

ICRP symposium 2013

**Experience and current issues
with recovery management from
the Fukushima accident**

Michiaki KAI

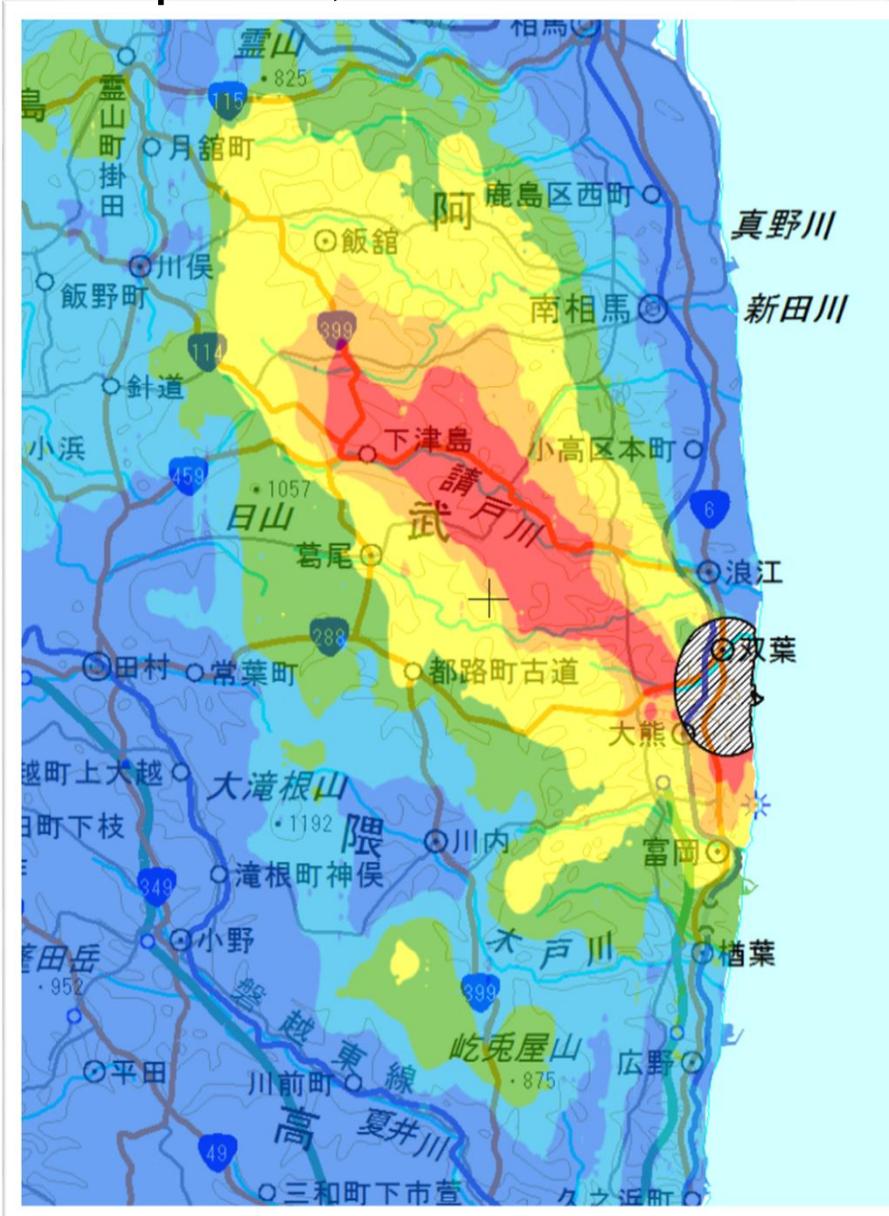
ICRP C4 member

Oita University of Nursing and Health Sciences

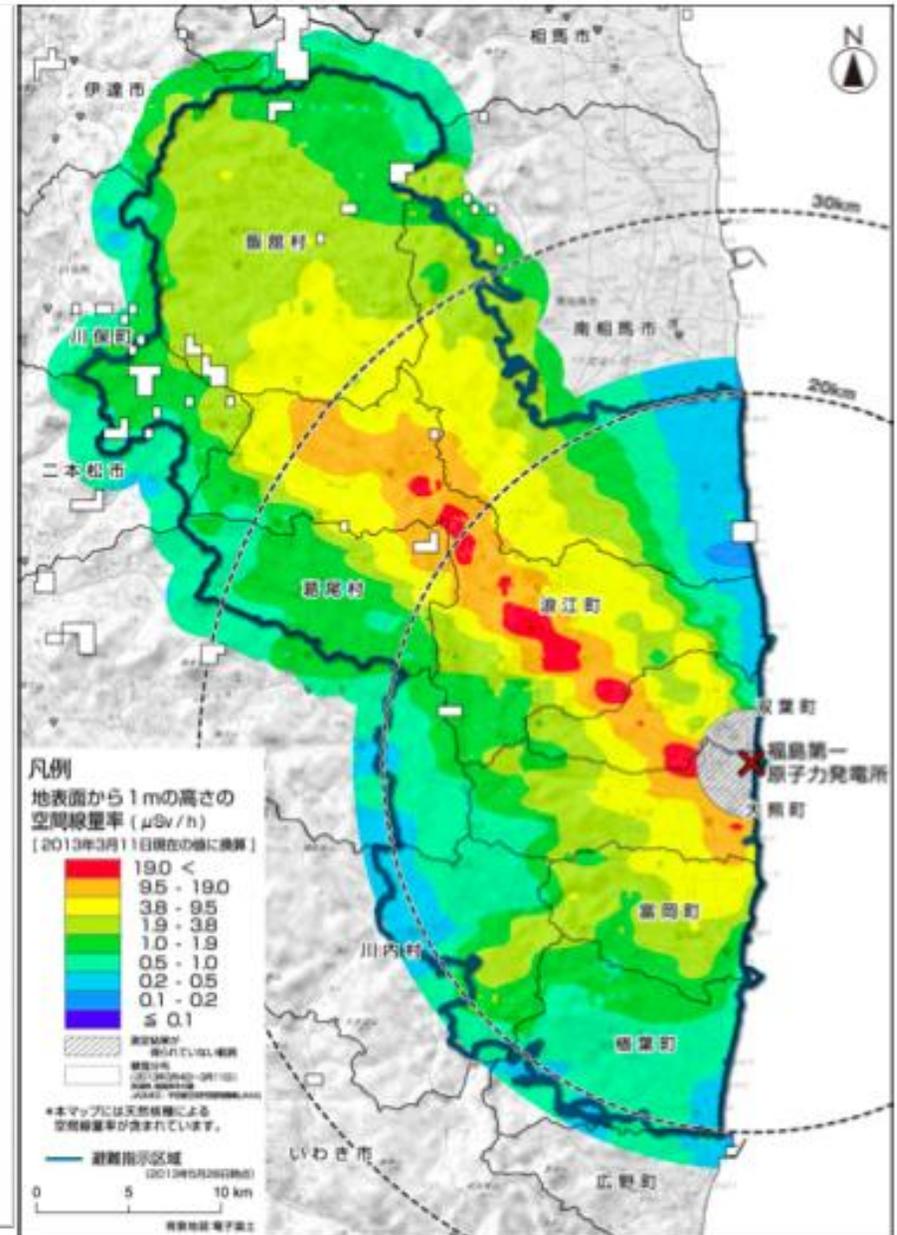
Aerial Survey

April 29, 2011

March 11, 2013



(放射線量等分布マップ拡大サイト/電子国土)



(NRA: Nuclear Regulatory Authority)

Current Situations in Japan

- “ Socio-economic consequences with inevitable changes of daily life as well as psychological effects.
- “ Concerns about the risk at low doses is very much present and amplified among the population.
- “ WHO et al. assessed the health effects from the accident and concluded that It would be not possible to detect an excess of cancer deaths from the radiation exposure. However the concerns persist.
- “ Rehabilitation moves forward in no way as expected

