

Developing Effective Risk Communication through Understanding Risk Perception Factors

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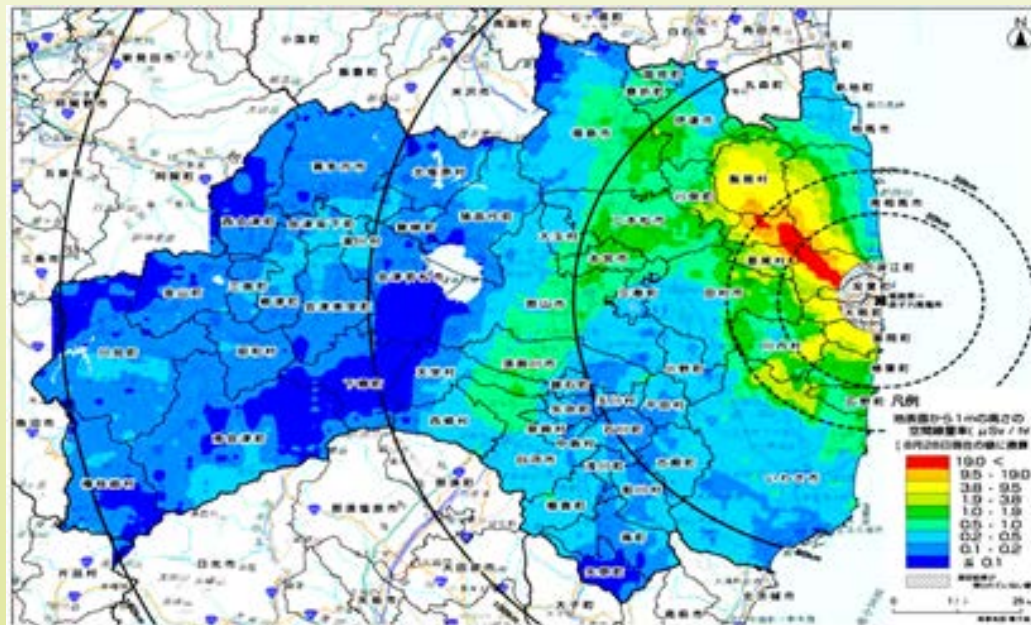
Agenda

1. Risk Communication Issues In General and Relevance to the IAEA
2. Incorporating Risk Perception into Risk Communication
3. Why address Perceived and Actual Risks?
4. Complexity of the Risk Perception Factors
5. Recommendations

Meeting Purpose

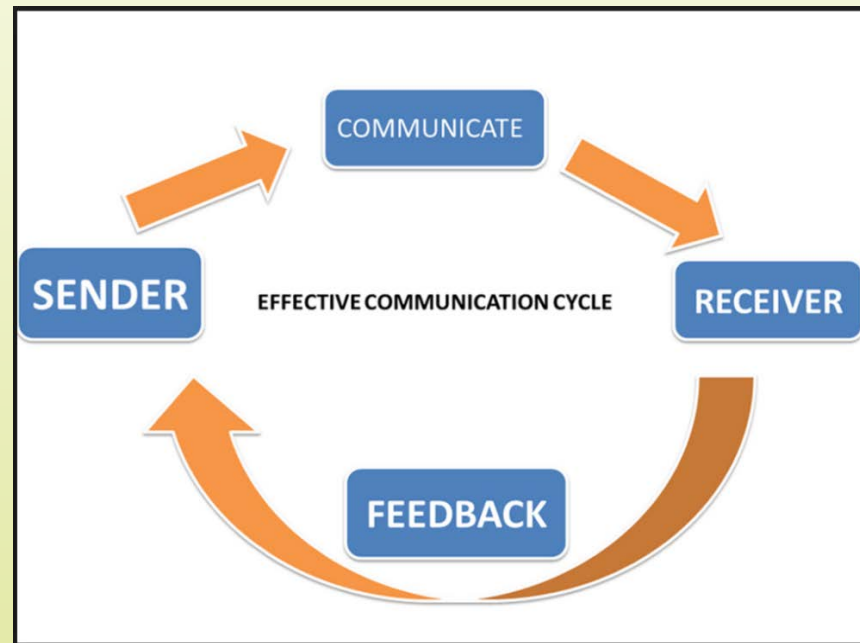
- To elaborate on the issue of Public (Risk) Communication
 - In general and for the specific regulations
- To discuss recommendations on how to enhance public (risk) communications through integration of risk perception factors communication strategy with stakeholders ;
- To improve public acceptance of i.e. “remediation initiatives” (decontamination, waste management, monitoring , remediation) by addressing the concerns of the local residents
 - Concerns for factual information and addressing perceived risks.

