The Use and Prospects of the Survey of Land Use Trend of Japan

Yukio HIMIYAMA, Kei TAKASE

土地利用動向調査の活用と展望
氷見山幸夫・高瀬慧

要 旨

政府は1980年「土地利用動向調査」の実施を決定し、以来各都道府県は毎年の調査を実施し、その成果を2冊の調書と2枚の総括図に取りまとめ、刊行することとなった。この調査の成果は当該都道府県において土地利用計画策定等に活用されることを目的として作成されたものである。北海道教育大学旭川校地理学教室ではこの調査の存在を調査開始の2～3年後に知り、直ちに各都道府県に成果を無償提供を依頼、以後今日まで毎年それを続けている。それを用いた研究は、多岐に及び、土地利用動向についての理解を深めることに大いに貢献してきた。しかし近年、この調査のニーズが減少了との判断から調査を取りやめるところが増え、調査の継続は今後再び困難である。本研究はこの極めて貴重な調査の成果品を用いてこれまでに行われた研究をレビューし、その意義とこれからの展望を検討するものである。

Keywords: Survey of Land Use Trend, land transaction, land use planning, land readjustment

1. Introduction

Each of the 47 prefectures of Japan issues a report entitled the Survey of Land Use Trend annually since 1980. It contains various detailed data related with land use changes. The Institute of Geography, Asahikawa Campus, Hokkaido University of Education has been studying land-use trend in Japan by using the various information included in these reports since 1987 (Himiyama, 1987, etc.). The present paper reviews the Survey and the academic works based on it, and discusses the use and prospects of the Survey.
2. Overview of the Survey of Land Use Trend

The Survey of Land Use Trend was started in 1980 by the National Land Agency (current Ministry of Land, Infrastructure, Transport and Tourism), and each prefecture was asked to conduct the Survey since then. The result of the Survey is reported in two separate booklets, namely Report of the Trend of Land Use Conversion (Fig.1), Report of the Main Facilities Development (Fig.2), and two Summary Maps. The contents of the two Reports are shown in Table 1. These booklets and maps are valuable information sources for grasping land use changes and other related changes. However, the central government decided to retreat from this scheme partly because of the declining role of the Basic Land Use Plan, and partly because of the mounting financial constraint of the country. Fig.3 is the official document entitled 'Enactment of the Guideline of Basic Land Use Plan', which authorized the Survey of Land Use Trend. However, on 30 January 2009, the head of the Land Use Planning and Control Division, Land and Water Bureau, Ministry of Land, Infrastructure, Transport and Tourism, sent an official document to the prefectures on the result of the investigation in the effectiveness of National Land Use Planning Act. The document says that each prefecture can stop or 'rationalize' the Survey by considering the socio-economic situation, and that it is no longer necessary to report on the result of the Survey to the Ministry (Fig.4). It means that the Survey is no longer in the hands of the Ministry, and is now in the hands of each prefecture.

Fig.5 shows the numbers of prefectures producing each of the following four items of the Survey Report each year:

- Report of the Trend of Land Use Conversion
- Report of the Main Facilities Development
- Summary Map of the Trend of Land Use Conversion
- Summary Map of the Main Facilities Development

From 1980 to 1985, i.e. during the pre-bubble economy period, prefectures are increasingly participating in the Survey. From 1985 to 2000, i.e. during and the post-bubble economy period, the Survey enjoyed its peak time. Then in the 2000s started to decline. Characteristically, in 2010 only Tokyo, okinawa and Akita managed to produce the Summary Maps, and this situation still continues, with Niigata joining the group in 2012.

Fig.6 - Fig.8 show prefectures executed the Survey in 2006, 2009, and 2012. Red colour denotes prefectures executing all the Survey items, i.e. two Reports and two Summary Maps, and orange colour denotes those lacking one, two or three of them. It is no easy task to compile the Reports and the Maps, which is laborious by all means. It is particularly difficult under the increasingly tight budget of local authorities. The decline of development projects offers another justification to the retreat (Himiyama, Araki, 2006; Himiyama, Shiozaki, 2009). Therefore, it is understandable that increasing number of prefectures 'rationalized' the scheme or even terminated it.

