

## LAND USE CHANGE AND THE TOWN PLANNING POLICY OF PHUKET

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**KEY WORDS:** Land use and land cover, Town Planning Policy, Suitable land use, GIS, Phuket

**Abstract:** Phuket is the world famous tourist destination and contributes approximately 30% of the total tourism income in Thailand. Historic land use change was accounted for by the transformation of mining to tourist industries. Phuket has experienced rapid population growth due to migration at local and international levels (e.g. labors, investors, and tourist foreigners). This is believed to be the main factor of significant changes in land use in the area. Effective planning of land use is vital for balancing sustainable development and environmental conservation. In the present study, we analyzed whether or not land use in 2009 has been in accord with the enforcement of town planning policy regulated in 2005 using the GIS overlay techniques. Results show that the land use was not in accordance with the regulation, particularly outside the urban areas. A number of buildings have been increasingly constructed in the areas that were planned to be agriculture land uses and in the areas of natural reserve. These manners were set to meet the requirements of human activities. In these issues, the government and agencies involved should have seriously enforced the regulation to control the land use in practice in order to sustain future direction of land development of Phuket.

### INTRODUCTION

In the past, Phuket province had its historic economy driven by extensive mining activities. In the late 1970s, mining industries had significantly reduced because of tin mineral resource depletion and a decline in its demand and price in the global market. At the same time, the government agencies has begun to promote tourism business in the region by including the national tourism plan into the Fourth National Economic and Social Development Plan during 1977-1981. Since then, tourism industries has been the mainstay of Phuket's economy. With approximately 4-6 million tourists per annum, Phuket now contributes, on average, 137 billion Baht to tourism industry in Thailand accounting for 30% of Thailand's tourism income (Office of the Permanent Secretary, Ministry of Tourism and Sports, 2011).

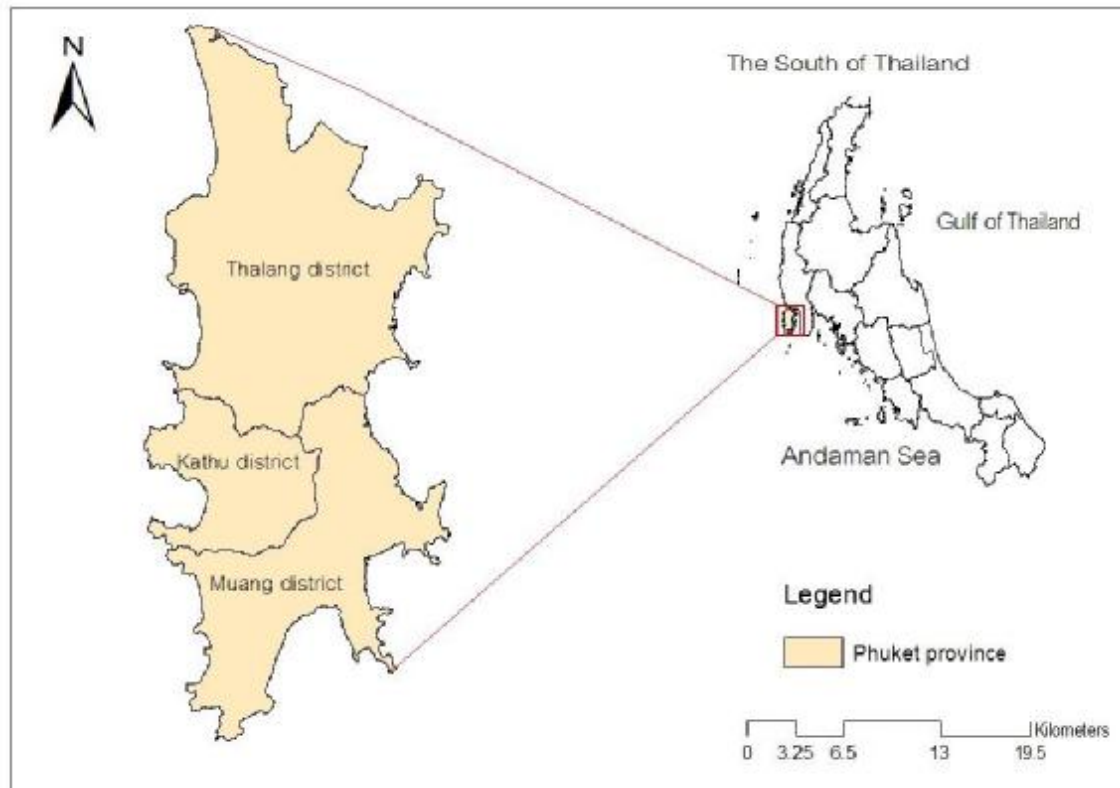
Tourism development is one of the major driving factors that regulate changes in land use and land cover around the world (Bai and Dent, 2007; Bengeston and Kant, 2005; EEA, 2005; Fan and Haque, 2000; FAO, 2001; Greenland, 1994). This has no exception for Phuket. Land use and land cover in the region has been changed unceasingly to accommodate the growth in tourism business sectors. Urbanizations with hotels, resorts, and housing under construction has expanded progressively both inlands and on the coastal lines of the island. Therefore, an effective enforcement of the Town Planning Policy of Phuket is in need and very vital for a control over a balance between income derived from development and the loss of natural resources.

