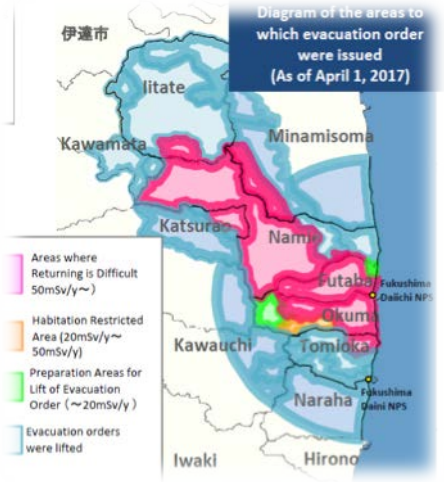
Lessons Learned from the Analysis of the Return of Populations following the Lifting of Orders of Evacuation after the Fukushima Accident



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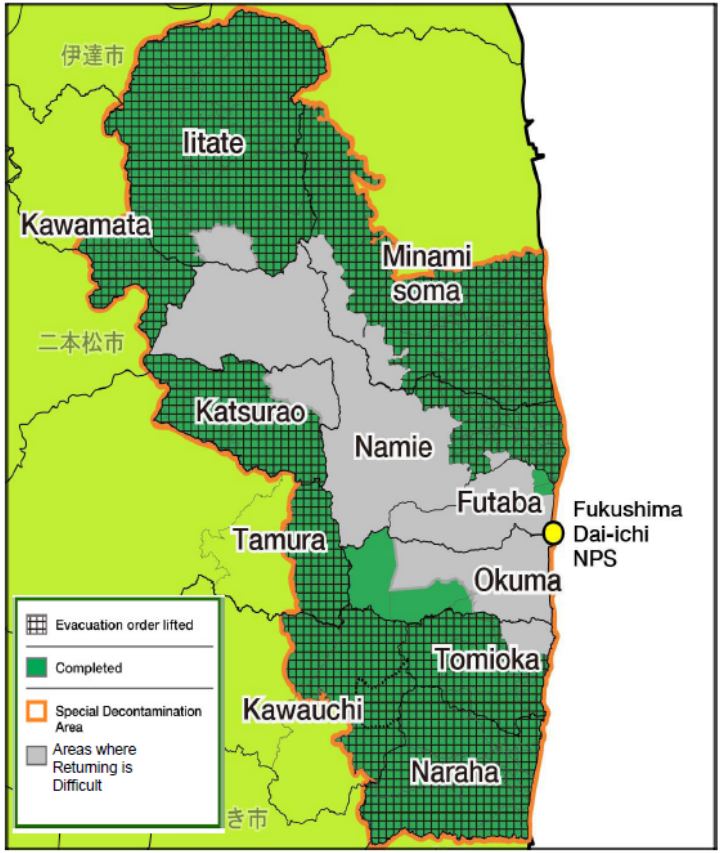
Introduction: context

- Large number of **people evacuated** after the Fukushima accident: **up to 160,000 persons** with more than 50,000 for more than 6 years
- Short term evacuation transformed into "**temporary relocation**"

- Post-Fukushima Reconstruction **General Policy**
  - Favour initiatives allowing the **lifting of the evacuation orders** and the return home of the evacuees, if they wish
  - Favour initiatives that allow evacuees and returnees to **restart a new life** in acceptable conditions (in or outside the Fukushima Prefecture)
  - Reinforce efforts to **control the NPP**
  - Speed the **process of reconstruction**

Lifting of evacuation orders

Source: METI



Municipality	Evacuation order was lifted on
Tamura city	April 1, 2014
Kawauchi village	October 1, 2014*1 / June 14, 2016*2 *1 Former Preparation Areas for Lift of Evacuation Order *2 Former Habitation Restricted Area
Naraha town	September 5, 2015
Katsurao village	June 12, 2016
Minamisoma city	July 12, 2016
Iitate village	March 31, 2017
Kawamata village	March 31, 2017
Namie town	March 31, 2017
Tomioka town	April 1, 2017

