแบบรูปของการตั้งถิ่นฐานทั้งในลักษณะของ 'การรวมศูนย์' บริเวณฝั่งตะวันออกของแม่น้ำเจ้าพระยา และในลักษณะของ 'การกระจายความเจริญ' ไปยังพื้นที่บริเวณใหม่ โดยมีการกระจายตัวโดยรอบศูนย์กลางจังหวัด ตามแนวถนนและแม่น้ำสายสำคัญ อย่างไรก็ตาม พบรการกระจายตัวของพื้นที่เมืองไปยังพื้นที่เกษตรกรรมอย่างไร้ทิศทาง ซึ่งส่งผลให้เกิดปัญหานานัปการในเขตชานเมืองของกรุงเทพมหานคร

ข้อเสนอแนะ คือ การสนับสนุนให้หน่วยงานทางการวางแผนใช้มาตรการทางผังเมืองในการส่งเสริมให้เกิดการรวมกลุ่มของการตั้งถิ่นฐานให้มากขึ้น ซึ่งจะช่วยบรรเทาปัญหาความไม่พึงพอของการให้บริการขั้นพื้นฐาน นอกเหนือนั้นควรมีการพัฒนาทักษะของเจ้าหน้าที่ขององค์กรส่วนท้องถิ่นในระดับต่างๆ ให้สามารถทำงานร่วมกันในการบริหารจัดการเมืองและให้แต่ละจังหวัดมีการจัดทำฐานข้อมูลเพื่อการพัฒนาเมือง ทั้งนี้เพื่อให้การตัดสินใจในการจัดลำดับความสำคัญของปัญหา การเลือกกลยุทธ์ในการแก้ไขปัญหา และการพัฒนาเชิงพื้นที่ เป็นไปอย่างมีประสิทธิภาพ

คำสำคัญ: การกลยุทธ์เป็นเมือง การเปลี่ยนแปลงแบบรูปการตั้งถิ่นฐาน ชานเมืองของกรุงเทพมหานคร

INTRODUCTION

In developing countries, urban-driven economic and social changes on the edge of large cities were most intense. Rapid population increase, urbanization and changing socio-economic patterns have influenced spatial changes in peri-urban areas tremendously. The changes have resulted in a rising housing demand that was associated with the need for serviced land. (Garba and Al-Mubaiyedh, 1999; Mattingly and Gregory, 2006).

For Thailand, spatial change in peri-urban Bangkok was so obvious. Askew (2002) described that Bangkok was the principal site where modernization and modernity was displayed and generated. The city later on became a metropolis and the 'capital of everything'. Although the emergence of Bangkok and the nature of its key economic and occupational changes were initially tied to international rice and commodity economy; in the past couple of decades the metropolis was promoted to function as an international trading and tourism center in Southeast Asia, and to stand in the position of a secondary city in the world urban network system. To date, Bangkok expansion has not only turned the metropolis and its surrounding five provinces into one of the world's largest urban agglomerations but also induced changes in the peri-urban land markets and livelihoods.

This article presents findings from a research on 'urbanization and changes of settlement patterns in the peri-urban areas of Bangkok' undertaken in January 2007- May 2008. The research objectives were to investigate population dynamics and the changes of economic base and settlement patterns; and to obtain an understanding on existing conditions of urbanization in peri-urban Bangkok.

RESEARCH METHODOLOGY

To analyze how peri-urban Bangkok has transformed over the year 1988 – 2007; statistical data on population dynamics and the changing value

of Gross Provincial Products were analyzed together with direct field observations and the interpretation of satellite images from Landsat TM-5, and in-depth interviews with local staffs at provincial and district levels. Nonetheless, part of the discussions in this paper used some findings from the author's former research on 'Transformations of Land Markets and Livelihoods in Peri-urban Bangkok, Nonthaburi Province' completed in June 2006.

The study areas – peri-urban Bangkok – covers five provinces surrounding Bangkok Metropolis namely Nakhon Pathom, Nonthaburi, Pathum Thani, Samut Prakan, and Samut Sakhon province. The five provinces are officially included in the Bangkok Metropolitan Region (BMR). The study areas cover 6,067 sq. km. that is around 80 percent of BMR or 1.2 percent of the whole kingdom.

