

Evaluating the Underdeveloped Ratio (UR) Map: A Case Study of Amakubo 3 Area, Tsukuba

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1. Motivation

Although there are some developed landscapes in the study area, such not fully developed buildings can be subjected to the development in future (Fig.1). The chief motivation of this study is to identify the area (the potential development area) by conducting the field based study.

2. Study area

In order to achieve this purpose, Amakubo 3 area was selected as a study area. As a low intensity of development area near the campus, this area belongs to the second-class height control district, which the maximum floor area ratio (FAR) is 200% in law. According to this number, there are still many spaces can be developed in the future.

3. Methodology

The goal of this field work is to evaluate the underdeveloped ratio based on the FAR of maximum zoning allowance in law for study area.

$$FAR = A_{\text{building}} * F / A_{\text{plot}}$$

FAR is floor area ratio; A_{building} is total covered area on all floors of buildings; F is the number of floors; A_{plot} is the area of the plot.

With the manual GPS-assisted capturing process, the location, land use type, field boundary and floors of the buildings can be captured. Furthermore, based on the high-resolution airborne images (32cm), the historical shape of buildings can be digitalized.

4. Results

Fig.2 shows the final results of this study. The pie charts show the developed ratio of land use, and the orange color map is the evaluated UR map. The deeper orange color is the higher possibility to be developed in the future.

With the comparison of 2006 and 2016 maps, 4 new buildings are built in this 10 years. The spatial distribution pattern of new buildings corresponded to the 2006 UR map. The average UR of study area decreased from 65.01% to 59.71%. Furthermore, with the 3D visualization techniques (Fig.3), the red areas are predicted as the easiest developed areas in the future.

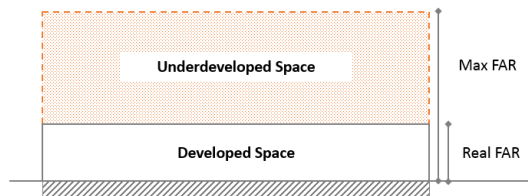


Fig.1 Conceptual illustration.

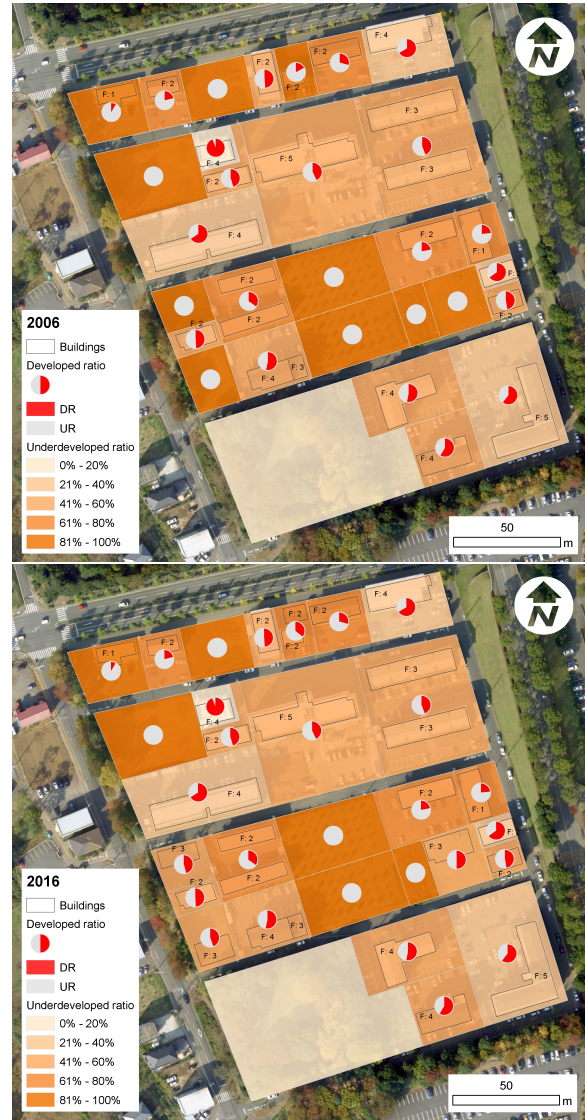


Fig.2 UR map of 2006 and 2016.

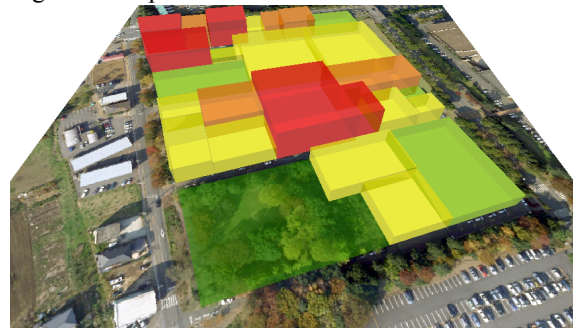


Fig.3 3D view of UR map of 2016.