

Why Nuclear Host Municipalities Refuse Nuclear Waste? A Dynamics of Peripheralisation in Japan

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Research Questions

- Why cannot we find the site of high-level radioactive waste (HLW) final disposal?
- Japan and other countries have located nuclear power plants successfully but never found sites for HLW final disposal.
- What are the difference between HLW final disposal and other nuclear facilities.

Approaches

- A hypothesis: an accumulated consequence of nuclear host municipalities' action has a negative influence to cases of HLW.
- Focus on interactions between the national government and local municipalities.
- Developments of interactions are analyzed by the game theory and actors' strategies.
- We are taking three cases of Horonobe, Rokkasho and Toyo.

Preceding studies

- **Peripheralisation theory**: NPPs are located in peripheral area and municipalities are becoming to dependent on them.
- **Voluntary approach**: upon the willingness of municipalities.
- **Strategic analysis**: French sociologists, Crozier(1963), Friedberg(1972): Actors have powers and strategies.

- Municipalities are considered as active actors that have own powers and strategies but their resources are so limited.
- Municipalities are in a peripheralisation process with a unique strategy.
- By taking three cases, we are looking details of the dynamics of this process and municipalities' strategies.

History of HLW Location①

- 1966 The first commercial nuclear reactor started its operation.
- 1969 The first spent fuel was generated.
- In 1962, a task force for HLW in the government submitted a report that refers to deep-sea and geological disposal but should not be implemented until its safety is confirmed.

History of HLW Location②

- In 1976, Japan Atomic Energy Commission submitted a report on HLW.
- Power Reactor Nuclear Fuel Development Corporation started to research on HLW disposal.
- The Radioactive Waste Management Center was established (the current Radioactive Waste Management Funding and Research Center).

History of HLW Location③

- In 1977 and 78, big 10-electricity companies in Japan made a contract of reprocessing of spent fuel with COGEMA (now AREVA NC) in France and BNFL (now held by NDA) in the UK.
- Final residues are to be returned to the country of origin. About 2,200 casks of vitrified wastes have been transported to Japan to date.
- Those are storage at a temporary facility in Rokkasho.

History of HLW Location④

- **Before 2000:** Horonobe was the target. A symbolic event was happened in Rokkasho, Aomori
- **2000~2015:**
 - 2000. NUMO was established
 - 2002. Open Solicitation process started
 - 2007. Toyo town applied but canceled
- **After 2015:**The cabinet decided a new guideline:
The national government active deal
- 2017.Publication of Scientific map

The first candidate: Horonobe

- Officials in Horonobe had hoped to construct a nuclear power plant at first.
- The government suggested a low-level radioactive waste disposal and then, HLW disposal in 1984.
- People in Horonobe strongly opposed the HLW disposal plan.
- The prefectural congress of Hokkaido decided to oppose to the plan in 1990.
- There is only the Underground Research Center.