Yamanashi Prefecture and Shizuoka Prefecture started to put the result of the Survey of Land Use Trend on their websites since 2005 so that anyone could see it. Shizuoka Prefecture adds an electronic source book entitled 'Land Use in Shizuoka Prefecture'. Kanagawa Prefecture started to include 'Land Statistics Source Book' since 2008. It contained information on 'Main Facilities Development' but only till 2009. Oita Prefecture and a few others omit some contents of the Reports. Thus, the Survey of Land Use Trend is at a turning point.
Fig. 5  Trend of the number of prefectures which produced each of the four items each year

Fig. 1  Contents of the Report of the Trend of Land Use Conversion

Fig. 2  Contents of the Report of the Main Facilities Development

Fig. 6  Prefectures executed the Survey in 2006

Fig. 7  Prefectures executed the Survey in 2009
3. Overview of the Achievements of Related Research

The Institute of Geography, Hokkaido University of Education Asahikawa Campus, has produced some thirteen articles related with the Survey of Land Use Trend, as listed below:
2) The Recent Trend of Land Transactions in Japan (Himiyama, Y., 1989)
3) Grasping Land Use Changes by Land Transactions Data (Himiyama, 1992) (J)
4) The Trend of Recreational Developments in Japan since 1980 (Himiyama, Kumagai, Kakuchi, Shirakawa, 2002)
7) Land Readjustment and Land Use Change in Japan since 1980 (Himiyama, Araki, 2006) (J)
8) Agricultural Field Improvement Projects in Japan since 1980 (Himiyama, Kikuchi, 2007) (J)
9) Trend of Agricultural Field Reclamion Projects in Hokkaido in Japan since 1980 (Himiyama, Iwaki, Shinbo, 2008) (J)
10) Urban Development in Japan since 1980 (Himiyama, Shiozaki, 2009) (J)
13) The Trend of Conversion of Agricultural Land in the Agriculture Promotion Area in Japan since 1980 (Himiyama, Ose, 2011) (J)

They are mostly national, rather than prefectural, in their coverage. As the official purpose of the Survey is the use in the land use planning at local authorities, the central government showed little interest in its use at national level. However, thanks to the great help from the prefectural governments, the Institute managed to collect most of the Reports of the Survey from all the prefectures. Table 1 shows which items the above articles focused on so far.

4. The Great East Japan Disaster and the Use of the Survey of Land Use Trend

The Survey of Land Use Trend may offer useful information not only for planning, but also for evaluation of planning or even for disaster mitigation or prevention. Some cases of its application are proposed.

4.1 The case of Iwate Prefecture

Urban development and the inundation area of the March 11th 2011 tsunami are examined by using the Report of the Survey of Land Use Trend for Iwate Prefecture of 1981-2005. It has been found that urban development in this prefecture took place largely in inland areas, and not on the coastal areas. (inland areas: about 500 ha, the coastal areas about 100 ha). Reclamation of publicly-managed waters is particularly evident since 1981 to 2005. Fig.9 is the Summary Map of Main Facilities Development of Miyako City in 1985, which indicates the concentration of public reclamation works at the public water surfaces. It includes
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Fig.3 Enactment of the guideline of governing Basic Land Use Plan

Fig.4 Authorization of the order to report the result of the Survey of Land Use Trend
land readjustment schemes, but they did not suffer from serious damages. Area of each reclamation scheme varies from below 1 ha to over 30 ha, and the extension was modest. The main use of the reclaimed land includes fishery industry and port facilities. Most of the residential development schemes and land readjustment schemes escaped from inundation by the March 11 tsunami. However, the land readjustment scheme in Ofunato City suffered from the tsunami with exceptional severity. Fig.10 is the Summary Map of Main Facilities Development in Ofunato City in 1981, which shows that the land readjustment scheme near the coast was as large as 110 ha, the main stakeholder is the municipal authority, and the purpose of the scheme was the development of new urban area.

4.2 The case of Fukushima Prefecture
The effect of nuclear power plants on urban development can be studied by using the Report of the Survey of Land Use Trend, as it contains Summary Maps of Land Use Conversion and Main Facilities Development as well as information of individual development project. Just like Iwate Prefecture, Fukushima Prefecture has more concentration of urban development in inland areas than in coastal areas. The towns near the Tokyo Electric Company Fukushima Daiichi Nuclear Power Plant (TFNP-1) and the Fukushima Daini Nuclear Power Plant (TFNP-2), namely Namie, Futaba, Okuma, and Tomioka, did not show much urban expansion during the 1981-2012 period. Fig.11 is part of the Summary Map showing the area covering the two nuclear power plants in 1998. The map shows a few development projects within the 5 km zones of the two nuclear power plants. The residential area development project in Futaba Town consists of two projects coordinated by the Fukushima Prefecture Housing Agency and a land development company respectively. Both of these two projects are found inside the 5 km zone of TFNP-1, and they cover about 5 ha in size with 400 planned population. The two development projects found in Tomioka Town are located inside the 5 km zone of TFNP-2, and are both land readjustment projects. They are 10 ha and 50 ha in size, and are coordinated by a local community and local government, respectively. The details of each project are found in the following section of ‘Report of Main Facilities Development’ in Table 1.

