

Decision-making Gaps regarding Food-Energy-Water Nexus? A Case Study of the Kyoto City in Japan

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Abstract

This research aims to identify several decision-making gaps which seem to be existed around Food-Energy-Water Nexus through local case study in the Kyoto city, Japan. Our research methodologies include calculating food self-sufficiency ratio at local level using national statistics, production area proportion of each food categories using local market reports, and conducting impact assessment for Water-Energy Nexus based on several scenarios of food policy. Based on the above calculation and scenario analysis on several food policies, decision-making gaps regarding Food-Energy-Water Nexus is abstracted. During the scenario analysis, decision-making gaps regarding Food-Energy-Water Nexus are found. In other words, while a watershed is decided automatically by natural and geographical conditions, energy-shed usually depend on big electricity companies and food-shed consists of consumers' preferences, retailers' procurement policy, farmers' tendency to change (or not change) their production style and so on.

Decision-making Gaps regarding Food-Energy-Water Nexus? A Case Study of the Kyoto City in Japan (H13M-1930)

Introduction

As birth place of the Kyoto Protocol, the Kyoto City has a legal target to **reduce 40%** of the GHG (Green House Gas) emissions from the city by 2030 in local ordinance. To achieve this, understanding on relationships between Food-Energy-Water Nexus and Climate (GHG) is essential. In Japan, various data of prefecture level can be collected easily, compared to city level. For example, among the 232 SDGs global indicators, **81 localized indicators** can be collected at prefectural level, and **56 localized indicators** at city and town level. Using Kyoto City data, some decision-making gaps regarding Food-Energy-Watershed nexus have been pointed out.

Objectives

This study clarifies availability of FEW nexus data in the Kyoto City, **using multi-level statistics** and identifies **existing barriers** in terms of data collection at city level.

Data

1. Related statistics and policy documents of Kyoto City
2. Aggregated data of national statistics within Kyoto City

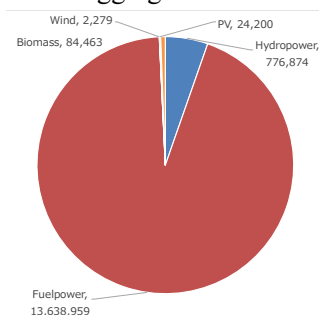


Fig. Proportion of electricity generated in **Kyoto Prefecture, 2016** (Unit: MWh)

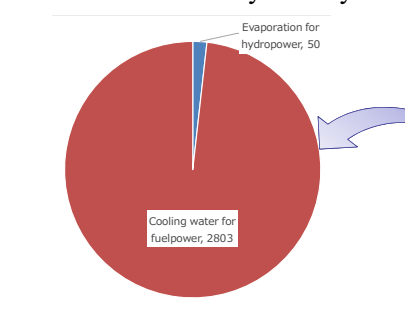


Fig. **Water for electricity** generated in Kyoto Prefecture, 2016 (Unit: 10^6 m^3)

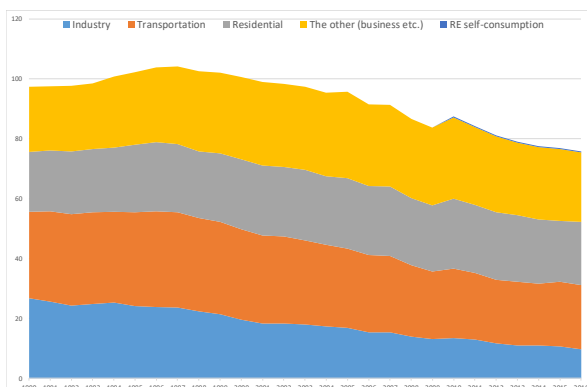


Fig. Changes of energy consumption and proportion in Kyoto City (Unit: PJ)

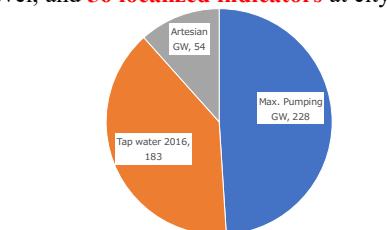


Fig. Proportion of **water origins** estimated in Kyoto City (Unit: 10^6 m^3)

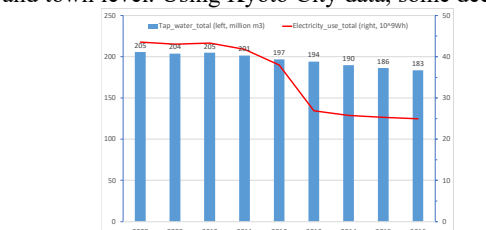
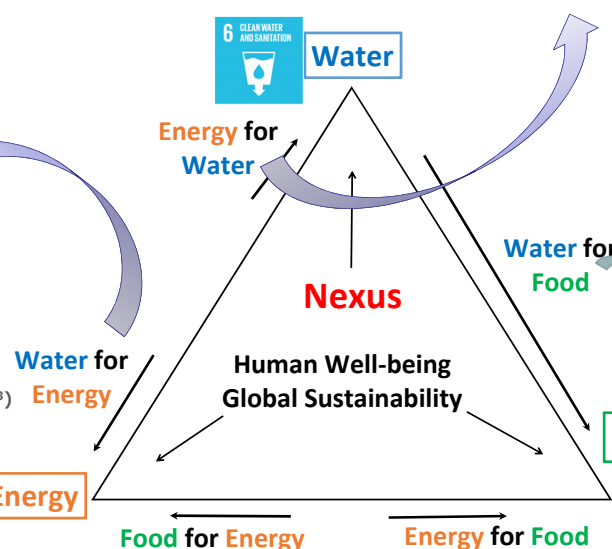


Fig. Change of tap water use and **electricity use for water service** in Kyoto City



⇒ Basic unit: 0.14 kWh/m³

Result I (F)

Food (Rice) consumption: **gradually decreasing** during 15 years due to decrease with average family scale and changing lifestyle ⇒ **less dependence on Water?**
Over 60 % of Water for Food is embodied with meat consumption in Kyoto City.
Origin of meat: almost 20 % of Beef, 75 % of Pork come from the Kyoto Prefecture
Barrier: data lack of actual consumption and origin proportion of rice, meat and so on. And also, data lack of water-footprint indicators for each prefecture or regions.

Conclusion

Direct resource consumption of F (Rice)-E-W: **gradually decreasing** all
Various data lack, in other words decision-making gaps have been identified, such as **food** origin proportion, **electricity** production and consumption at city level and actual pumping **groundwater** volume.

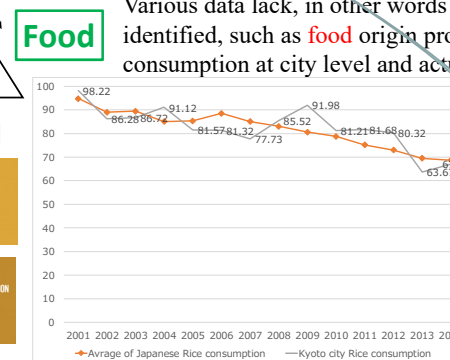


Fig. Trends of rice consumption pattern in Japan (Unit: kg/household)

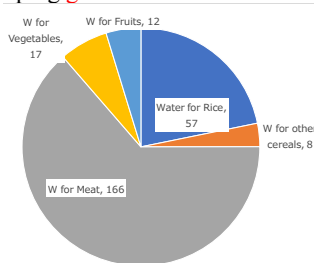


Fig. **Water for Food** consumption in the Kyoto City (Unit: 10^6 m^3)

Acknowledgment

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