Municipality	Completion of decontamination
Tamura city	June 2013
Naraha town	March 2014
Kawauchi village	March 2014
Okuma town	March 2014
Katsurao village	December 2015
Kawamata town	December 2015
Futaba town	March 2016
Iitate village	December 2016
Tomioka town	January 2017
Minamisoma	March 2017
Namie	March 2017

Introduction: objective of the analysis

- 3 year- (2015-2017) **follow-up** of the issues regarding the **return of evacuated people**
- ~ **120 stakeholders** met at all levels of decision
- Identify **issues raised** and **lessons to be learned** for emergency preparedness and response
- Focus on specific municipalities where the **evacuation orders** have been (or will be soon) **lifted**

Modelling issues in emergency situation

- Difficulties encountered with environmental **modelling** at the time of the accident:
  - **Lack of data** on source term
  - Resulting in **approximation on potential affected areas**
- Weak information provided to **municipalities** for organising sheltering and evacuation
- **Modification of the identification of affected areas** following information provided by environmental monitoring
- Increase the **lack of confidence** towards authorities for the management of the situation

Evacuation of affected areas

- Evacuation of **hospitals and elderly houses** not always efficient
  - **Lack of suitable transport** in some cases
  - **Inadequate care** during transportation induced the death of 62 patients evacuated from several hospitals
- **Precarious situation during evacuation** period and difficulties to identify location for prolonged evacuation resulted in excess mortality and serious psychological consequences among the elderly
- **Difficulties** for elderly people to **come back rapidly** to their home without adequate provision of **health services**
- **Stigmatisation** for some people during the period of evacuation

Living conditions in temporary houses

Zoning criteria and their evolution (1)

- **Zoning** proved to be very "**dimensioning**"
- Lifting of order of evacuation is primary constrained by **completion of decontamination** operations based on priorities according the zoning
- Large **discrepancies** and **competition between municipalities** and sometimes inside municipalities
- The more time passes, the more the inhabitants' expectations and concerns **focus on living conditions**, particularly in terms of employment, housing, education, health and more generally of **well-being**

Zoning criteria and their evolution (2)

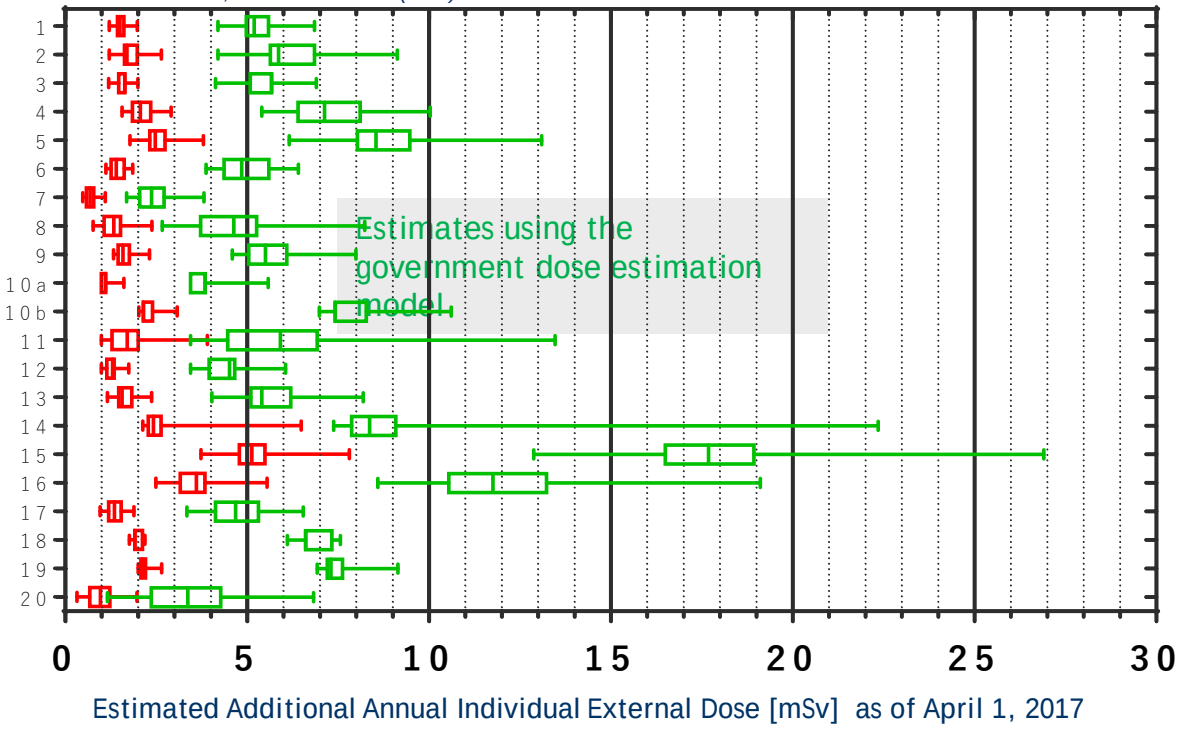
- Difficulty to clearly explain and catch the **meaning of reference level** as defined by ICRP
  - Large **debate and distrust** associated with the selection of criteria: 1 or 20 mSv/y

