To build sustainable cities and cities that create new value

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1. Policy-related challenges related to urban research

(1) Changes in policy-related challenges

Cities in Japan are transforming into mature cities after going through an era of rapid urbanization, and some of them are now transforming into deteriorating cities.

Challenges that urban policies should respond to have also shifted from controlling disorderly development to renewing and rearranging existing urban areas and then to the maintenance and management of deteriorating cities and the restoration and conservation of nature and history.

Today, the most important challenges in urban policies that various entities from various specialties must face include 1) depopulation and a super-aging society, 2) large-scale natural disasters, and 3) energy and environmental problems.

(2) New efforts using new technologies

As a way to overcome these challenges, national strategies to realize super-smart cities (Society 5.0) have been set forth to comprehensively transform the socioeconomic structure of Japan through innovation.

The development of a comfortable infrastructure and cities is one of the five strategic fields that will realize Society 5.0. Smart-city development efforts have already started by using new technologies that are already in practical use or ones to fit into society in the near future to realize sustainability by solving various issues and creating new values.

As discussed above, urban policies are one of the important elements in the national strategies. Issues that surface with the socioeconomic transformation in individual cities need to be responded to in advance through the involvement of entities in various fields. Thus, it is necessary to start full-fledged development of technologies that will enable unity and cooperation among different fields and researches on how technologies would and should affect people and cities.

2. Principle of research activities

The Urban Planning Department is conducting surveys, researches, and technological developments needed to properly and quickly plan, propose, and implement the urban policies of the Ministry of Land, Infrastructure, Transport and Tourism. The department is continuing its surveys and researches by setting the following three themes as important fields.

(i) Urban development for a society facing depopulation
(ii) Development of disaster-resilient cities
(iii) Development of low-carbon cities

The department is going to take on new challenges and keep responding to the needs of society and the administration based on socioeconomic issues and trends; national plans and the future perspective of the private sector; unexpected incidents, such as disasters and accidents; and the future perspective of technological innovations within the above framework.

In particular, the department will focus on comprehensive research and development that lead to the realization of Society 5.0 and regional revitalization, long-term fundamental researches conducted on the basis of political strategies, and academic researches founded on liberal ideas. At the same time, the department will ensure that these activities are conducted in a good balance.

It is also important to support the activities of local governments and residents as the main players in urban operations. The department will thus transmit information about the examination of research plans, research outcomes, and research activities to them. The department is also going to actively gather and transmit information through international joint researches and other activities.

3. Examples of research activities

Research activities are categorized as follows.

1) Participation in the implementation of policies at the Ministry of Land, Infrastructure, Transport and Tourism

- Preparation of the draft of technologies related to the City Planning Act, Building Standards Act, Low Carbon City Act, and other laws and regulations and the implementation of disaster surveys

2) Application of technological capabilities to the actual worksites

- Development and release of various simulation programs for advanced uses based on statistical survey data, geospatial information, building data, and other data and information
- Joint researches concerning ways to utilize traffic big

data

3) Leading new policies

- Prior surveys, researches, and technological development for the future, such as the development of compact cities, low-carbon cities, disaster-resilient cities, super-smart cities, etc.
- Development of green coverage ratio measurement methods using AI
- Development of methods to evaluate low-carbon city development by improving urban thermal environment using green areas, etc.

Focused researches and developments are introduced below.

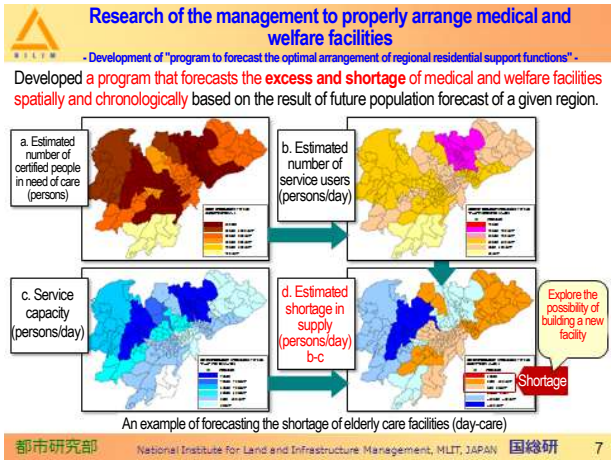
(1) The release of future population and household forecasting tools based on the unit of small areas (blocks and sections) (improved version)[1] and development of a program to forecast the optimal arrangement of regional residential support functions using the tools

The National Institute of Population and Social Security Research has been estimating future populations in individual municipalities. Meanwhile, the department developed a tool to forecast populations in individual blocks and sections within municipalities. The improved version of the tool based on the 2015 National Census was released through the Geospatial Information Center.

The program to forecast the optimal arrangement of regional residential support functions forecasts the excess and shortage of medical and welfare facilities based on the forecasted number of people certified to be in need of care, which is computed by population estimation simulations at individual blocks and sections. The objective of this program is to use the forecast to properly arrange facilities within municipalities.

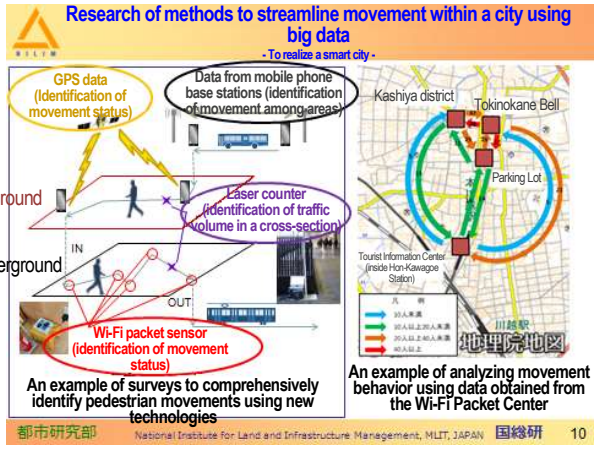
(2) Identification of movement within cities using big data

There is a need to reduce the workload required in traffic volume surveys and to provide more real-time data.



Thus, the department is trying to use big data obtained through various information and communication technologies for pedestrian traffic volume surveys.

The department is developing methods to provide accurate information that will reflect the actual traffic volumes by effectively combining different characteristics of information and communication technologies and where and how they can be used.



4. Summary

Activities related to smart cities to realize Society 5.0 are now being implemented as model projects throughout Japan.

The department is going to implement researches and the developments of evaluation methods so that new technologies, such as information and communications technologies, and new services can be used to overcome various issues and create values as a part of the efforts to promote the development of smart cities.

The department is also going to further promote the use of new technologies and real-time data and improve the accuracy of identifying various phenomena and future forecasting to help provide solutions to various challenges by improving currently used simulation tools and creating new ones.

In addition, while the necessity for open innovation has been increasing, the department is going to promote coordination and cooperation with external organizations and develop a research environment where diverse people can work successfully.

☞For more information:

1) Geospatial Information Center “Future population and household forecasting tool (improved version)” download website
https://www.geospatial.jp/ckan/dataset/cohort-v2