This study aimed to investigate whether or not land use in 2009 has been in accord with the enforcement of the Town Planning Policy regulated in 2005 using the GIS overlay techniques. Our focus was on detections of any unsuitable built-up areas on the lands that have been set by the policy to serve agricultural purposes and/or to reserve for forest land covers.

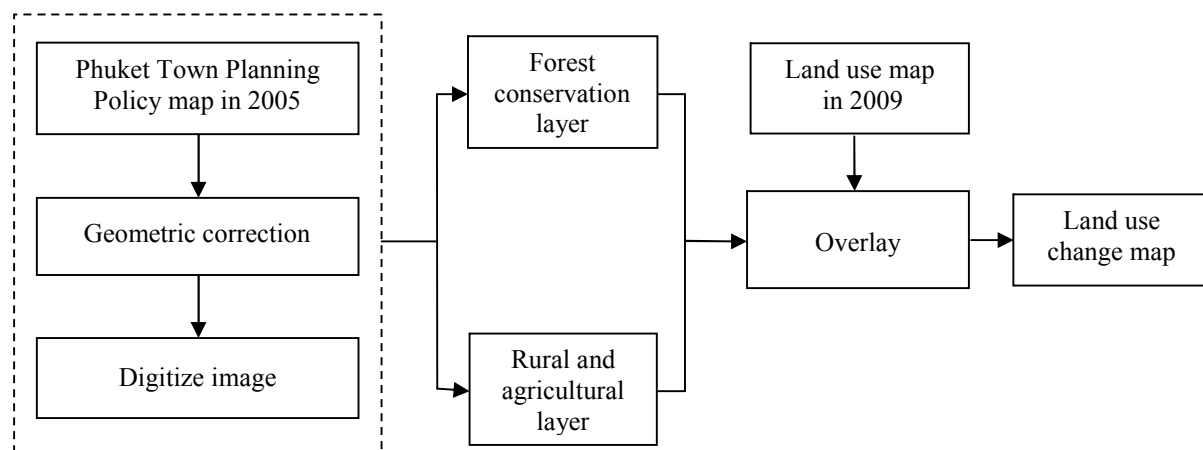
### METHODS

#### *Study area*

Phuket is the largest island of Thailand, located between latitude 7°45' - 8°15'N and longitude 98°15' - 98°40'E (Fig. 1). A total area is approximately 570 square kilometers with a length of 48.7 km from north to south and a width of 21.3 km from west to east. Phuket has three districts; Thalang, Muang, and Kathu.



**Figure 1:** Study area of Phuket province, Thailand.



**Figure 2:** Study framework.

### Methods

The study framework started with geometric correction, image digitization, and then overlay technique. The WGS 1984 zone 47 N coordinates system was input into the the Phuket Town Planning Policy in 2005 (Office of Public Works and Town Planning Phuket). Forest conservation and rural and agricultural area boundary were digitized on the map. Then, it was overlaid with urban area from the Phuket land use map in 2009 (Land Development Department). Then, encroachment of urban area on forest conservation and rural and agricultural area has been monitoring.

## RESULTS

From the Town Planning Policy of Phuket in 2005, the 23.40% of forest conservation and 21.73% of rural and agricultural area have been determined for Phuket province. The total forest conservation area in Muang, Kathu and Thalang district were 33.17%, 28.18% and 38.65%, respectively. The total rural and agricultural area in Muang, Kathu and Thalang district were 24.59, 7.59% and 67.82, respectively.

The study of land use of Phuket in 2009 compared with the Phuket Town Planning Policy in 2005 showed that forest conservation and rural and agricultural areas were transformed to residential areas by 3.19% (10.051 km<sup>2</sup>) and 10.95% (15.598 km<sup>2</sup>), respectively. An approximately 8% decline in forest conservation area was observed mostly in Thalang district whereas rural and agricultural areas decreased markedly by 24% of the total in Muang district (Table 1, Fig. 3).

Table 1: Land use change of forest conservation area and rural and agricultural area.

