

URBAN CHANGE MONITORING AND LAND USE POLICIES

Somporn ONTHONG*, Sangdao WONGSAI

Graduate student, Faculty of Technology and Environment Prince of Songkla University, Phuket Campus

80 Moo 1 Vichit Songkram Rd., Amphur Kathu, Phuket 83120, Thailand;

Tel: +66-676-276-142; Fax. +66-7627-6002

E-mail: b4073@hotmail.com*, sangdao.w@phuket.psu.ac.th

KEY WORDS: Remote Sensing, Land Use, Land Cover, Forest, Agricultural, Government policy

Abstract: This study was monitoring urban changes in Kamala sub-district, Phuket province, the South of Thailand. This area has experienced increasingly significant growth of population in recent years. Geospatial satellite image accessed in January 2011 was used to classify land use and land cover types. Field survey was conducted for the accuracy assessment of land use and land cover mapping. Comparisons the map with three government policies and regulations have been investigated. These are (1) Notification of Ministry natural resources and environment RE: Territory and environment protection measure for Phuket B.E. 2546 (A.D. 2003), (2) Ministerial Regulations that cover overall city planning, B.E. 2548 (A.D. 2005) issued under the City Planning Act B.E. 2518 (A.D. 1975) and (3) Ministerial Regulation No.20 B.E. 2532 (A.D. 1989) issued under the Building Control Act B.E. 2522 (A.D. 1979). Three major conflicts were evident. First, a number of buildings were constructed in the prohibited areas. Second, the height of the buildings was over the limit enforced by the regulations. Finally, built-up area has been found in the forest conservation areas and agriculture lands. These conflicts should be brought attention to authorities responsible for the planning of urban development in this region. Thus, monitoring urban change is important and would assist policy-makers to implement future policies and practices that ensure a balance between urban development and natural conservation.

INTRODUCTION

Land use zoning is the most common form of land-use regulation and can be regarded as an effective tool for local governments to manage lands in order to serve a different purpose for a particular use, and to control the property development within their borders (James A, 2009). The zoning is based mainly on the characters and structures of land. Laws of land use zoning focus on an increase in public health, safety and welfare of the local community rather than an improvement of the economic development for any particular private groups (Ashe, et al., 2003).

Monitoring land use policy is a key for the success of implementing the land use zoning laws and regulations into practice. Nevertheless, several series of government land use policy are often confusing and inconvenient for compliance enforcement (Kajonpison, 2001). As a consequence, lands have been used without considerations of public benefits and non-financial purposes.

In the past, the land use monitoring in accord with regional and national policies had been difficult to accomplish due to costly, time consuming, and limitation of accessibility to large geographic regions. To date, the availability and capability of remote sensing technology and GIS have made it possible to monitor changes in land uses in different times and spaces. In the present study, we aimed to investigate whether or not urban changes in Kamala sub-district, Kathu district, Phuket province, the South of Thailand, in year 2011, has been made to correspond with the enforcement of public land use policies and regulations.

METHODS

Study Area

Kamala town is located in Kathu district, Phuket, the south of Thailand, with a population of approximately 6,500 people, excluding a population of 20,000 potential travelers each year. The terrain is surrounded by mountains in the north and the terrain slopes down to the kamala beach in the south and the east. A total area of approximately 20.2 square kilometers.