THE RESEARCH FINDINGS

1. Urbanization in peri-urban Bangkok

According to Rubenstein (2003) and Pacione (2005), an urbanized area is the area where population growth was found mainly in urban area so that urban population was increased in a faster speed than the average growth rate of the region. The

urban population therefore shared greater proportion and it then became the engine of population growth. For the research, the author defined 'urbanized area' similarly.

To summarize how peri-urban Bangkok became urbanized; the findings on population dynamics, changing economic base and evolution of settlement patterns are presented below.

1.1 Population dynamics and changing level of urbanization

1.1.1 Population growth

During the last 15 years, population growth in the outer zone of BMR has increased drastically. Population dynamics in peri-urban Bangkok in 1993 – 2007 was recognized in terms of its rapid growing population with substantial high growth rate which led to increasing population density. Table 1 shows that, in 2007, peri-urban Bangkok shared greater proportion of population as it accommodated 43 percent of population registered in BMR with the average annual growth rate around 2.07 percent, which is higher than the annual rate of population growth of the whole country (0.52 percent annually) and much higher than that of Bangkok Metropolis (0.17 percent).

Table 1 Population dynamics in Bangkok Metropolitan Region

Area	Populations				Number	Population Growth (1993-2007)	
	1993		2007			% to BMR	Growth rate
	Number	%	Number	%			
1. Bangkok Metropolis	5,572,712	64	5,716,248	57	271,895	11	0.17
2. Peri-urban areas	3,196,629	36	4,348,878	43	774,118	89	2.07
2.1 Nakhon Pathom	710,290	8	830,970	8	120,680	9	11
2.2 Nonthaburi	717,405	8	1,024,191	10	306,786	24	27
2.3 Pathum Thani	500,086	6	896,843	9	396,757	31	34
2.4 Samut Prakan	895,384	10	1,126,940	11	231,556	18	20
2.5 Samut Sakhon	373,464	4	469,934	5	96,470	7	8
BMR (1+2)	8,769,341	(15)	10,065,126	(16)	1,295,785	(28)	0.92
Whole Kingdom	58,336,072		63,038,247		4,702,175		0.52

Source of data: www.dopa.go.th accessed on March 2008

Note: (15), (16), (28) are the percentage of population in BMR to whole kingdom.

Table 1 also shows that 28 percent of population growth in Thailand was found in BMR. And it was the peri-urban areas that accommodated almost 90 percent of that growth, which indicated how important the peri-urban areas have been to BMR and to the country as a whole.

Resulted by the growing number of population in peri-urban Bangkok, population density has increased from 527 persons per square kilometer in 1993 to 716 persons per square kilometer in 2007 that was six times higher than population density of whole kingdom (Figure 1).

Figure 1 shows that, excluding Bangkok, Nonthaburi was the most densely populated province and it was the province that grew in a second highest rate of population growth in BMR. In case of Pathum Thani, although it was able to accommodate up to 31 percent of total growth with 3.97 percent annual growth rate, the density was only one-third of Nonthaburi due to its much larger land coverage area. On the contrary, among all the five provinces, Nakhon Pathom played least significant role because of its largest land coverage area and the proximity from Bangkok.

1.1.2 Level of urbanization in peri-urban Bangkok

To analyze whether an area is in ‘urbanization’ process, decision was made upon Rubenstein and Pacione’s clarifications that it is the situation in which major growth is found in urban area so that the growth rate of that particular area is higher than the average rate of population growth in the region (Rubenstein, 2003; Pacione, 2005). The above Table 1 and Figure 1 illustrate that peri-urban Bangkok has been in the urbanization process as its annual rate of population growth in 1993-2007 was much higher than that of BMR.

Regarding the changing level of urbanization of each province in peri-urban Bangkok, the United Nations’ identification of level of urbanization was used to categorize the areas where urban population shares less than 20, 20-30, 31-40 and more than 40 percent as low, medium-low, medium-high and high levels of urbanization in consequence (UN, 1995 in Puntip, 2008).