Map of Simokita and Rokkasho

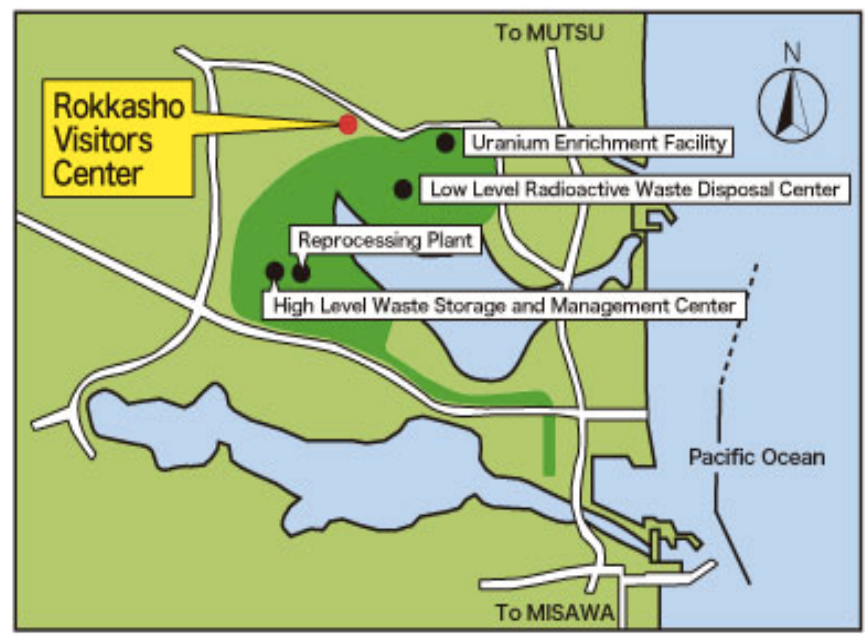


Ohma

Mutsu

Higashidori

Rokkasho



Rokkasho①

- The nuclear fuel cycle appeared in 1985.
- In the first plan, a facility for HLW disposal was not listed.
- In 1989, JNFL (Japan Nuclear Fuel Limited) applied to begin construction of the temporal vitrified waste storage center that started its operation in 1995.
- The opening of this center was for the first returned vitrified waste from France.

Rokkasho②

- Officials in Aomori have been supporting to promoting the nuclear policy including nuclear fuel cycle.
- However, Aomori prefectural government and Rokkasho strongly refuse to become a final disposal site for HLW.

Rokkasho③

- When the first ship that contained vitrified wastes came to the port of Rokkasho closely, the governor of Aomori stopped to carry those wastes into Rokkasho.
- He demanded a contract with the minister of Science and Technology Agency. It promises Rokkasho and Aomori will not be the final disposal site for HLW.

NUMO

- The nuclear waste organization of Japan (NUMO) was established in October 2000, for carrying out the geological disposal of HLW.
- The siting process is done by open solicitation of volunteer host municipalities.
- The siting process has 3 stages: the literature survey, the preliminary investigations, and the detailed investigations.

TOYO

- The only applicant to the first step of the process has been a small town named Toyo in Kochi prefecture.
- In 2006, the town mayor submitted the application documents and a large protest occurred. He resigned and ran as a candidate for the next mayoral election but lost. The new mayor announced the withdrawal from the plan.