- Use of radiological criteria with calculation based on **ambient dose rates** leads to **highly conservative** approach compared to direct measurement of external exposure

- **No clear implementation of the ALARA** approach for the decontamination programme with generation of large volume of waste

Estimated individual dose in Iitate

From W. Naito et al., J. Radiol. Prot. 37 (2017) 606



The estimates of individual external doses based on the result from the study were about ¼ of the estimates calculated by the government dose estimation model.

Complex waste management

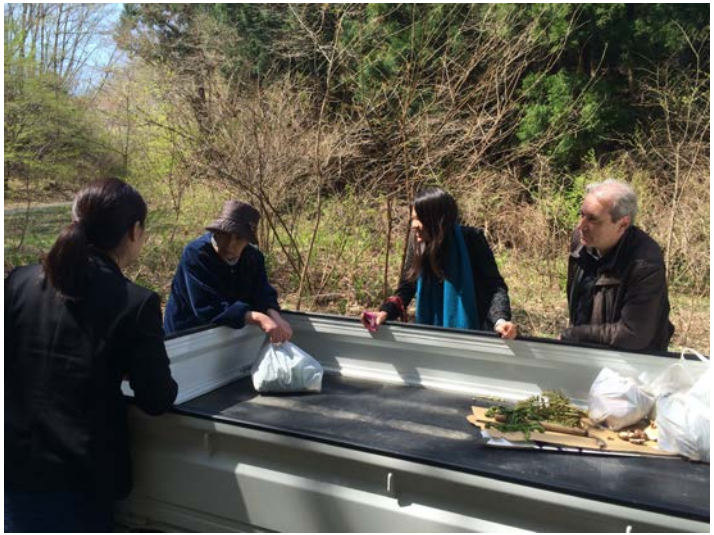
Health, social and economic issues (1)

- Influence of the **compensation system** on the decision
- Influence of the **tax system** and support of municipality for daily life:
  - **Maintaining services** during evacuation period
  - **Ensuring attractive conditions** for the return of population
- Difficulty for people to abandon **houses belonging to the family** since several generations, but **lack of return of young generations**
- Large **health monitoring** put in place after the accident: thyroid, health management survey…
- **Difficulties for adapting the health service** in municipalities where the order of evacuation has been lifted due to lack of knowledge on the dynamics of return of evacuees

Health, social and economic issues (2)

- Importance of **setting up health surveillance** with specific emphasis on living conditions of the people, including:
  - **Radiological monitoring**
  - Development of **radiological protection culture**
  - Organising the **vigilance** and opening **places of dialogue** to address local issues related to daily life
  - Focus on **well-being** of the population

Collecting sansei in Kawauchi



Possible attractiveness for new citizens?

Concluding remarks

- Fukushima introduces for the first time the **sensitive issue of the return** of evacuees including **radiological**, **socio-economic and ethical dimensions**
- Importance to better address the **temporal dynamics** and to consider as much as possible the longer term issues
  - Elaborate **emergency plans** and design **exercises** taking into account all phases of the accident
  - Carefully consider the **role of radiological criteria** and their **evolution**
  - **Involve local populations and professionals** in the decision-making and processes
- Importance of designing with local communities **mechanisms of governance** aiming to restore **decent and sustainable living conditions**

THANK YOU

FOR YOUR ATTENTION