The Human and Societal Dimensions of the Fukushima Accident

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Introduction

- The Fukushima accidents happened a quarter of a century after that of Chernobyl, with very different causes and in very different technological, social, economic and political contexts
- It would be tedious to list all these differences in detail whether it concerns the circumstances of the two accidents, their kinetics, the protective actions implemented and the contributions of science and technology to mitigate their consequences
- However, the two accidents surprisingly show many similarities both in terms of their human and societal consequences, and of their lessons regarding the rehabilitation of the living and working conditions of the affected people
- My presentation will mainly focus on the Fukushima accident with some reminders about Chernobyl

Content

- A brief overview of the Fukushima accident
- The Fukushima dialogue
- The human and social consequences of the accident
- The co-expertise process
- Concluding remarks

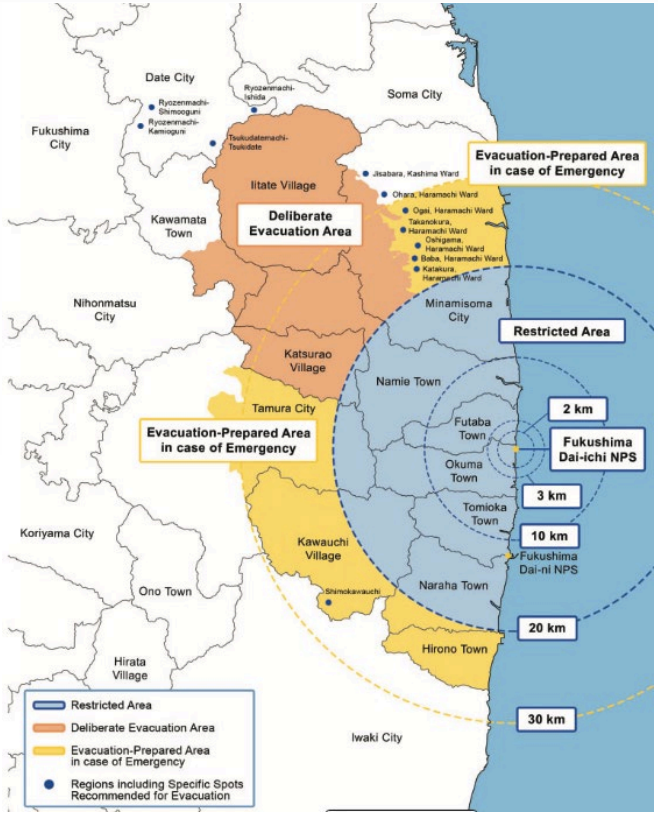
The Fukushima Daiichi nuclear plan accident

- The accident started on 11 March 2011 as a consequence of the Great East Japan **Earthquake** (magnitude 9.0) followed by a large **tsunami** that struck the east coast of Japan
- The earthquake and tsunami left an estimated **16,000 deaths and 2500 people missing,** and severely damaged the **nuclear power plant** operated by the Tokyo Electric Power Company (TEPCO)
- Due to the earthquake, all **off-site power supply** to the nuclear power plant was lost, and the tsunami caused **flooding of all power rescue systems**
- This resulted in the **melting of the reactors** and a series of **hydrogen explosions** that occurred on 12 and 13 March 2011
- A large quantity of radioactive material was released into the **atmosphere** and was deposited on **land** and in the **ocean** mainly in the Fukushima Prefecture

The early and intermediate phase (March 2011 – April 2012)

- Exceptional arrangements were adopted to ensure the protection of **responders** on-site
- Off-site, a series of actions for the protection of the population were adopted including **sheltering**, **evacuation** (approximatively 78 000 residents) and **temporary relocation**, **administration of stable iodine**, **decontamination of people**, and **restrictions on the consumption of foodstuffs** and **drinking water**
- Authorities organised a series of **public meetings** in the affected areas to inform the population
- The **Fukushima Health Management Survey** was established in June 2011
- By July 2011, the source of the releases was considered **stabilised**
- The **characterisation** of the radiological situation allowed to understand where, when, and how people were exposed and to establish a plan for the **decontamination** of the affected areas