My Points

Aftermath of Fukushima accident

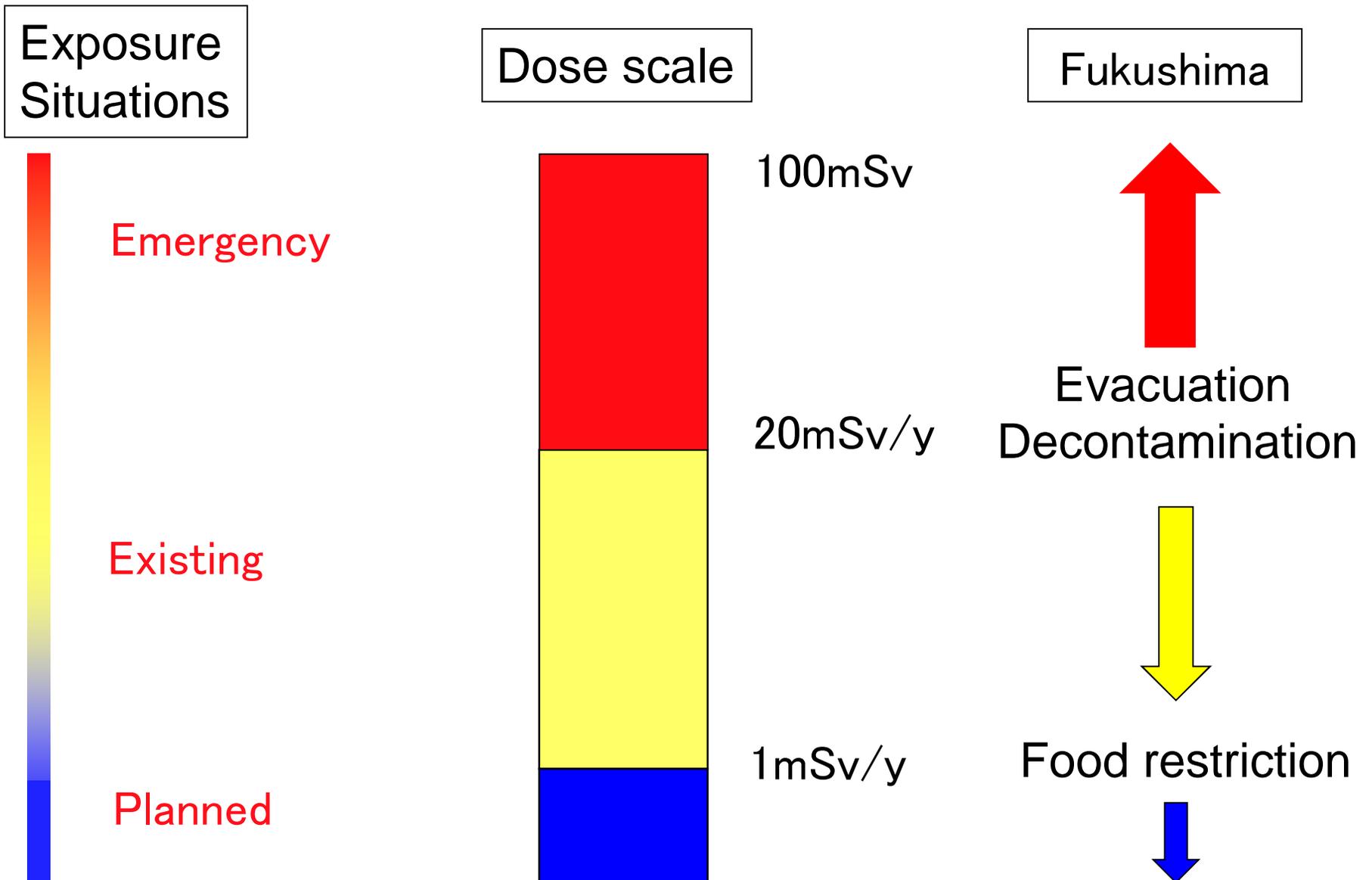
Lessons on RP system and knowing radiation risk

- “ **Knowing Radiological Protection philosophy**
 - . **Gap between experts and ICRP message**

- “ **Community Involvement in Radiological Protection issues for conducting better rehabilitation**

- “ **Disseminating Good Science**
 - . **Credibility for experts and authorities**

ICRP RP system for the public



What happened in Fukushima?

