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Facing "Local Extinction": Connect Public Facilities of Morioka Wide-Area in 2040 with Open Data.

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Abstract

The aging population, low birth rate, and urbanization are amongst the most pressing and critical issues of the decade for Japanese bureaucratic organization. For the local government, this population change could directly lead to a shortage of workforce, decrease in income tax, and challenges in public resource distribution. According to the Japan National Institution of Population and Social Security Research (IPSS), 896 cities, towns, and villages throughout Japan will face extinction by 2040, which Masuda calls "Local Extinctions."[1] Especially for Tōhoku prefecture, where the area was hit by the 2011 Tōhoku earthquake and tsunami, which led to the evacuation of some residents to other prefectures. This resulted in a 3.8% reduction of Tōhoku's population within three years.[2] To mitigate the negative impacts of these issues, Japan Ministry of Internal Affairs and Communications launched "Compact and Networked Core Wide-Area Plan" to finance middle-sized cities, reallocating public resources with surrounding rural prefectures.

This project seeks to explore the accessibility and effectiveness of public facilities in Morioka City and its surrounding towns in the next 30 years. We use Open Data from Japan Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) and Japan National Statistic Center. As of GIS tool, we use EarthFinder developed by Kokusai Kogyo Co., Ltd for this research, which the GIS originally is a Marketing GIS for franchise retailers, such as convenience stores, to evaluate business strategies to open shops. Taking advantages of the function "accessible area," by overlapping the population data with the imported nine types of public facilities, we can compare the distribution of population and facilities. Since we are concerned with the "future intention" of population growth, this research adopts an algorithm by IPSS to simulate the estimated population of Morioka Wide Area. We then proceed to bring the results to attribution in 500m Mesh and color the meshes with Natural Breaks. Ultimately, by using Buffer with Reachable Area, the population coverage of a particular facility can be estimated.

- Mesh: 500m mesh, 3799 meshes in total. (jSTATMAP, Japan National Statistic Center)
- POI Sets: 9 sets- public emergency hospital, college, cultural facilities, sports center, conventional center, post office, police office, governmental office, fire station. (source: National Spatial Planning and Regional Policy Bureau, MLIT of Japan, SHP file)

Taking public emergency hospital as an example, the average time of emergency transport is 39 .3 minutes in Japan. As every minute is critical for survival, it is suggested to have the accessible area within 30 minutes.[3] The following GIS map shows the coverage of population, with Reachable Area (30 minutes by car). It is evident that if the University hospital relocates to the southern part of the prefecture, this can increase the coverage by 2.1%.

[1] Masuda, Hiroya. Chihō shōmetsu: tōkyō ikkyoku shūchū ga maneku jinkō kyūgen. Chūōkōronshinsha, 2014.

[2] Nihon Keizai Shimbun, “Tohoku 6 ken jinkō, gonen de 3.8% gen, 15 nen no kokuseichōsa sokuhō”, 2016.

[3] Japan Fire and Disaster Management Agency, Heisei 26 nen Kyūkyū Kyūjo no Genkyō, 2014.

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