The implementation of early protective actions

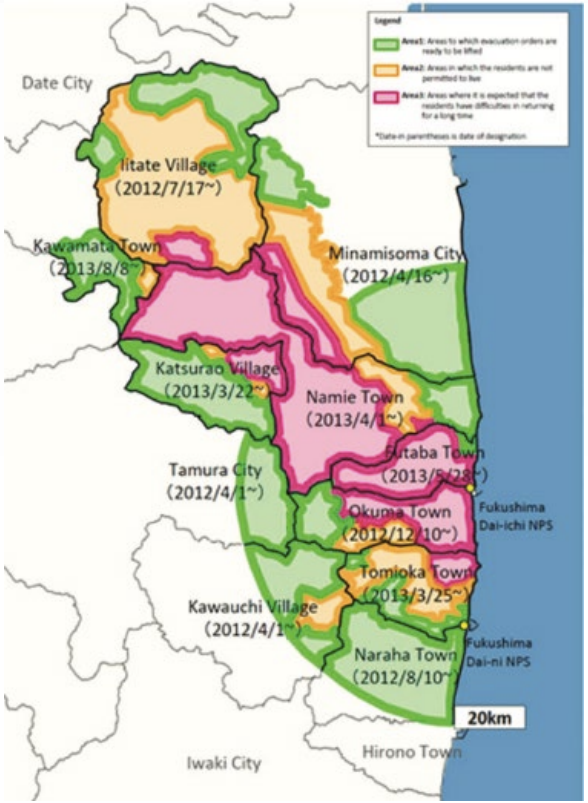


Areas and locations for which urgent protective actions were ordered in 2011 (As of August 2011)

The long term phase (April 2012 - until now)

- The Government established **conditions** for the lifting of evacuation orders in August 2013:
  - **Annual dose** of residents should be less than 20 mSv
  - Essential **infrastructures and social services** should be restored
  - Residents should be extensively consulted
- New **food contamination** criteria were adopted
- Decontamination generated large amount of **contaminated soil and waste** placed in **temporary storage sites** in municipalities before transfer to an **interim storage site** close to the nuclear power plant
- Four **thyroid examination campaigns** were implemented as part of the Fukushima Health Management Survey. 220 cases of thyroid cancer have been identified in a population of approximately 300,000 individuals until 2019

Implementation of long-term protective actions (1)



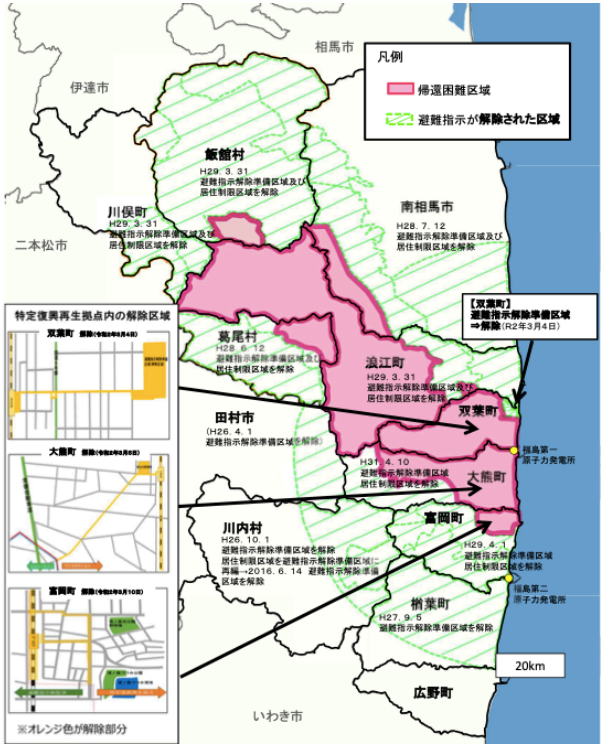
Evacuation ready to be lifted

Not permitted to Live

Difficult to return in the long term

Arrangements for areas where evacuation orders had been issued
(as of August 2013)