“ Evacuation

- . **Deliberate evacuation** in Iitate village

- “ Exceptional case of circle zoning within 20-30km

- > ref. map



Iitate village

What happened in Fukushima?

Evacuation

- . **Deliberate evacuation** in Iitate village

- “ Exceptional case of circle zoning within 20-30km

- “ 50 mSv, intervention level for evacuation

- “ 20 mSv/y newly adopted from June 2011

- . To allow a return due to less than 20 mSv/y

- “ April 2012 in some villages

- “ 20 mSv/y created considerable confusion

- . The meaning and rationals behind were not clear for the authorities

Main Radiological Protection Measures for Rehabilitation

“ December 2011

- . Government announced the reactors were stabilized

“ January 2012

- . **Decontamination** program started
- . Target to the area more than 0.23 Sv/hr equivalent to 1 mSv/y

“ April 2012

- . **New food regulation** came into effect assuming limitation of 1 mSv/y from Cs-134 and Cs-137
- . Overall review of the **evacuation zones**

What happened in Fukushima

Foodstuff restriction

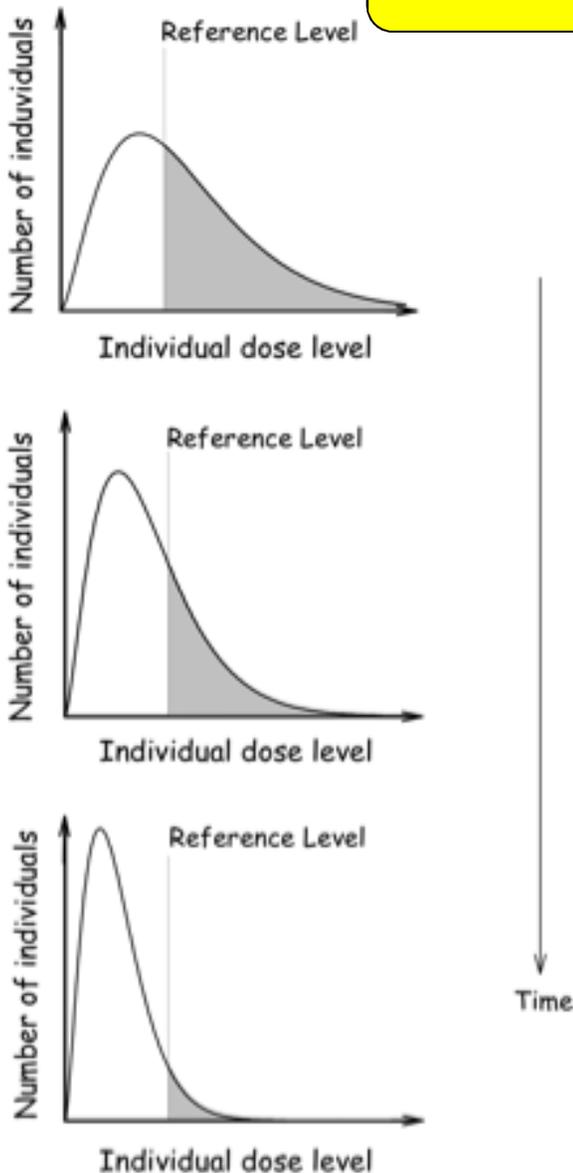
- . New limitation when shifting from emergency to existing exposure situation
- . Since July 2011, a thorough debate at national level about **what is safe level**.
- . Main focus on improving consumers' concern
 - " 100 Bq/kg linked with 1 mSv/y
 - " Strategy of toxic chemicals was applied
- . Conflict among the relevant stakeholders
 - " consumers, farmers, distributors, etc.