Indicating by the change of urbanization level in the peri-urban areas of Bangkok, the characteristics of study area can be categorized into

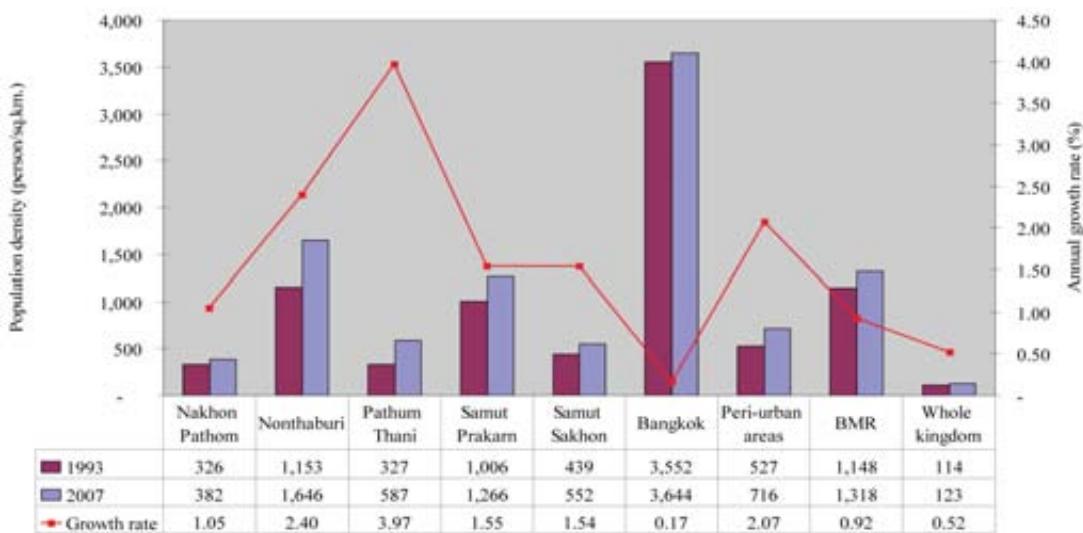


Figure 1 Density and annual rate of population growth in the study area as compared to Bangkok, BMR and whole kingdom

three groups; the predominating high urbanization level area, the fast growing and recently high urbanization level areas, and the slow growth areas (Table 2).

The first group is Nonthaburi that took advantages of its proximity to Bangkok so that it shared second largest proportion of population growth in peri-urban Bangkok since 1993. Due to the way that more than 50 percent of its population has resided in urban areas from 1993, the province was assessed to be at high level of urbanization from the start. However; as it has been the most densely populated province, the growth of urban population was much slower than other provinces. In the fast growing provinces like Samut Prakan and Pathum Thani, urban population has increased from less than 10 percent in 1993 to over 40 percent in 2002. This is as a consequence of industrial development over the past one and a half decades. They have reached high level of urbanization from 2002. On the other hand, the provinces locating furthest from Bangkok like Samut Sakhon and Nakhon Pathom are the ones that changed slightly as compared to other provinces in the study area. Therefore, in 2007, the two provinces were still at medium-high and medium-low level of urbanization.

1.2 Peri-urban economic and its changing base

In order to elaborate the change of economic

base and role of peri-urban Bangkok for the growth of BMR economy in 1988-2006, the Location Quotient (LQ) was used to identify the basic sectors (indicated by the LQ that is higher than 1.0) that peri-urban Bangkok has performed in the production of goods and services for the region or for the country as a whole.

It was found that agricultural sectors (comprising of agriculture and fishing) in peri-urban Bangkok accounted for less than three percent of Gross Regional Products (GRP) in 2006 despite the fact that agriculture dominated overall land holdings in the study areas. However, in comparison with Bangkok, it was the peri-urban areas that served the metropolitan region with agricultural-related products (LQ accounted for 2.44). Therefore, the role of agricultural sector was still considered significant for the region despite the fact that other provinces outside BMR played much greater role. Furthermore, the decreasing value of LQ in agricultural sector both in comparison with BMR and with whole kingdom showed that the importance of agricultural sector has declined substantially as a result of urban expansion in the outer zone of BMR.