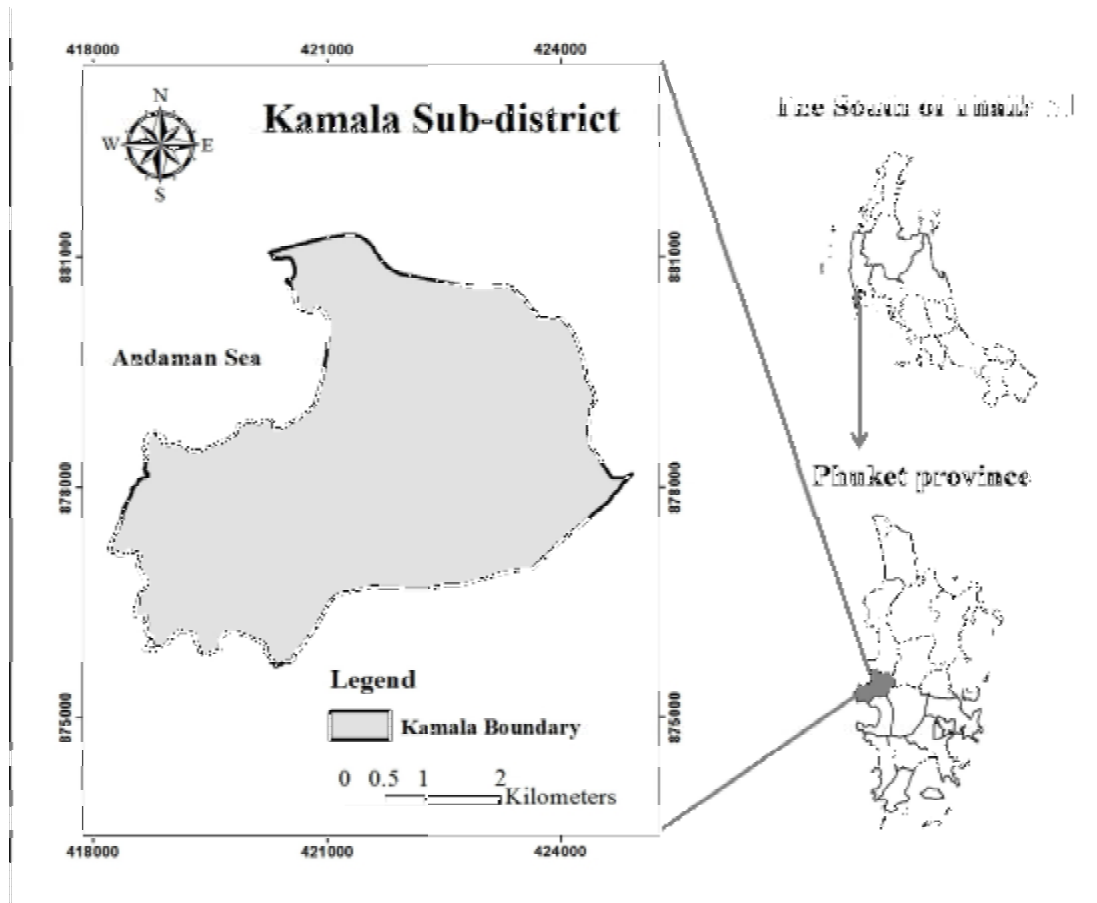


Figure 1: The study area of Kamala sub district Phuket Thailand.

Land use policies

Kamala is the area of land use policies and land use control laws in Phuket Thailand. Comparisons the map with three government policies and regulations have been investigated. Definitions of land use zoning in each policy have been found elsewhere (REF; REF) and summarized as follows.

1. Notification of ministry natural resources and environment RE: Territory and environment protection measure for Phuket province B.E. 2546 (A.D. 2003) (the “MR”). Land use zonings are shown in Figure 2.

Zone No. 1 means the precinct having a length of 50 meters measured from surrounding shore lines to the land in Phuket island and dependent islands except the precincts specified in Zone No. 5, Zone No. 6 and Zone No. 7.

Zone No. 2 means the precinct having a length of 150 meters measured from the boundary of Zone No. 1 to the land except the precincts specified in Zone No. 5, Zone No. 6 and Zone No. 7.

Zone No. 3 means the precinct that is announced to be the government center according to the resolution of the Cabinet and also the precinct that having a length of 200 meters measured from the boundary of Zone No. 2 to the land except the precincts specified in Zone No. 5, Zone No. 6 and Zone No. 7.

Zone No. 6 means the precinct that is higher than the mean sea level from 40 to 80 meters.

Zone No. 7 means the precinct that is higher than the mean sea level from 80 meters.

Zone No. 8 means other precincts not mentioned in Zones 1-7.

2. Ministerial Regulations that cover overall city planning, B.E. 2548 (A.D. 2005) (the “MP”)

Zones Yellow color in yellow, will be low-density residential areas.

Zone Orange color in orange, shall be medium-density residential.

Zones Dark Green shall be rural and agricultural areas.

Zones Light Green color shall be areas which will be kept open for public use and for the maintenance of the environment.

Zones Light Green color with White stripe will be reserved forest areas where the land is to be used for the protection and preservation of the forest, wild animals, water resources and any other natural resource.

Zones Light Gray color shall be areas for educational institutes. Land here is to be used for educational purposes or any activity relating to education.

Zones Navy Blue color will be areas for government offices and public utilities.

3. Ministerial Regulation No.20 B.E. 2532 (A.D. 1989) (the “MB”) issued under the Building Control Act B.E. 2522 (A.D. 1979).

Zone No. 1 means areas from the shore lines to the sea are 100 meters and the precinct having a length of 50 meters to the land measured from surrounding of the western side of the island.

Zone No. 2 means the precinct having a length of 150 meters measured from the boundary of Zone No. 1.