Scientific map

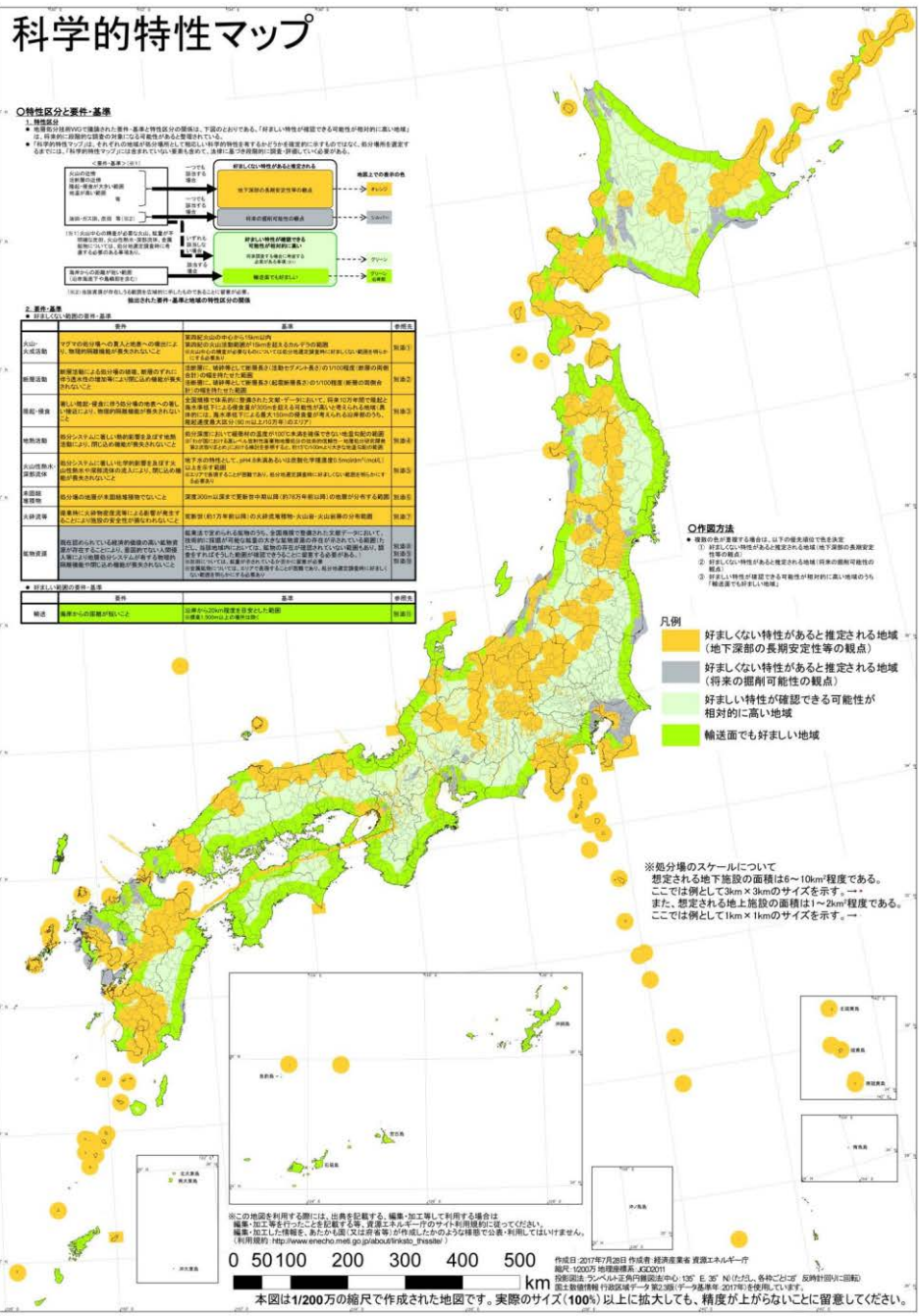
科学的特性マップ



2. 要件-基準

●科学的特性マップの作成-基準

特性	要件	基準	評価
人口変動	人口変動が激しく、将来の人口変動が大きいこと	震害想定範囲内の人口変動が大きいこと	評価1
避難行動	避難行動に関する科学的特性、避難の手段に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価2
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価3
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価4
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価5
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価6
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価7
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価8
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価9
避難-被害	避難行動に関する科学的特性が不明なこと	避難行動に関する科学的特性が不明なこと	評価10



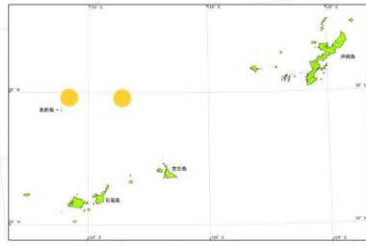
○作業方法

●科学的特性マップの作成-基準は、以下の要素を踏まえて作成した。
 ① 科学的特性が確認できる可能性が高い地域
 ② 科学的特性が確認できる可能性が高い地域
 ③ 科学的特性が確認できる可能性が高い地域
 ④ 科学的特性が確認できる可能性が高い地域

凡例

- 好ましくない特性があると推定される地域 (地下深部の長期安定性等の観点)
- 好ましくない特性があると推定される地域 (将来の揺れ可能性の観点)
- 好ましい特性が確認できる可能性が相対的に高い地域
- 輸送面でも好ましい地域

※揺れ動きのスケールについて
 想定される地下施設の面積は6~10km²程度である。
 ここでは例として3km x 3kmのサイズを示す。一
 また、想定される地上施設の面積は1~2km²程度である。
 ここでは例として1km x 1kmのサイズを示す。一



この地図を利用する際には、出典を記載する。編集・加工等して利用する場合は、編集・加工した情報を、あたかも我が国(又は消費者)が作成したかのような印象で公表・利用してはなりません。
 本図は1/200万縮尺で作成された地図です。実際のサイズ(100%)以上に拡大しても、精度が上がりません。
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NUMO's meeting

- Nationwide explanatory meetings about 80 times as of 2019.10.3
- Around some ~ 40 participants in each
- Explanation from officials and discussions in small groups
- Not bottom up but just an explanation
→but hopeless

Characteristics in Japanese case

- The government has separated the process of location of HLW disposal facility from that of nuclear power plants.
- Incentives and compensations are attractive for some official in municipalities.
- Host municipalities of nuclear facilities have a distinct strategy, which push waste and risk to other municipalities with getting maximum benefits. We call this strategy “double standard” which is referred in the next section.