Gradually, non-agricultural sectors have played a significant role. In comparison with Bangkok, there are a number of production sectors that peri-urban Bangkok performing key role over the past decade. The main sectors that peri-urban Bangkok has served

Table 2 Level of urbanization in peri-urban Bangkok

Study areas	Level of urbanization				Annual growth rate of urban population
	1993	1997	2002	2007	
1. Predominating high urbanization level area (slow growth)					
• Nonthaburi	High	High	High	High	2.85
2. Fast growing and recently high urbanization level areas					
• Pathum Thani	Low	Medium-high	High	High	23.14
• Samut Prakan	Low	Medium-high	High	High	14.47
3. Slow growth areas					
• Samut Sakhon	Medium-low	Medium-high	Medium-high	Medium-high	6.00
• Nakhon Pathom	Low	Low	Medium-low	Medium-low	5.45
Peri-urban areas	Medium-low	Medium-low	High	High	7.56

Source: Author's compilation

the region are mining and quarrying, manufacturing and the provision of public utilities. However, as compared to whole kingdom, mining and quarrying was not the basic sector since other provinces outside BMR performing more outstanding role. Regarding manufacturing and the provision of public utilities, the two sectors still be the basic sectors as the LQ in 2006 accounted for 2.5 and 1.13 in consequence. However, their roles seemed less important since the value of LQ were decreasing.

1.3 Evolution of settlement patterns in peri-urban Bangkok

According to direct field observations in 2006 – 2007 and interpretation of satellite images (Landsat-5 TM) taken in 1988, 1997 and 2007; it was found that in the past two decades built-up areas have expanded from Bangkok to its periphery in all directions. However, the connectivity that Bangkok had with its peri-urban areas in early 1980s was limited to those in the eastern side of the Chao

Phraya River as the river was considered a barrier to urban expansions. Resulted by the physical constraints; in 1988, built-up areas were found mainly along major road networks in northward direction (to Pathum Thani) and southward direction (to Samut Prakan). Whereas the eastern side of Nonthaburi province had already been included in the same mass of Bangkok Metropolis (Figure 2).

After the completion of the Outer Ring Road and several radius road networks in BMR, much of agricultural lands in the western side of the River; particularly in Nonthaburi, Pathum Thani and Samut Prakan province; have been converted to non-agricultural purposes. Paddy fields, orchards and abandoned lands have been replaced by large-scale housing development projects, commercial buildings, and industries.

Figure 2 also illustrates the changes of settlement patterns in peri-urban Bangkok over the past two decades. The expansion of built-up areas reflected the changes of settlement patterns being

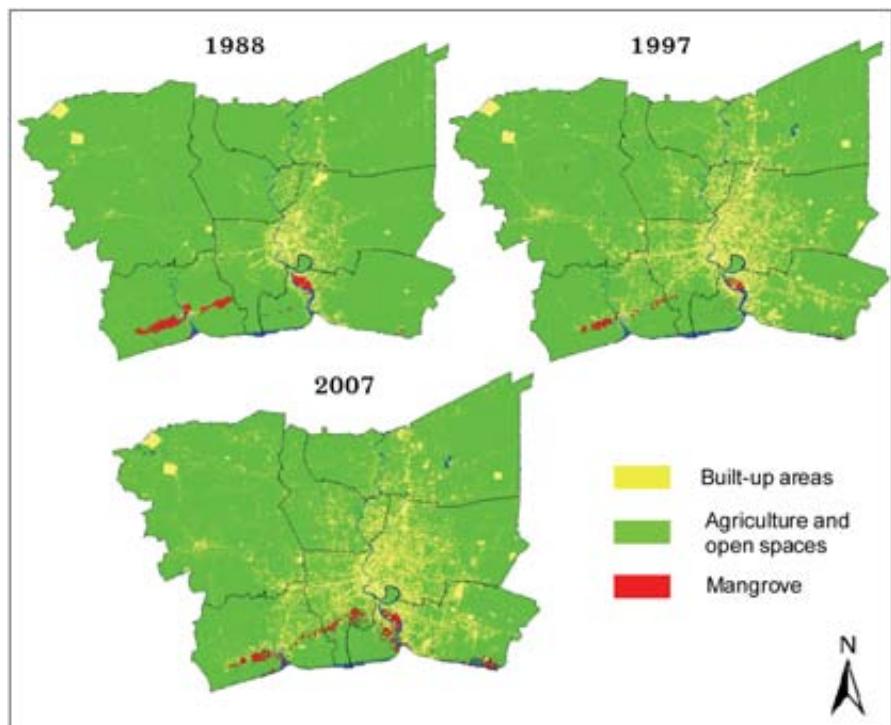


Figure 2 Land cover changes in BMR in 1988, 1997 and 2007.

