Spatial analysis of urban and rural landscape management sustainability based on indicator of labor input - case in Matsusaka city

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Abstract

Japanese agricultural and forest landscapes are mainly constituted of artificial forests, paddy fields, vegetable farmlands and orchards. Japan is facing a severe issue related to agriculture and forestry land abandonment and hyper-aged society. Examination of spatial distribution of future population decrease and their labor input is important for sustainable agricultural and forest landscape conservation.

The main objective of this study is the estimation of the amount of labor input of the typical agricultural and forest landuse types and its spatial distribution which are classified by environmental and social condition in urban and rural landscape management.

The targeted area of this study is Matsusaka city, which is comprised of forty percent of agricultural and forest landuse. In the early 2000s, there was a turning point of population decrease. Especially, the area which consist of forests had a serious population decrease since 1950s. Two districts were selected from various plain areas and mountainous areas, and hearing survey were conducted. These detailed labor input datasets were obtained by hearing survey from the management stakeholders as annual labor input (hour) of a targeted landuse.

By using the result of the survey and several statics dataset, the total amount of labor input in the city scale was estimated and the spatial distribution of this results was mapped. The spatial distribution of the future personal annual labor input (hour/person) was also mapped based on population projection datasets. For mapping the spatial distribution, National Land Numerical Information, Population Projection mesh Data (MLIT of Japan, 2014) and Vegetation survey, Natural Environmental Information GIS (Ministry of the Environment of Japan 2005) (polygon data) were used. Finally, the amount of each indicator was summarized in 500 meters mesh data.

The result of this survey indicates that the forest had lower labor input per area size than agricultural landuse. In agricultural landuse, the amount of labor input of family-owned farming was higher compared with that of organized farming. The result of the spatial distribution clearly shows that population of mountain areas will decrease in future, and the area will have serious personal burden of labor. The labor input of plain areas is not serious in comparison with that of mountain area. However, the characteristic of serious aging indicates future decreasing labor.

In this study, worker's residence is not considered. It is important that the distance between residential and working place should be studied further.