Zone No.3 means the precinct having a length of 300 meters measured from the boundary of Zone No. 2.

Data sets

The GeoEye imagery with 0.5 m resolution was used to digitize urban area. The Contour Line was obtained from Provincial Administration Organization used to create zones based on land use regulations. The Phuket city plan map obtained from Phuket Office of Public Works and Town and country planning was used to compare with the urban land use map for monitoring land use change in Kamala sub-district.

Step creates a map of the monitoring land use policy enforcement .

Step 1: Urban area boundary was digitized from GeoEye images.

Step 2: Compared the urban map with nine different land use zones of the “MR” map. Land use enforcement of Kamala sub district has only six zones (1, 2, 3, 6, 7 and 8).

Step 3: Compared the urban map with thirteen different land use zones of the “MP” map. Land use enforcement of Kamala sub district has only seven zones color.

Step 4: Comparisons the urban map with the “MB” map.

Finally: Validation the data comparison by field survey.

RESULTS

Figure 2 shows areas of the buildings, roads and a man-made reservoir total in Zone No. 7, accounting for 1% (0.12 km²) of the total area. This precinct is an area that is located at a level higher than the 80 meters from the sea level. This area has been reserved for environmental protection.

Figure 3 shows the buildings in a zone with Light Green color Land and a zone with Light Green color with White stripe. The Light Green color zone is to be used only for the purposes of recreation, or any activity relating to recreation. The zone with Light Green color with White stripe will be reserved forest areas. The land is to be used for the protection and preservation of the forest, wild animals, water resources and any other natural resource.

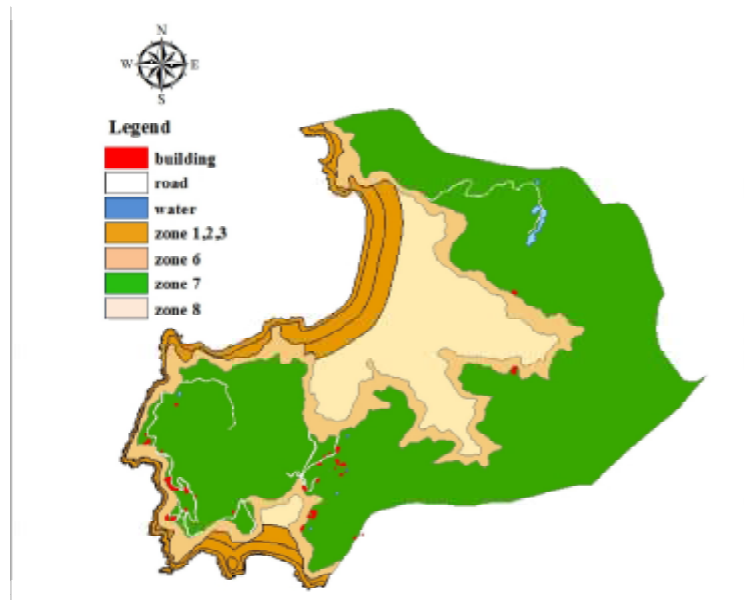


Figure 2: The buildings, roads, and a man-made reservoir in Zone 7 (the “MR”).

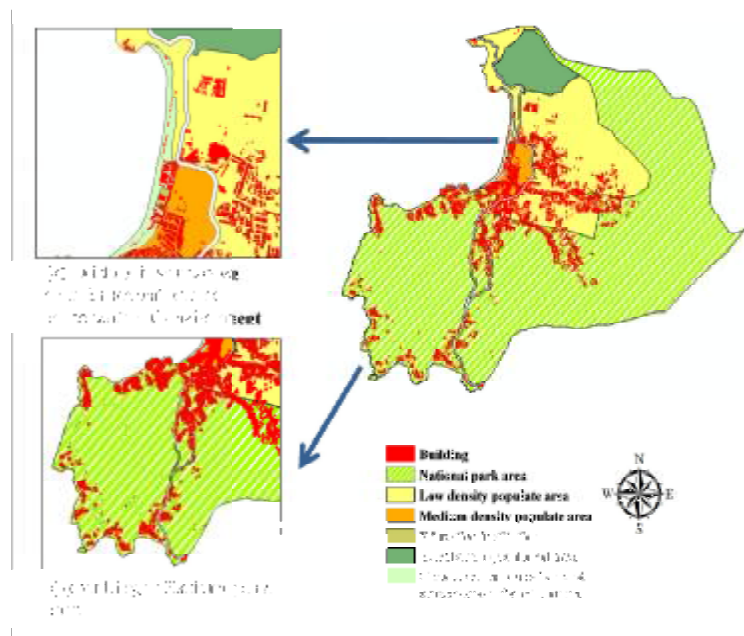


Figure 3: The buildings in zones Light Green color and zones Light Green color with White stripe (the “MP”).