characterized as 'concentration' and 'de-concentration'. The concentration of settlements was found in the eastern side of the Chao Phraya River in Nonthaburi, Samut Prakan and Pathum Thani province whereas the de-concentration was found in new areas by clustering around the provincial centers, along major roads and rivers, and scattering around agricultural areas. In conclusion, there were four main settlement patterns being found: 1) clustered pattern in primary urban centers; 2) radial pattern around provincial centers in Nakhon Pathom, Samut Sakhon and Pathum Thani; 3) linear pattern along major road networks and rivers; and 4) scattered pattern in the areas away from main road networks, especially in the western side of the Chao Phraya River (Figure 3).

Based on the settlement patterns mentioned above, numbers of problems have occurred. In fact agglomeration of built-up areas was found, but in a larger scale, widespread of urban sprawling was also noticeable. In many cases, housing development projects and industries often appeared to be located in the middle of paddy fields where services were limited.

Furthermore, the surface area covered by the housing development has resulted in the high costs

of investment in infrastructure and the resultant use of services being inefficient. This is because the prime agricultural plots were shaped on the basis of sharing of land and water resources so that each holding normally had access to a waterfront. Those plots were subdivided to the owner's children but to maintain access to the waterfront, the landholdings became very narrow. In other cases, plots are not only narrow but irregular due to the pioneer land developers' effort to respond to rapid increase in the demand for housing in the outer zone of BMR in early 1990s. Therefore, they put up their housing projects as soon as they could purchase land. Despite the fact that the shape of the purchased plots was irregular or very narrow, and thus inefficient to the installation and the use of services; the developers determined to implement their projects whatever the costs (Figure 4).

As peri-urban Bangkok has evolved from agriculturally based rural areas to a more urban-like landscape, it can be summarized that the study area was in 'urbanization' stage of urban development indicating by higher rate of population growth in peri-urban areas than the metropolitan region, changing economic base and more agglomeration of built-up areas.

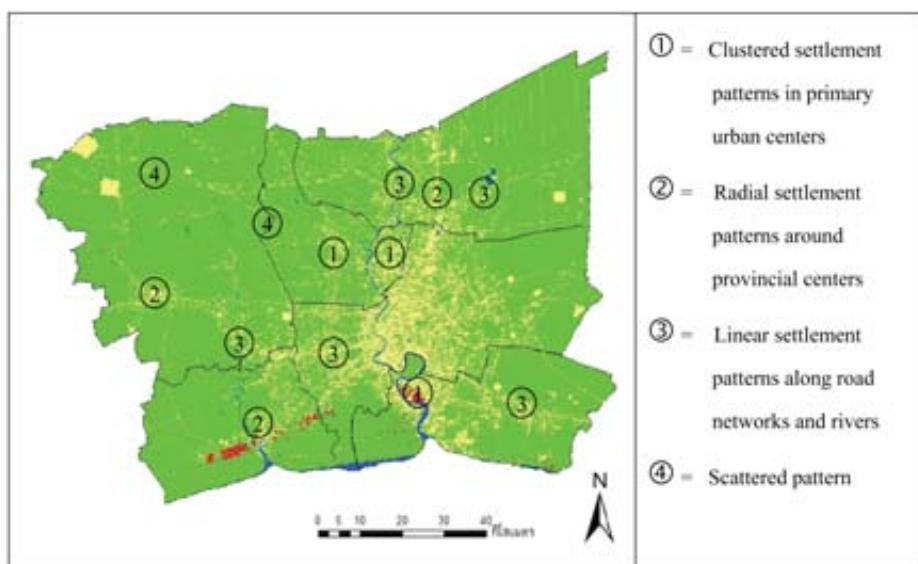


Figure 3 Four main settlement patterns in peri-urban Bangkok.



Figure 4 Unusual pattern of housing development in Nonthaburi province

Source: www.googleearth.com and the Thai Ministry of Defense

While peri-urban Bangkok became urbanized, the metropolitan region as a whole was therefore in ‘suburbanization’ stage. Due to the drastic changes in peri-urban Bangkok, the problems confronting its inhabitants nowadays are on environmental deterioration, land use conflicts, and competition for services. These problems are resulting in water pollution, traffic congestion, inadequate public transport, low pressure of piped-water, flooding due to poor drainage system, and insufficient garbage collection services.

