Prospects and Challenges for Planning Green Smart Cities and Communities

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Society 5.0 Vision

“A human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space.”

For urban planners:
How can we plan and develop physical space (i.e. cities and communities) that support “Society 5.0” starting from the existing physical space that supported previous “societies (1.0-4.0)”?
**Society 5.0 Vision**

**Mobility**
- Increased mobility with less energy consumption

**Healthcare and Caregiving**
- Reduction of costs associated with aging society

**Agriculture**
- Increased production / reduced loss of food

**Energy**
- Reduction of GHG emissions
Smart City Projects in Large-Scale Urban Development

Not all communities can follow this model of smart city

Kashiwa-no-ha Smart City

A New Vision for the Cities of Tomorrow

Humankind must address numerous issues in the years ahead, including those related to the environment, energy, food, and health.

Having encountered difficulties in these fields much before many other countries, Japan feels duty-bound to help resolve them. Kashiwa-no-ha Smart City embodies that commitment, drawing on the partnerships among public, private, and academic sectors to create an open platform for all of humanity as well as a stage for resolving issues.

http://www.kashiwanoha-smartcity.com/
Compact + Network Urban Structure
Physical shrinkage of urban areas (promoted by MLIT) really a solution?

- More public transport to connect places
- More working opportunity!
- Vibrant Local Economy
  - Attractive shops!
- Vibrant urban center with events!
- Higher Quality of Life
  - Livable neighborhood with necessary facilities!
- Stable Population
  - More working opportunity!

Great environment to raise children!
Public transport will take you to many places!

More people are visiting our city!
Yokosuka City, a depopulating city in the periphery of Tokyo

Transformation of the physical environment (urban space) is complex
Interventions to Shrinking Cities

Torino, Italy
- Intervention to brownfields
- Recovering natural environment

Yokosuka, Japan
- Intensifying urban centers
- De-intensifying valley and suburban residential areas

Downsizing FIAT factories (1970s)
Downsizing Nissan and Kanto (Toyota) factories (21c)
Interventions to Shrinking Cities

Detroit, USA – Reorganizing urban structure from site/district scale up
EcoDistricts: Process-Oriented Framework for Existing Communities
Just, resilient and sustainable cities, from the neighborhood up
Preliminary image of incremental transformation of the district under Nishiki 2 Community Vision for 2030
(1) Nishiki 2 Low-Carbon Community Development Project

“Street Plazas”

Roadside Mixed-Use Zone
Concentration of Urban Functions Mainly Office

Central Mixed-Use Zone
Concentration of Various Urban Functions and Promotion of Urban Center Living

Active Nishiki Street
Central Corridor of Urban Center

Green Street

Trad. Plaza
New Plaza
Alley
(1) Nishiki 2 Low-Carbon Community Development Project

Many possibilities to introduce IoT technologies in existing urban area under transition

Design guideline for buildings and open space not available!
(2) Urawa Misono: 2017 Urban Design Studio (Georgia Tech)

Studio students participating in an interdisciplinary World Cafe design charrette in Atlanta.

University of Tokyo students providing feedback on CD-M during the studio’s design charrette in Tokyo.

Figure 2. Urban Design Systems Model: Urawa Misono
Installing eco-elements into development typologies and measuring their performances
Installing smart city systems / IoT technologies in the district
(3) Nishi-Tokyo Studio: Shaping Ecodistricts in the Tokyo Suburbs
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Proposals focused on green/blue infrastructure

### SWOT Analysis

**Strengths**
- Presence of Urban Green Spaces (e.g., farmlands & nurseries)
- Presence of Farmers' markets
- Study map
- History map
- Eat map
- Culture map
- Nature map
- Landmarks (e.g., Tanashi Tower)
- Presence of Farmers' markets
- Neighborhood Associations
- Accessibility of Stations

**Weaknesses**
- Limited Accessibility to Train Stations from some neighborhoods
- Physical Barriers into Entry of Public Spaces
- Uneven Distribution of Public Spaces
- Distance between Citizens & Administration - Separation of Municipal Planning Divisions
- Low Quality of Social Housing
- Shrinking Population
- Changes in Land Use
- Inheritance Tax
- High congested streets
- Medium congested streets
- New road network

**Opportunities**
- Funds from Tokyo Metropolitan Government
- Attractive New Homes
- Presence of Regional Agricultural
- Nearby Olympic Stadium
- Proximity to Tokyo
- Tamako Cycling Path

**Threats**
(3) Nishi-Tokyo Studio: Shaping Ecodistricts in the Tokyo Suburbs

Proposals focused on green/blue infrastructure
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- Creation of riverfront (Eco-Path)
- Big park surrounding the river
- Improve the capacity of the actual river
- Create flood zones bordering the river for rainy periods
- New spaces for comunal productive green zones
- Densification near the new roads (new housing projects)
- Adaptive Structure for the old buildings
(3) Nishi-Tokyo Studio: Shaping Ecodistricts in the Tokyo Suburbs

Proposals focused on green/blue infrastructure
(4) Fujimakicho Sato (Rural) Community Vision

- Planned but un-developed urban park with minimum infrastructure.
- Residential community with nearly 200 households.
- Impossible for Nagoya City to purchase all properties within the next 100 years.
- Residents are maintaining the forest.
(4) Fujimakicho Sato (Rural) Community Vision

- Conducted advocacy planning initiative to address the issues to the City.
- Drafted community development vision
- Formal discussion in the City lead to alter urban park designation and find a solution as a low-density residential community
(4) Fujimakicho Sato (Rural) Community Vision

Official de-designation of urban park area

Voluntary Community Vision to conserve a residential community in a forest

IoT technologies in Sato (rural) community to support sustainable living and citizens-led forest management
Prospects and Challenges for Planning Green Smart Cities and Communities in the Japanese Context

- Interventions to **urban transformation under the trend of urban shrinkage (population and economy)**
- Simple solution of “Compact + Network” urban structure (=physical shrinkage of urban area does not seem to work)
- Need to **get down to the community / district / neighborhood scale**
- Various types of urban transformation >>> Potential smart communities
  - Nishiki 2: Urban center neighborhood
  - Urawa Misono: New development area around a transit station
  - Nishi-Tokyo: Sprawled urban area with urban farmlands
  - Fujimakicho: Sato (rural) residential area with forest
- Installing **smart infrastructure (IoT technologies)** together with **green/blue infrastructure** while downsizing + updating aged **grey infrastructure**
- **Holistic co-design approach** essential: various stakeholders of different sectors and expertise collaborating at the different scales