DISCUSSION

The "MR" and the "MB"

Land use zoning of Phuket province has been set according to the Natural Resources and Environmental Policy and Planning, the "MR", and Ministerial Regulation No.20 B.E. 2532 (A.D. 1989), the "MB". By law, control measures of the environment protection for any building construction must be reported in the forms of the Initial Environmental Examination or Environmental Impact Assessment reports (Withanage, 2006). A board of expert committees has set to consider the two reports and, subsequently, has decided whether the construction could be built on a particular land. Despite these processes, inappropriate built-up areas have been observed in the prohibited land for natural reserves, suggesting that non-strict law enforcement and, perhaps, corruptions. This kind of practices not only observes in our studied area, Kamala town, but also in other regions (Hubbard, 2005; Poret, 2002; Coşgel, 2011).

The "MP"

The town planning policy of Phuket), the "MP", has been established for regulating appropriate uses of lands in the region. Even though the local and government agencies have carefully and deliberately considered the general welfare of local community coupled with promoting tourism development, they have failed to enforce their policies with an expense of unsuited construction lands distributing around the recreations and conserved areas for environments. Each of specific land use types defined in the planning policy has the primary and secondary purposes. For example, if a land is zoned for recreation use, residential buildings are not normally permitted there. However, the secondary purpose of land use in this type of land allows the constructions of hotel and resorts. This secondary purpose is set to enhancing the growth in tourism business sectors in accordance with the national tourism plan. Such that it has created unintended gaps for either public or private land owners to take an advantage over the lands in an unsuitable manner, particularly with no concerns for any adverse environmental consequences that may occur. This indicates that a failure in law enforcement has been found in this present study and other developing countries. To control this problem a reduction of the rate of undesirable land conversion and land use can be accomplished through appropriate policy intervention (Wannasai, 2008).

CONCLUSIONS & RECOMMENDATIONS

Our study pointed out three conclusions regarding land uses monitoring and zoning law enforcement in practices for Kamala region, Phuket; (1) an evidence of small-scale forest invasion for residential and commercial purposes, (2) inappropriate gaps in land use planning policy to support the growth in tourism business sectors, and (3) an ineffective implementation of regional and national laws due to weak enforcement, corruptions, and confusions of several law editions. Considerations for future land use planning policy and related local and national laws should be given to conserve and encourage the most appropriate use of land throughout a particular locality.

REFERENCES:

- Barnett, B., [Internet]. 2009. New Phuket Town Planning Regulation Imposes Further Restrictions; [cited 30 Mar 2012]. Available from <http://www.thephuketinsider.com>
- Boyce, James K., et al. 2003. *Natural Assets: Democratizing Ownership of Nature*. Washington, D.C.: Island.
- Coşgel, M., Etkes, H., Miceli, T.M., 2011. Private law enforcement, fine sharing, and tax collection: Theory and historical evidence. *Journal of Economic Behavior & Organization*, 80(3), pp. 546-552
- Duensing & Kippen, V. (2011, August 5). Phuket's new zoning laws. *The Phuket news*, pp. 12-13.
- Gorman, Tom. 2002. "Bush Makes Yucca Mountain Project Official." *Los Angeles Times* (July 24).
- Hubbard, P., 2005. 'Inappropriate and incongruous': opposition to asylum centres in the English countryside. *Journal of Rural Studies*, 21(1), pp. 3-17.
- Lina, C.S, and Hob, P.S., 2003. China's land resources and land-use change: insights from the 1996 land survey. *Land Use Policy*, 20(1), pp. 87-107.
- Merill, Karen R. 2002. *Public Lands and Political Meaning: Ranchers, the Government, and the Property Between Them*. Berkeley: Univ. of California Press.
- Meyer, W.B., and Turner, B.L., 1996. Land-use/land-cover change: Challenges for geographers. *Geojournal*, 39(3), pp. 237-240.
- Poret, S., 2002. Paradoxical effects of law enforcement policies: the case of the illicit drug market. *International Review of Law and Economics*, 22(4), pp. 465-493.
- Wang, Y., Morgan, R.K., and Cashmore, M., 2003. Environmental impact assessment of projects in the People's Republic of China: new law, old problems. *Environmental Impact Assessment Review*, 23(5), pp. 543-579.