2. Forces driving urbanization and changing settlement patterns in peri-urban Bangkok

Rapid growth of population in peri-urban Bangkok has been highly influenced by the growth and decline of the metropolis. Forces driving urbanization and changing settlement patterns in peri-urban Bangkok are political, economic, legal and private sector participation. Each of them has driven the changes either in positive or negative ways.

The intervention of central government was considered the primary driving force of the growth of peri-urban Bangkok. Through its public policy on large-scale infrastructure developments which aimed to reduce congestion in the inner zones of the Metropolis, urban growth in the outer zone of BMR was initiated. The intervention has influenced the rise of supply for serviced land but the original narrow and irregular shape of predominating agricultural land stemmed from the sharing of water resources

added up investment costs and resulted in an inefficient use of services.

Apart from the governmental intervention, economic was another driving force. Driven by the installation of large-scale infrastructures to increase supply of serviced land in order to accommodate urban growth, the demand for new economic activities was raised accordingly. Large parts of predominantly agricultural lands have therefore been converted to residential, commercial, industrial and other urban land uses. The land conversions have influenced the change of economic bases of peri-urban Bangkok over the past decades. Since agriculture is no longer as active as it once was, riverside locations being favored by farming households are no longer considered suitable due to the limitations of accessibility. Consequently, the land use and settlement patterns are shifting. Clustered settlements are now found along new major road networks. However, there is also a tendency for the widespread of new settlements throughout the peri-urban areas of Bangkok. The widespread was found in the areas away from the riverside and from the main road networks where infrastructures are limited. This is because of the lower price of land.

Another point is the absence of an efficient regional plan to guide land use development in BMR. Furthermore, at the provincial level, the master plans to control land use development in each of the five provinces were unassociated. The enforcement period, the planning boundaries and the planning concepts of the current master plans were unrelated. This was

due to the way each of them was produced independently. Accordingly, land uses in peri-urban Bangkok were hardly controlled and thus led to environmental deterioration.

Furthermore; in the absence of an efficient legislative framework controlling and organizing the use of lands, private sector has played a leading role in peri-urban land markets. As most of the peri-urban land belongs to private individuals and land developers, they determined the uses of land. Consequently, during the economic boom in the 1980s – mid 1990s many housing development projects and new settlements decided to take risks by developing their projects or by building houses in the areas where land prices were cheap, despite being prescribed in the master plans for agricultural purposes so that basic infrastructures were provided at lowest level. Therefore, complains of having inadequate infrastructure and social services from peri-urban households and from land developers were not only because of the inability of local governments to provide them, but also due to the poor commitment to planning principles of landowners and land developers themselves. These have caused a sprawling pattern of settlement and environmental deterioration in peri-urban Bangkok nowadays.

CONCLUSIONS AND POLICY IMPLICATIONS

The high rate of population growth, transforming economic base to non-farming activities, and rapid expansion of built-up areas in peri-urban Bangkok indicated that it has entered '*urbanization*' stage. The provinces that tended to become highly urbanized are Nonthaburi, Pathum Thani, and Samut Prakan which are those locating nearest and having good linkages with Bangkok. Resulted by the urbanizing peri-urban Bangkok, the BMR as a whole can be named to be in the stage of '*suburbanization*' in which the growth of the region is influenced by the growth of its outer zone whereas the primary core has declined or in stagnation.

The research findings reflected the changes of settlement patterns being characterized as '*concentration*' by increasing density in the eastern side of the Chao Phraya River in Nonthaburi, Samut Prakan and Pathum Thani province; and as '*de-concentration*' to new areas by clustering around the provincial centers, along major roads and rivers, and to predominating agricultural areas. So far, these changes have generated number of urban problems. It showed that the force of urbanization in peri-urban Bangkok greatly influenced the changes of settlement patterns and consequentially the deterioration of peri-urban environments.

To tackle with these changes, recommendations are that planning organizations should formulate planning strategies to promote agglomeration of settlements and to alleviate the severity of urban problems from insufficient provision of basic services. It is suggested to improve local government staffs' coordination skills regarding urban management and administration. Moreover, each province should develop database system for urban development planning so that the decisions on the prioritization of problems, problem solving, and spatial planning strategies can be made in a more efficient way.

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