

Method to estimate the cost effectiveness of developing medical and welfare facilities which support lives in regions

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1. Introduction

The development of a consolidated urban structure where child-raising households to elderly households can safely live within walking distance requires the proper arrangement of facilities and services, including medical facilities and welfare facilities, which support the lives of a region (hereinafter “regional lives support functions”) by shifting them to the central area of a region, such as by constructing them adjacent to public tenant housing when they are rebuilt.

The National Institute for Land and Infrastructure Management is developing planning and evaluation technologies to chronologically and spatially forecast the demand and shortage of regional lives support functions based on forecasts of the future population and household structures on a regional level to accelerate proper arrangement of these facilities.

The following discusses the method to estimate the cost effectiveness of developing regional lives support functions proposed through the development of this technology.

2. Method to estimate cost effectiveness concerning the development of regional lives support functions

Upon the development of regional lives support functions, the authors examined categories to evaluate the costs and effectiveness of individual stakeholders (local residents, facility administrators, regional public organizations) in monetary amounts (table 1).

The cost effectiveness is evaluated by blocks for local residents, individually for facility administrators, and by administrative zones for regional public organizations.

Figures 1 to 2 show examples of estimating the future shortage of facilities through the construction of new facilities using a kindergarten as an example and changes

in the cost effectiveness for local residents. In figure 1, the mesh distribution of the forecasted number of children in 2040 is overlapped with the available zone (walking distance) of current facilities. When a new kindergarten is constructed in 2020 in an area with many children who face difficulty in using a kindergarten because they are outside of the available zone or because current kindergartens are full even when they are in available zones, the number of children facing difficulty in using a kindergarten significantly decreases. Figure 2 indicates that the cost effectiveness for applicable local residents remains around 0.5 with the current facilities, but it exceeds 1.6 when a new kindergarten is constructed in 2020, indicating the high effect of constructing the facility.

3. Summary

The method proposed above enabled the estimation of the cost effectiveness of constructing regional support functions for individual stakeholders that can be used to determine the appropriateness of constructing applicable facilities. The authors are going to improve the precision of the cost effectiveness estimation method by verifying it based on case studies in various cities and regions.

Table 1: Categories to evaluate cost and effects of constructing facilities for individual stakeholders

Stakeholder	Cost (C)	Effect (B)
Local residents	User fees, time and cost to go to hospitals and drop off/pick up, time and cost needed to childcare and nursery when a facility cannot be used, etc.	Value of time to use childcare and nursery services, value of the time for dropping off/picking up by facilities, etc.
Facility administrator	Cost of administration, cost of dropping off/picking up, lease charges and renovation cost, cost of trips for visiting nursery services, etc.	Business revenue, subsidy, etc.
Regional public organizations	Subsidies given to administrators	Residents tax with increased employment for parents and caretakers, corporate tax revenue from facilities, increased residents tax due to the employment of staff at facilities, etc.

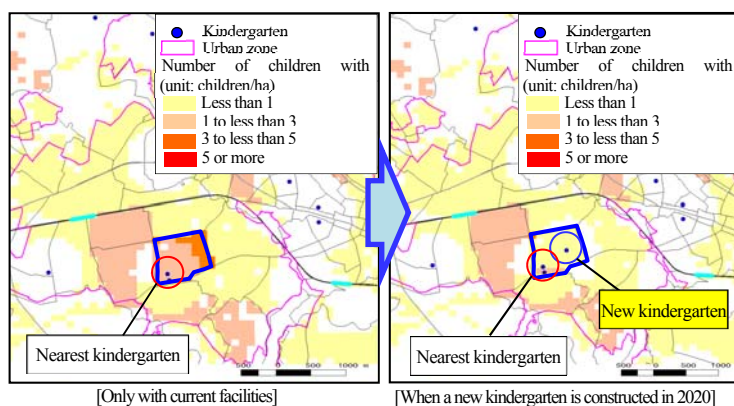


Figure 1: An example of estimating changes in future shortage of facilities when a new kindergarten is constructed

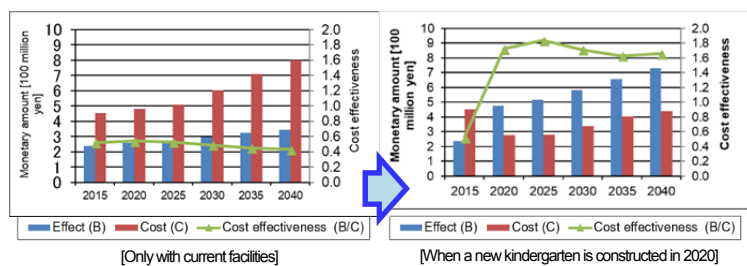


Figure 2: An example of estimating changes in cost effectiveness for local residents when a new kindergarten is constructed