Implementation of long-term protective actions (2)



Difficult to return areas

Areas where evacuation orders have been lifted

Situation as of March 2020

The Fukushima Dialogue

- Five weeks after the Fukushima Accident on March 11, 2011 the board of the **International Commission on Radiological Protection** met in Seoul, Korea
- The Japanese members asked many questions to their European colleagues concerning the Chernobyl accident (April 19986) and it was decided to organize a **mission in Belarus** severely affected by the accident
- During the mission in September-October 2011, the Japanese participants discovered the role of **dialogue meetings** in helping the affected people to better understand the **challenges** they now had to face in their daily lives
- Returning to Japan they decided to organize a dialogue meeting in the Fukushima Prefecture with **the support of ICRP** colleagues having an experience with Chernobyl

The dialogue meetings in Belarus

The ETHOS Project
(1996-2001)

The CORE Programme
(2004-2008)

The ICRP visit in Belarus, September-October 2011 (1)

The ICRP visit in Belarus, September-October 2011 (2)

The first dialogue meeting in Fukushima

- On **26-27 November 2011** at the Fukushima Prefecture with the title: 'The rehabilitation of living conditions after the Fukushima accident: lessons from Chernobyl and ICRP Recommendations
- Participation of representatives from the Fukushima Prefecture and national authorities, Date city, Kawauchi and Iitate villages, professionals from affected localities, scientists from universities and national institutes, and international NPOs,
- **Testimonies from participants** including Belarus and Norwegian experts
- Presence of several local and national **media**
- After 2 days of meeting participants expressed the **wish to organize other dialogue meetings**

The first dialogue meeting, Fukushima City
26-27 November 2011

Some participants to the first dialogue meeting

How the dialogue meetings were structured?

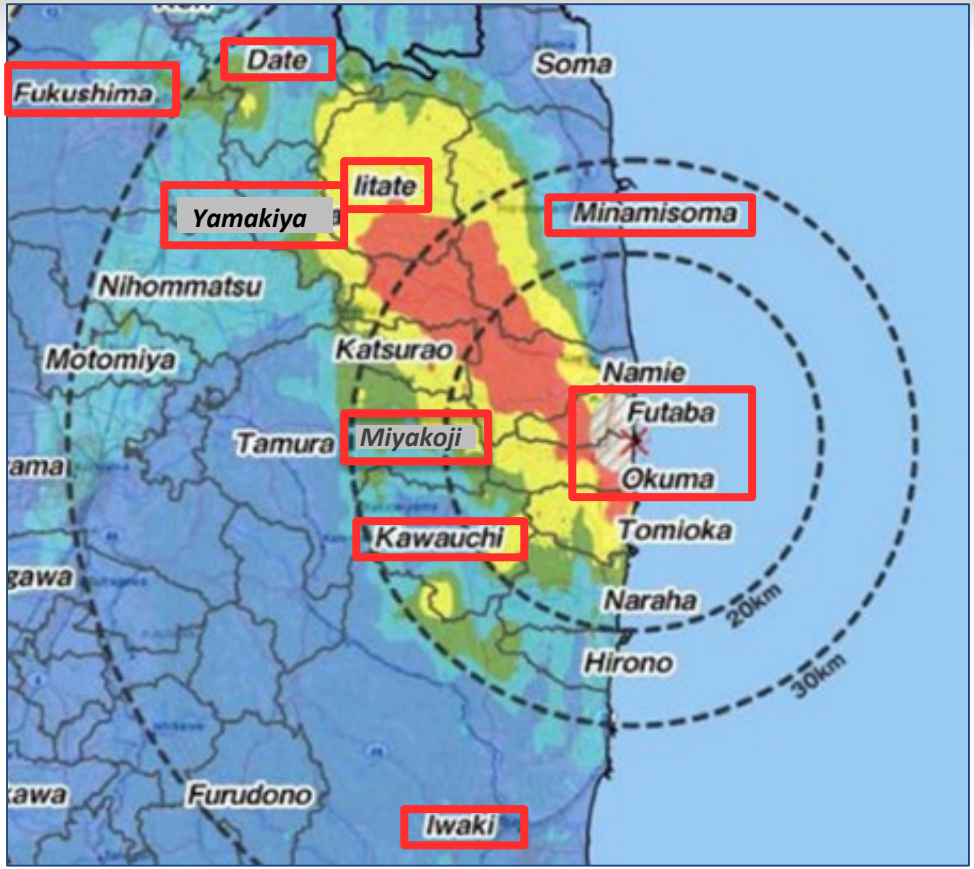
- **2 days meeting** during weekends
- **Invited participants** including Belarusians and Norwegians
- Local, national and foreign **observers**
- **Facilitation** by ICRP members
- Use of **common language**
- Simultaneous **translation**
- Use of a **dialogue technique** to give each participant the opportunity to express her/his view and to react to the views of the other participants
- Summary of discussions by **rapporteurs**
- General discussion
- **Video recorded** and **open to the media**