What happened in Fukushima

“ Decontamination of the land

- . Since January 2012, decontamination law started.
- . Criteria for decontamination
 - “ Areas more than $0.23 \mu\text{Sv/hr}$ (RL)
 - “ $(\text{RL} - 0.04) \times (8\text{h} + 16\text{h} \times 0.4) \times 365 = 1\text{mSv/y}$
 - . $\text{BG} = 0.04\mu\text{Sv/hr}$, Shielding factor=0.4
- . There is no designated goal to decontamination
 - “ $0.23 \mu\text{Sv/hr}$ (= 1mSv/y) was taken as a goal.
 - “ Affected residents seem to prefer 1mSv/y
- . Few temporary waste depositories have been kept
 - “ On-site depositories goes on

The Role of Reference Level



Doses above RL are not advisable to be exceeded

Below RL, exposures should be optimized

Figure shows the evolution of the distribution of individual doses with time. (ICRP 111)

Fukushima

- 1) RL interpreted as a goal
- 2) 20 mSv/y is supposed to be maintained
- 3) No message about the meaning of RL

Expert Credibility

Gap between some experts and ICRP message

Radiation risk

“Some experts message

- . No effect of less than 100 mSv of radiation has been proved

“ICRP message (Pub. 103, § 62 & 236)

- . In the case of cancer, epidemiological and experimental studies provide evidence of radiation risk albeit with uncertainties at doses about 100 mSv or less.
- . At doses higher than 100 mSv, there is an increased likelihood of deterministic effects and a significant risk of cancer