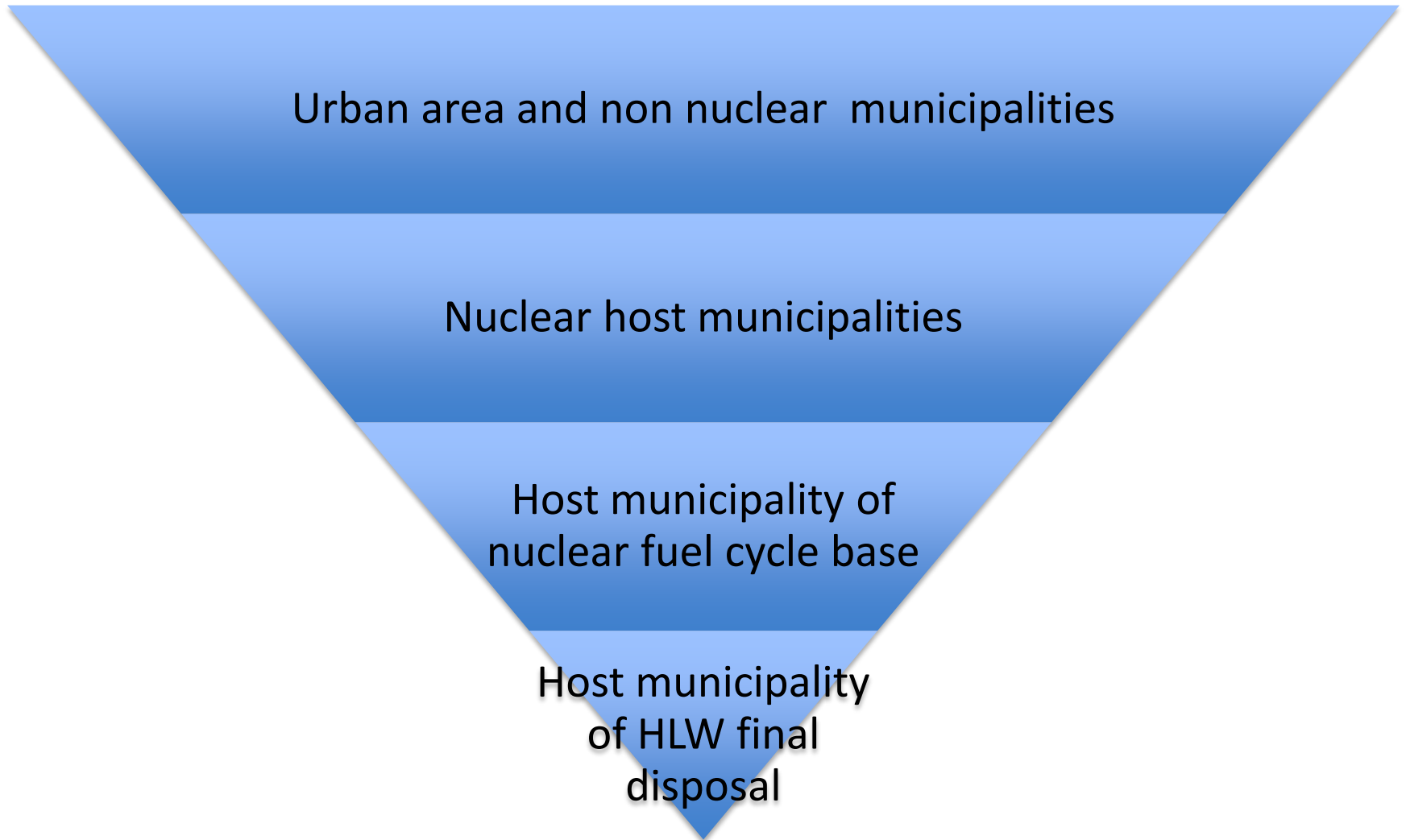
Double standard

- “Double standard”, which means that municipalities receive benefits from nuclear power and push risk and disadvantages to more peripheral areas. This is a strategy that has been widely used by municipalities but they don’t consciously use it. Funabashi (2012) gave this name to overall tendency of municipalities’ behavior.

Formation of a hierarchy

- The accumulation of individual exertion of this strategy reaches some essential and unintentional consequences. The most influential result is to form a hierarchy of nuclear host municipalities.