General views of the Dialogue meetings

Some topics discussed in the dialogue meetings

- Situation in Date City
- Improving the quality of food products
- Education of children and youth
- To return or not, to stay or leave
- Facing the situation of Iitate people together
- Self-help actions in Iwaki and Hamadori
- Situation and challenges of Minami-soma
- Raising children in Fukushima
- Value of tradition and culture in Fukushima
- Role of measurements in regaining control
- Experience we have gained together

Locations of the dialogue meetings



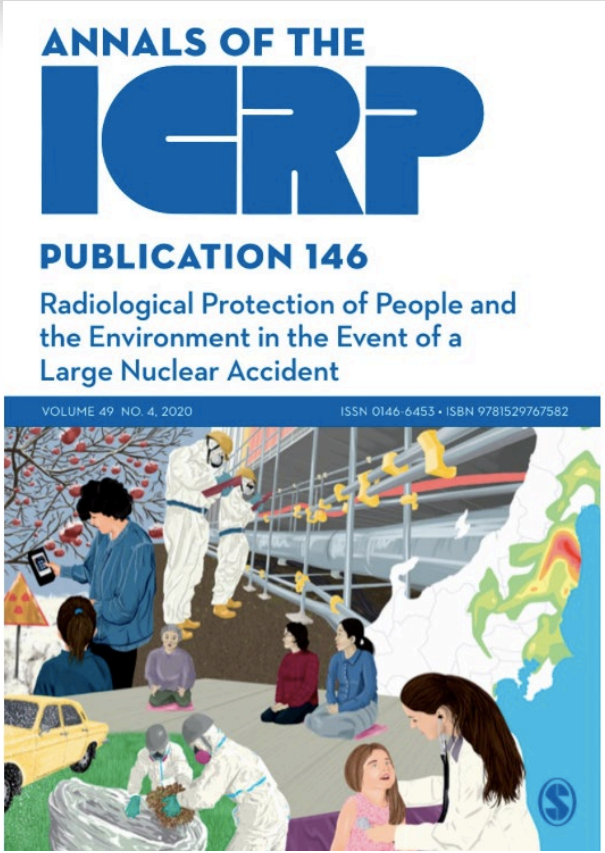
The main lessons from the dialogue meetings (1)

The 22 Dialogue meetings held so far allowed to better understand:

- The difficult **dilemma** for affected people to stay or leave, or to return or not in the affected areas
- The **societal and economic consequences** of evacuation and decontamination
- The **discrimination** of affected inhabitants, products and areas
- The importance for experts to comply with the **ethical values** of radiological protection (*see ICRP Publication 138*)
- The role of **measurements** of radiation levels and individual exposures to **communicate** and **involve** people in the recovery process (*Cf. the co-expertise process*)