Radiological protection

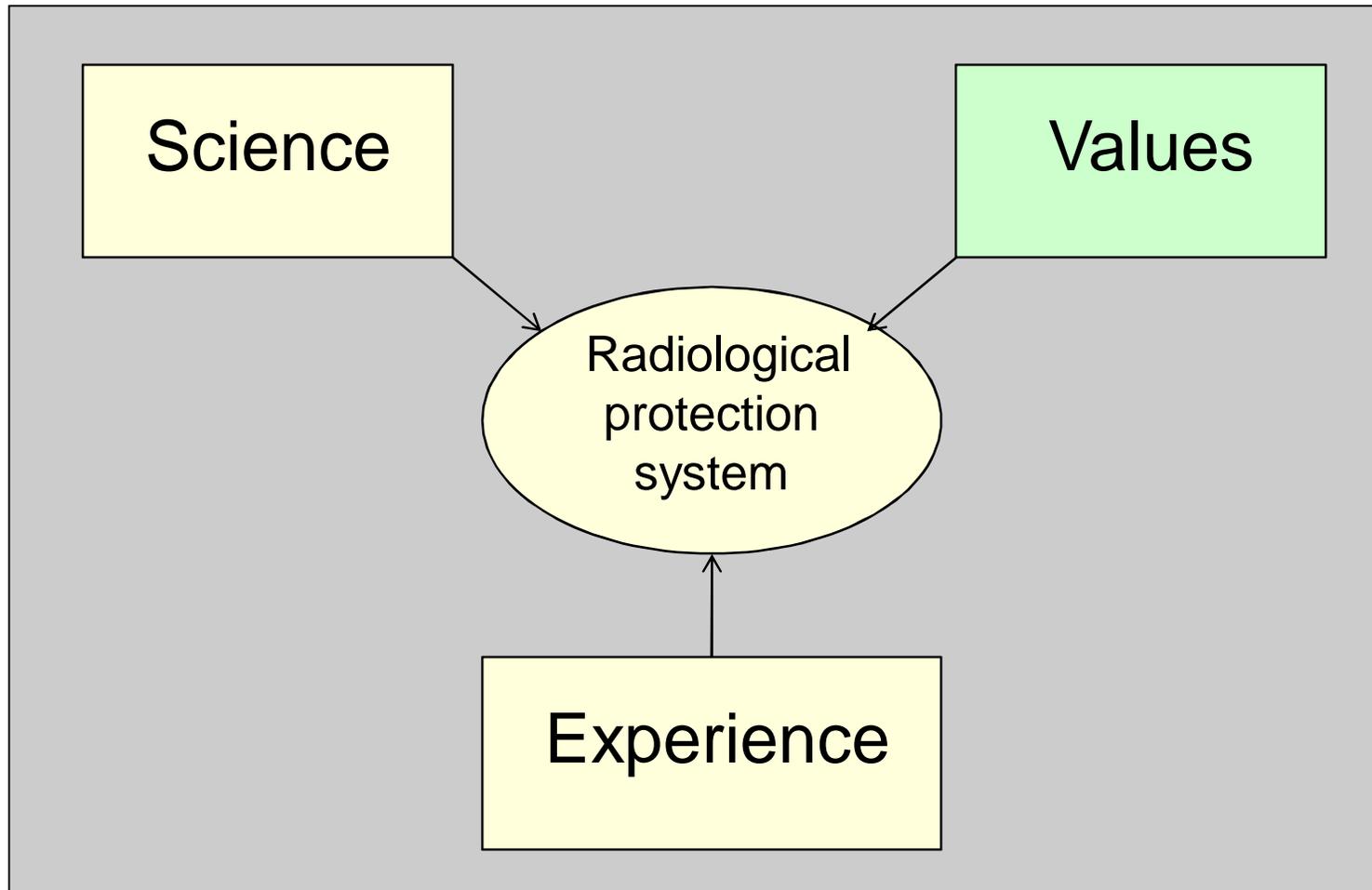
“Some experts message

- . The public does not understand that risk is quite low

“ICRP message (Pub. 103, § 224)

- . This decision-making process may often include the participation of relevant stakeholders rather than radiological protection specialists alone.

Why a focus on the ethics of radiation protection?



Credibility for RP

Gap between current situations and ICRP message

- “ **Difference between science and value/ethics based judgment**
 - . Using numbers e.g RLs like 1 and 20mSv/y
 - . RP includes **the participation of relevant stakeholders**

- “ **Difference between intervention levels and reference levels**
 - . No need to reduce the dose below ILs
 - . RLs are used for optimization
 - . Difficulty to understand why doses less than 100 mSv should be reduced

- “ **Difference between planned and existing exposure situations**
 - . Before the accident, no regulation about existing exposure situations in Japan
 - . RP experts insist on the difference between the two situations
 - . **People including non-radiation scientists are reluctant to accept**

Issues to be challenged

Science issues

- “ Experts try to mitigate health concern
- “ Some try to enlarge health concern
- “ The focus on risk leads affected people in a bind
- “ Experts failed to find ways to discuss about the tolerability of risk and risk comparison
- “ **How to talk about scientific knowledge on risk**
- “ **ICRP should reach out to inform the public about radiation risk.**

e.g. through Internet

Ethical issues

- “ Dialogue with the public
- “ Involvement of other health professionals in RP
- “ Discuss and disseminate the ethical and social values that are embodied into the system of protection

Loss of trust

Loss of credibility

ICRP Dialogue with stakeholders

THE REHABILITATION OF LIVING CONDITIONS AFTER THE
FUKUSHIMA ACCIDENT

- “ 1st: Nov, 2011
- “ 2nd: Feb, 2012
- “ 3rd: Jul, 2012
- “ 4th: Nov, 2013
- “ 5th: Mar, 2013
- “ 6th: Jul , 2013