A Hierarchy of Nuclear municipalities



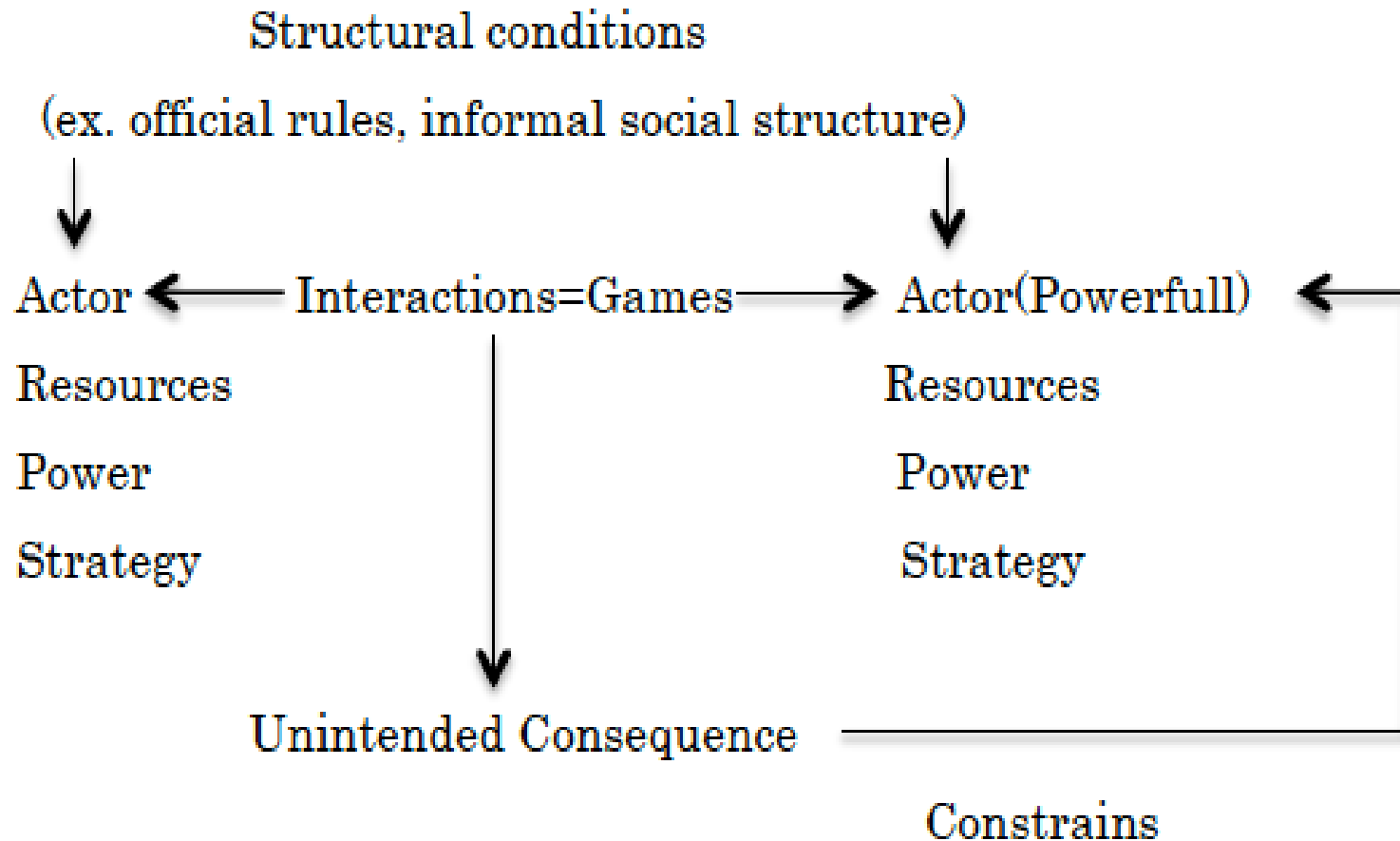
Findings

- Double standard strategy by municipalities
- Formation of the hierarchy of nuclear municipalities
- HLW site is at the bottom of this hierarchy
- Agreements with host nuclear municipalities on HLW are tough limitation for the national government → Powerless peripheralised area constrains the national government

Remarks

- An effect of path dependency
- Need a review of the current procedure and to construct a new and fair decision-making procedure to get a consensus.

Summary



Thank you for listening!
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