

Understanding the demand for ecosystem services provided by parks and green spaces: Using the partial profile choice experiment

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Introduction

The aim of this study is to identify the demand for ecosystem services (ESs) provided by parks and green spaces in Sapporo (northern Japan) using a partial profile choice experiment (PPCE), which is an application of a discrete choice experiment (DCE).

Parks and green spaces in urban play a key role in that they provide various ESs which are essential to the quality of human life. However, we do not know the overall demand of ESs, therefore park managers are unaware of what kind of maintenance should be promoted. It is, therefore, important to identify what type of ESs residents expected. In this respect, DCE is a promising method for responding to various demands, however, the DCE has the number of attributes is limited. In order to understand the overall demand for various ESs provided by parks and green spaces it is necessary to evaluate them simultaneously.

Therefore, in this research we try to solve this problem by using a PPCE which can accommodate a large number of profiles at one time. In addition, we are paying particular attention to provision of facilities for the elderly and shelters to prepare for disasters. Recently, in Japan, there is a great demand for facilities for the elderly. The elderly population is 34.6 million, accounting for 27.3% of the total population and the number is expected to increase. Because of this situation, the park managers are concerned about providing facilities for the elderly which is one service of the ES provided by parks and green spaces. For example, in Japan, “park golf” which is a form of golf that can enjoyed in small corners of parks is popular among the elderly. In response to the demands of elderly, park golf courses have been developed in several parks. According to this, park managers should know if these facilities are really needed and if they need to be built in the future. Another important issue is the provision of shelters to prepare for disasters. Although the necessity of providing evacuation sites has been raised, it is necessary to examine whether maintenance should be continued as this is considered as one of the ES provided by parks and green spaces.

Based on this background, our specific research questions are as follows:

1. What is the preferred ESs provided by parks and green spaces?
2. What are the preferences for the provision of facilities for the elderly and evacuation sites?

Material and Methods

Study Area

The case study site is the Sapporo urban area. Sapporo is the largest city in Hokkaido Prefecture, an island located in northern Japan. The city is the fifth largest in Japan by population. The population of Sapporo is about 1.9 million people.

Partial profile choice experiment (PPCE)

The PPCE was introduced as a method for adapting the DCE so that it could handle large numbers of attributes (Chrzan, 2010). In conventional DCEs, the attributes being valued are limited. However, in the PPCE, researchers present only a subset of the attributes being considered in the survey. If respondents can be made to properly understand the nature and levels of attributes that do not appear in a choice, task bias can be avoided (Bradlow et al., 2004; Chrzan, 2010).

Survey design and sampling procedure

In this survey, 15 ESs were constructed as parks services based on literature reviews and interviews with experts. The valuation scenario is as follows: policies that would strengthen or weaken the 15 ESs are being considered and park area will be increased or decreased in the area accordingly. In this scenario, it is assumed that a tax burden must be accepted to implement these policies. This study used a willingness-to-pay measure to understand demands quantitatively.

We obtained our survey data—including data from the PPCE—from 1,109 respondents in December 2017. A consumer research company sent invitation emails to registered respondents living in the Sapporo urban area, who then responded to the questionnaire through a website.

Results and discussion

In this study, we were able to simultaneously evaluate ESs that have been individually evaluate using PPCE. We examined the valuation of 15 ESs provided by parks and green spaces using PPCE and investigated what services are important to residents.

To date, monetary evaluation of ESs provided by parks and green spaces has been conducted by DCE, but there was no case in which 15 ESs were evaluated at the same time. Based on this results, the park managers can understand which services is more important than other at once.

Figure 1 shows the marginal willingness-to-pay (willingness-to-pay for 1% increase of park area) for 15 ESs and contents of 15 ESs are delineated below the Figure 1.

We now look into the specific results of this research. The service that residents think the most important was “1. Formation of landscape”. This is consistent with the results of survey on urban park utilization which was conducted by Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT, 2015). According to the report, the pleasant and beautiful environment in city was selected as number one expected role of the park. Also, following that, “3. Providing a place to interact with the forest” and “15. Providing evacuation sites” were valued highly. On the other hand, the service that residents regarded as unimportant was “7. Providing facilities for the elderly”.

The importance of elderly facilities and evacuation sites has been pointed out, however, the average results indicated that providing elderly facilities were not as important as the evacuation sites.

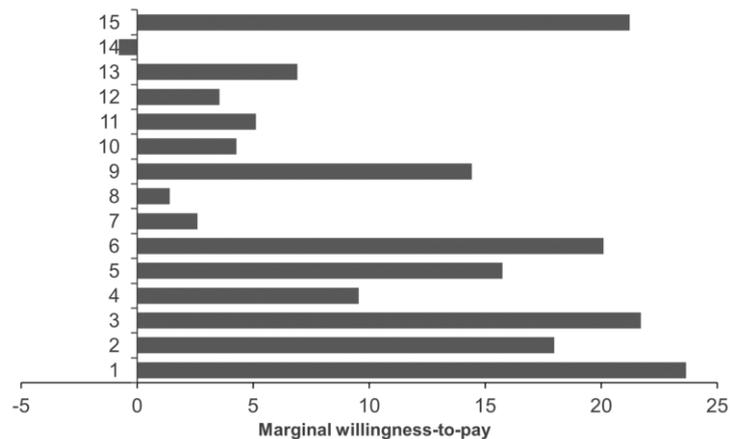


Figure 3 Marginal willingness-to-pay (willingness-to-pay for 1% increase of park areas) for 15 ecosystem services (100 JPY is nearly equal to 0.8 EUR)

1. Formation of landscape; 2. Conservation of biodiversity;
3. Providing a place to interact with the forest 4. Providing a lawn;
5. Providing a place to interact with flowers; 6. Providing facilities for the children
7. Providing facilities for the elderly; 8. Providing cultural facilities;
9. Providing a parking lot; 10. Providing a playground; 11. Providing a place for learning;
12. Providing a place for events; 13. Providing a place for community activities;
14. Providing an eating venue; 15. Providing evacuation sites

References

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