Places: Date city, Fukushima city

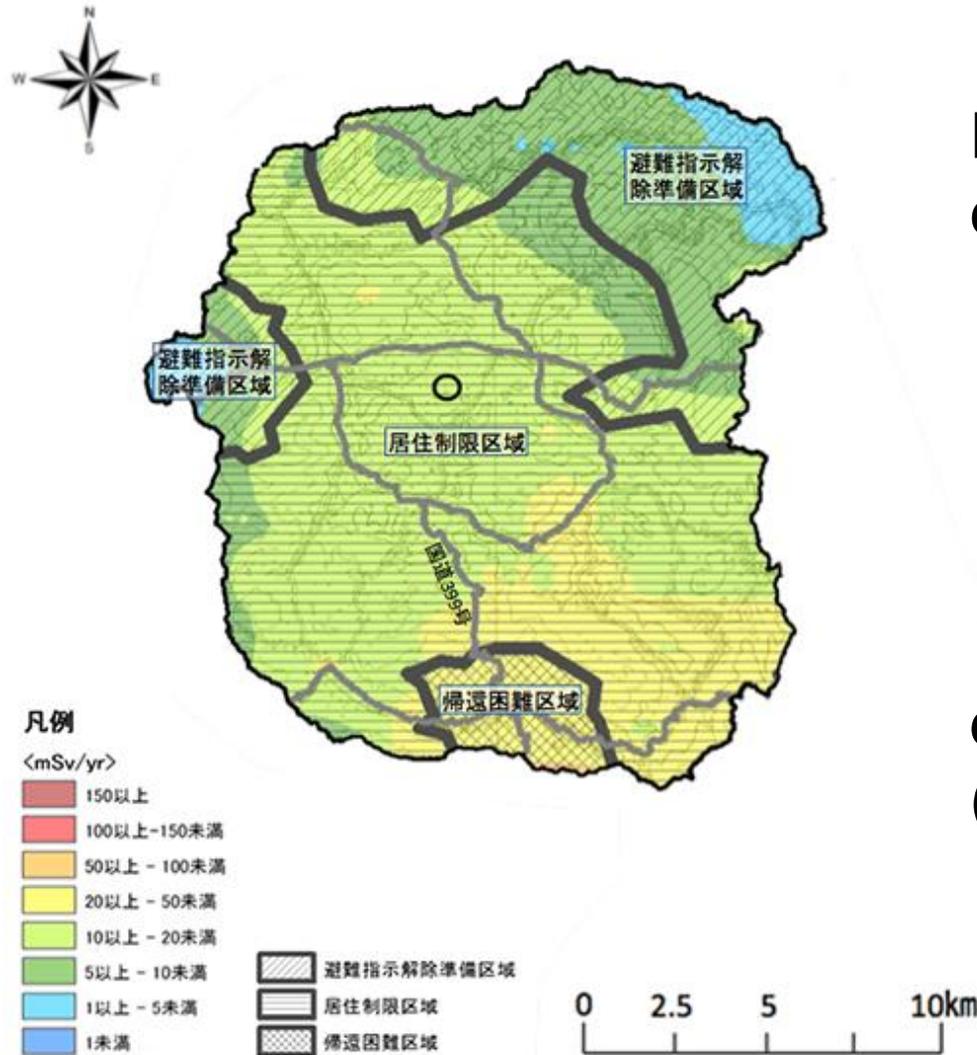
ICRP dialogue

makes clear a gap between elderly and younger family

- “ Elderly people hope to return as soon as possible in their village
- “ Younger people hope to keep new living outside
- “ Whether to return or not is up to each individual. **Any choice has to be respected**

Importance to create, as soon as possible, the conditions for elderly people to make their own decisions concerning on whether or not to return to litate.

Ambient dose in Iitate on 11 Mar, 2013



Preparatory zone for lifting evacuation (< 20 mSv/y)

Zone for limiting residence (>20 mSv/y)

difficult-to-return zone (> 50 mSv/y)

ICRP dialogue

makes clear a gap between elderly and younger family

- “ Elderly people hope to return as soon as possible in their village
- “ Younger people hope to keep new living outside
- “ Whether to return or not is up to each individual. **Any choice has to be respected**

Importance to create, as soon as possible, the conditions for elderly people to make their own decisions concerning on whether or not to return to litate.

Conclusions

“ **ICRP system seems to work**

- . Problems in implementing the system, e.g. meaning of reference levels
- . Failures in community involvement in radiological protection issues for conducting better rehabilitation

“ **Knowing radiological protection philosophy**

- . Gap between RP community and outside
- . RP experts need to communicate with experts from other fields.
- . Ethics is essential to go beyond the scientific uncertainty

“ **Disseminating good science**

- . About radiation risk and particularly low dose risk from internal exposure, low-dose-rate exposure
- . ICRP is responsible for dissemination a different message than from UNSCEAR or WHO etc.