A study of land use category for application of survival time analysis: Differences between forestland and wasteland

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In many cases, forestland changed to other land uses during land use transition such as expansion of farmland and urbanization. For this reason, forestland is one of the significant land use categories to grasp the land use transition. While, the popular land use data sets which are named as "detailed digital information (10 m grid land use)" and "digital map 5000 (land use)" aggregated the "forestland and wasteland" as one category. This category includes forestland and the others. There is no guarantee this category might have any impact on the analyzed of land use transition including forestland. This study aims to investigate the impact on the land use category which is "forestland and wasteland" for survival time analysis of land use.

The land use data set which has forestland and wasteland as individual categories are used. The used data set follows the land use classification of digital map 5000 (land use) which is published by Geospatial Information Authority of Japan and additionally classified more details about "forestland and wasteland" using referencing data.

The impact of the aggregation and disaggregation of forestland and wasteland is analyzed using the land use data set. Temporal aspect of each category is analyzed through the application of survival analysis. To analyze survival time of each category means to evaluate the survival probability for land use categories. The expected results will show whether the category has the similar trend or not. As a study area, the Central area of Tsukuba City is selected and the study period is from 2000 to 2007. Farmland has the largest aerial share through the study period, and residential land and road are the second and the third order.

Results show temporal changes of forestland and wasteland in area from 2000 to 2009. Forestland decreased from 85 ha to 60 ha. 10 ha of forestland decreased from 2003 to 2004 and the after forestland decreased gradually. Area of wasteland also decreased from 15 ha to 10 ha. But the area of wasteland increased a few from 2003 to 2005. Then after, it went to back to decrease trend. In addition, aggregated area of forestland and wasted land are analyzed. As a result, the ratio of forest and wasted land is eight to one. Because forestland has the larger than the wasteland, the impact is small using aggregated "forestland and wasteland".

Based on the above initial analysis, survival analysis is applied to for each forestland and wasteland individually. And the impact of the aggregation and disaggregation is discussed.

Keywords: land use category, lifetime, survival time analysis, forestland, wasteland