Integrated Land Suitability Assessment Scenario for Peri-urban Agriculture

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Peri-urban area is an area of transition between urban and rural land uses. Most of the peri-urban areas in developing countries have agriculture activities contributing to intensive production of perishable foods like fruits, vegetables, meat, fish, dairy products and employment opportunities generation. But the cultivating area is decreasing because of remarkable trend of city sprawl to peri-urban agricultural areas. Therefore the urban and regional planners have to identify high potential areas for the agriculture and take necessary protection measures while preparing the master plan. The main purpose of this research was to prepare an integrated land suitability assessment scenario for peri-urban agriculture.

Remote sensing (RS), geographic information system (GIS) and analytical hierarchical process (AHP) techniques were integrated together while developing the scenario. A field survey equipped with GPS and camera was conducted for collecting the location-based information and focused group discussions. A case study was done as an application of the scenario. Hanoi province from Vietnam was selected as a case study area. It is located in Red River delta spread over 928km2 area with the flat topography from northwest to southeast. The province comprises of seven inner urban districts and five surrounding peri-urban districts with agricultural activities. The population of the province was 2.81 millions in 2001 with the growth rate of 3.2% where 53.56% populations were lived in urban area.

Five spatial parameters namely soil, land use, water resources, road network and market and a policy parameter were considered as major input of the scenario. The parameters were chosen based on result analysis from focused group discussions during the field survey in Hanoi. Landsat satellite image 2001, road network, administrative boundary, soil map and field survey (2003) were used as dataset. The digital soil map was classified based on Brady (1974). Supervise classification technique was performed in the Landsat image and detected seven type of land uses as paddy, mixed agriculture, agriculture + residential area, forest cover, water resources, built-up area and bare soil at 89% of accuracy level. Accessibility maps for road, water and market were prepared with the field survey based logical criterions. The AHP method was applied to identify the priority weight of each spatial parameter. Grid based spatial analysis was performed using linear combination method. The resulted map was further scaled as High, Medium, Low and Not suitable land for peri-urban agriculture. The government policy was descriptively analyzed for making understanding of sustainable agriculture.

The land suitability assessment was performed in five peri-urban districts of the province. The scenario was able to allocate the suitable land for the peri-urban agriculture very precisely. The resulted map shows about 308sq. km of total land has high potential for peri-urban agriculture whereas 115sq. km, 14sq. km and 109sq. km have medium, low and not potential, respectively. The not suitable land may be due to the lack of fertile soil or far from water resources accessibility, etc. The areas considered as not potential may be suitable for housing, built-up area or setting up new industrial estate and so on but separate assessment is necessary to make appropriate decision. Rest of the area of peri-urban is covered either the water resources or built-up and forest cover. However, government policy plays crucial role for sustainability of the agriculture. In Hanoi peri-urban area, the government policy is positive towards the sustainable peri-urban agriculture. This method has flexibility to add more decision parameters if deemed necessary. This practical scenario may help the urban and regional planners for taking action on various decisions at different levels and scales.