	Muang District	Kathu District	Thalang District
<b>Forest conservation area</b>			
Forest conservation area (km <sup>2</sup> )	104.319	88.634	121.550
Area of urban in forest conservation area (km <sup>2</sup> )	3.798 (3.64%)	5.677 (6.40%)	9.714 (7.99%)
<b>Rural and agricultural area</b>			
Rural and agricultural area (km <sup>2</sup> )	35.033	10.816	96.618
Area of urban in rural and agricultural area (km <sup>2</sup> )	8.293 (23.67%)	1.131 (10.45%)	6.173 (6.39%)

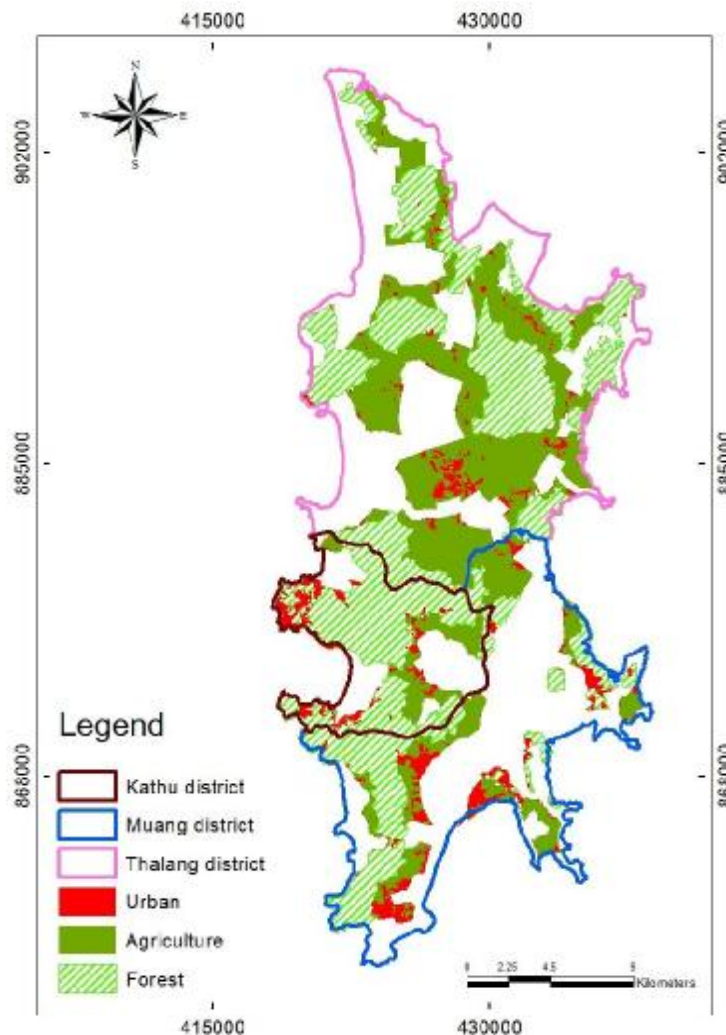


Figure 3: Areas of urban expansion of Phuket in forest conservation area, and rural and agricultural area.

## DISCUSSION

Today, land prices in many places have increased steadily (Treasury Department). Phuket is a province with high land prices, especially in Muang district. Therefore, the development has begun to expand into other areas, particularly in neighboring areas of Muang district and important economic zones.

The estate appraised value of the land shows that land prices in Muang district has growing continuously and more expensive than Kathu and Talang. As a result, the growth of city and community has been expended to Kathu and Talang continuously. Our study found that forest conservation and rural and agricultural areas in both districts were decreasing by urbanization. One of important reason for the expansion in Talang district was this area has cheaper land prices and thus reducing the cost of investment and in turn increasing the profitability of the investment. In addition, this area has terrain suitable for urban expansions, especially for tourism activity development. Many of hotels are being built in the forest conservation due to requirements for slope areas or hillsides that can serve the sea sightseeing. This was a cause of decreasing forest area and may lead to invasion problem on forest conservation in the future. Our findings are similar to other previous reports.

As the results of decrease in rural and agriculture areas in Muang district, due to Muang district is center of the province (i.e. economic, official place, education and entertainment). The population growth has led to increasing in residential and infrastructure, as a consequence land is in high demand and higher land prices. The previous rural and agriculture areas have increasingly changed to urbanization. (Tokairin, 2010)

## CONCLUSIONS & RECOMMENDATIONS

The development of tourism is a key driving force of a rapid land use and land cover changes in Phuket. Weak policy enforcement was marked in this study, pointing out an inconsistency between practical land uses in 2009 and the purposes of land uses set by the Phuket Island Town Planning Policy in 2005. Ongoing expansions of urban lands without serious control and enforced regulation may have brought undesirable impacts on natural disasters and biodiversity losses. A strong and effective collaborative between locals, private business sectors and government authorities is required to ensure sustainable tourism development coupled with environmental protection.

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