2. Development of basic facilities
   (1) Urban development and management
      ① Land readjustment and land use change

4.3 The case of land readjustment in the disaster-stricken areas
Land readjustment has been a useful tool of urban development or rehabilitation of the areas devastated by war or by great disasters such as the Great Kanto Earthquake or Great Hanshin-Awaji Earthquake. It is considered to be an effective tool in the case of the Great East Japan Disaster as well. It can be used when a residential estate with higher tsunami risk is moved to a higher and less risky site.

In December 1995, Ministry of Construction (now Ministry of Land, Infrastructure, Transport and Tourism) started ‘Land Readjustment and Land Use Change concerning Reconstruction of Urban Districts Damaged by Disaster’ in order to rehabilitate disaster-stricken areas (Yanase, 2012). This scheme has been applied with some flexibility to the areas suffered from the Great East Japan Disaster.

4.4 Some feature of ‘Land Readjustment and Land Use Change’
‘Land Readjustment and Land Use Change concerning Reconstruction of Urban Districts Damaged by
Fig.8 Prefectures executed the Survey in 2012

Fig.9 Summary Map of Main Facilities Development, Miyako City, 1985

Fig.10 Summary Map of Main Facilities Development, Ofunato City, 1981

Fig.11 Summary Map of Main Facilities Development, Fukushima Prefecture, 1998

Fig.12 Summary Map of Main Facilities Development, with tsunami inundation zone

Fig.13 Summary Map of Main Facilities Development, with tsunami inundation zone
Fig. 14 Project Karte for town development, Minato District, Ishinomaki City

Fig. 15 Project Karte for town development, New Kadonowaki District, Ishinomaki City

Fig. 16 Project Karte for town development, Gamo North District, Sendai City

Fig. 17 Project Karte for town development, Yuriage District, Natori Town

Fig. 18 Land readjustment project, Yuriage District, Natori Town (Google Map)
A comparison of land readjustment and land use change before and after March 11

Land readjustment projects in Miyagi Prefecture before and after March 11 have been categorized by the

Landslide was established in 1994 by the Act on Special Measures concerning Readjustment of Urban Development, which aims to reduce the risk of landslides in residential areas. The act was made in order to reallocate the areas hit by the Great Hanshin-Awaji Earthquake. In this context, the emphasis is on the need for readjustment and land use change in order to mitigate the risks associated with landslides and to ensure the safety and stability of residential areas.
Photo.1  Ground raising work in Kesen-numa City (2013.12.7)

Photo.2  Public housing scheme in Onagawa Town (2013.12.7)

Photo.3  Land readjustment project in Onagawa Town (2013.12.7)

Photo.4  Tsunami-stricken Shin Kadonowaki District in Ishinomaki City (2011.6.25)

Photo.5  Gamo North District of Sendai City flattened by 3.11 tsunami (2012.6.25)

Photo.6  Sendai Port area devastated by 3.11 tsunami (2012.12.9)
11 tsunami. To our regret, many houses are under construction or rehabilitation work in this area despite the high risk of tsunami disaster. Interestingly, the private company housing estate development project starting in 1988 and ending in 2001, which is 90 ha in size with 8,800 planned population, survived the March 11 tsunami. The Survey of Land Use Trend is useful in checking these facts.

Fig. 17 shows part of 'Project Karte' for town development, Yuriage District, Natori Town. This district was almost totally wiped away by March 11 tsunami, and empty land still prevails. The municipal government planned to raise the ground and rebuild the town, but the majority of the local residents prefer to move to further inland to avoid the risk of tsunami. As Fig. 18 shows, the latest plan is to do land readjustment as originally planned, but part of it is raised.

4. Conclusions

The Survey of Land Use Trend, which started in 1980, appears to be terminating its task, partly because of the socio-economic changes that may have reduced its use in regional planning, partly because of the financial constraint in both central and local governments, and partly because of lack of interest in land use change among land use specialists and others alike.

Land readjustment, which is called the mother of city planning, has played an important role in city planning. Although land-related development is becoming more and more modest in Japan, the principle and method of land readjustment are considered useful. They can be used for rehabilitation or re-building of local communities, particularly those resilient to hazards. It is essential for land readjustment to listen to the voice of the local residents and to be flexible especially in the case of rehabilitation from great disasters.

The Institute of Geography, Hokkaido University of Education Asahikawa Campus, led the study related with the Survey of Land Use Trend at national level, and yielded remarkable achievements. The present paper briefly reviewed them, and showed what can be done further. It is concluded that the Reports of the Survey are useful not only for the study of the past trend, but also for the planning of the future land use, particularly for a safer and liveable communities. It is hoped that the Survey of Land Use Trend is re-evaluated, used more widely, and consolidated for better use.

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(J): in Japanese