The main lessons from the dialogue meetings (2))

- The Dialogue meetings gave rise to rich **testimonies**, particularly as regards the **human dimension** of the accident, which will be a precious **legacy** of the people of Fukushima for improving **preparedness** and **supporting** affected people in case of a nuclear accident in the future
- Since 2020, the Dialogue meetings are completely in the hands of local residents through the **NPO Fukushima Dialogue**
- Lessons of the Dialogue meetings have been incorporated the recent **ICRP recommendations** published in 2020 : *Radiological protection of people and the environment in the event of a large nuclear accident: update of ICRP Publications 109 and 111. ICRP Publication 146. Ann. ICRP 49(4)*



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Content of ICRP Publication 146

- Chapter 1 introduces the Publication
- Chapter 2 presents the **timeline** of the accident, its **consequences** and the relevant **principles** for the protection of people and the environment
- Chapter 3 describes the recommendations that apply to the **early and intermediate phases** of an accident
- Chapter 4 describes those applying to the **long-term phase**
- Chapter 5 provides a short overview of **preparedness** planning for large nuclear accident
- Chapter 6 is a brief conclusion,
- Annexes A and B provide brief historical overviews of the **Chernobyl** and **Fukushima** nuclear accidents

Consequences of a large nuclear accident (1)

- Large nuclear accidents affect **all dimensions of individual and social life** and generate very complex situations

- The main concerns are about the potential health impacts of radiation due to its **unknown character** and **alarming image**

- However, nuclear accidents cannot be managed with radiological protection considerations alone but must take into account the **social, psychological, environmental, educational, cultural, ethical, economic and political factors** associated with the consequences of the accident

Consequences of a large nuclear accident (2)

In Publication 146, the Commission is considering successively the following consequences:

- **Radiation-induced health effects**
  - Tissue reactions (Deterministic effects)
  - Cancer and heritable effects (Stochastic effects)
- **Consequences for fauna and flora**
- **Societal consequences**
- **Economic consequences**
- **Psychological consequences**
- **Health impacts of changes in lifestyle**

The human and societal dimensions of the Chernobyl and the Fukushima accident

- **Loss of trust** in authorities and experts
- A strong **concern about radiation and its potential health effects** especially on children
- The **disintegration of family and social ties** and the breakdown of the economic fabric
- A general feeling of helplessness and **loss of control** on daily life, and abandonment and
- A strong **apprehension about the future**
- Beyond the **fear of radiation** what is at stake after a nuclear accident accident is the **autonomy** and **dignity** of the affected people

The co-expertise process

- **Emergence in the late 90s** in the context of the ETHOS project and the CORE programme aiming at protecting people and rehabilitating their living conditions in villages of the South of Belarus affected by the Chernobyl accident

- Based on the **direct involvement** of affected people **to characterize their personal radiological situation** and that of their community, and to implement actions to protect themselves and improve their quality of life with the support of experts and authorities

Ethos project, Belarus

Chernobyl

Ethos project, Belarus

Core programme, Belarus

Core programme, Belarus

The co-expertise process (1)

- **Refinement of the process** in communities affected by the Fukushima accident. Among them particularly the initiative undertaken by:

  - **authorities** of the village of **Kawauchi** in the Futaba region with the cooperation of **the University of Nagasaki**
  - **residents** of the community of **Suetsugi** in the North from Iwaki with the help of **volunteer experts**
  - **experts** from a technical institute in the village of **Yamakiya** in north east of Fukushima NPP
  - **members of an an NGO** in **Kashiwa**, located only 30 kms/40 minutes by suburban train from central Tokyo

- References are listed at the end of the presentation

Kawauchi, Japan

Fukushima

Kawauchi, Japan

Suetsugi, Japan

Suetsugi, Japan

The co-expertise process (2)

Combining:

Technical expertise

Two-way communication

Trust building

Citizen participation/ empowerment

Dialogue, measurements and **local projects** are the three pillars of the co-expertise process

The co-expertise process (3)

- **Cooperation process** between experts, professionals and local actors aimed at sharing local knowledge and scientific expertise

- Allows to **assess and better understand the radiological situ**ation, to develop protective actions to protect people and the environment and to **improve living and working conditions**

- Integral part of the practical implementation of **the principle of optimization** with the involvement and empowerment of stakeholders

The key role of dialogue between experts and the affected people

- It brings together **various skills and sensibilities** and helps to identify the **real concerns and expectations** of people
- It abolishes the duality between the experts and the laymen, i.e. **those who know** and **those who do not know**
- It is a space to share freely and openly **experiences** and for everyone to listen to different **view points** and **opinions** on the situation and put her/himself in **the shoes of others**
- The use of **common language** and **narrative** facilitates the sharing of each person's **intimate experience**, the revelation of the **richness of sense of the situation**, and also allows each one to revisit their values and aspirations and affirm their **identity**

The key role of radiation measurements by the affected people

- They make **visible** the presence of radioactivity in the direct environment of people
- They allow everyone to understand **where, when and how they are** exposed and to take control of the situation
- They are the **gateway to dialogue** with experts and the means to progressively **regain confidence** in the information disseminated by the authorities
- They facilitate **neighbourhood exchanges** and contribute to restoring the **quality of the living together** in communities
- They are the foundation of the **practical radiological protection culture** to exercise the necessary **vigilance** to live in a territory affected by radioactivity

The key role of local projects implemented by the affected people

- They are a means for those involved to find again the meaning of **personal fulfilment** stopped after the accident and to look again positively at the **future**

- They promote **cooperation** between affected people, competent authorities, public and private organizations and experts which is essential for the **restoration of trust**

- They need to be supported by **appropriate mechanisms** to ensure the **legitimacy, transparency and fairness** of the decision-making processes related to their implementation

Practical radiological protection culture

- The co-expertise process promotes the development of a **practical radiological protection culture** among affected which allows them:

  - To interpret the results of the measurements of radiation
  - To **build their own benchmarks** in relation to the radioactivity present in their daily life
  - To make their own decisions to protect themselves and their loved ones and to **implement self-help protective actions**
  - To **develop local projects** to improve their living conditions
  - To **judge the effectiveness** of the protective actions implemented by themselves but also by authorities and organisations

The ethical dimensions of the co-expertise process

- To be credible in the implementation of the process experts must:
  - Master the scientific basis of radiological protection and its practical implementation **- Accountability**
  - Share openly all information they own and recognize limitations **- Transparency**
  - Listen carefully to the stakeholders to understand their concerns and individual situations **- Empathy**
  - Deliberate and decide together with stakeholders- **Inclusiveness**
  - Act in accordance with the ethics of radiological protection, that is to say **prudently** and **equitably**
  - Preserve the **autonomy of choice** of people and **respect their individual decisions** without manipulating them in any way
  - And above all to remain **faithful** to their commitment over time

In summary

- The most effective way of **engaging affected people into a co-expertise process** after a nuclear disaster is:
  - To **listen to them** and **understand** their **daily concerns**
  - To use as much as possible **common language** and **narratives**
  - To carry out radiation **measurements with them**
  - Without ever forgetting that communicating about risk only works if there is **trust** between the people affected and the experts / authorities

Concluding remarks

- The Chernobyl and Fukushima experience showed that to make sense for people confronted with radiation, knowledge about radiological protection must be **anchored to their daily reality to allow them to act to improve their future living conditions**. This is only possible if they are directly involved in the process
- This involvement implies the mobilization of **specific skills from the experts**, **adapted means of measuring radiation** and the **support of authorities**. It also takes **time…**
- It also implies for experts to work closely **with** the people and not **for** them, in an **accountable, transparent** and **fair** way

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Thank you for your attention

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