Risk Communication



Communication

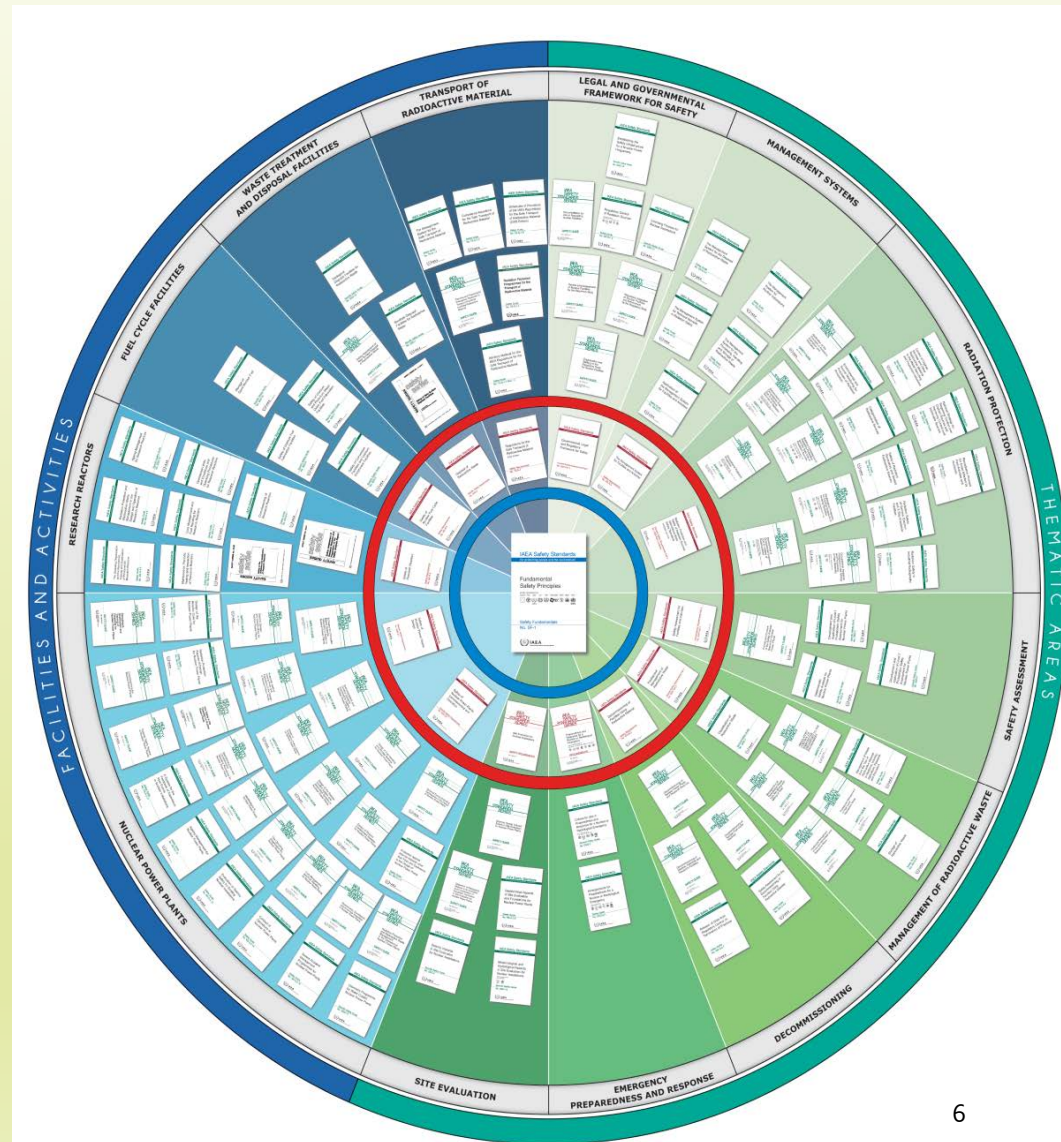
- Communication is simply the act of transferring information from one place to another.



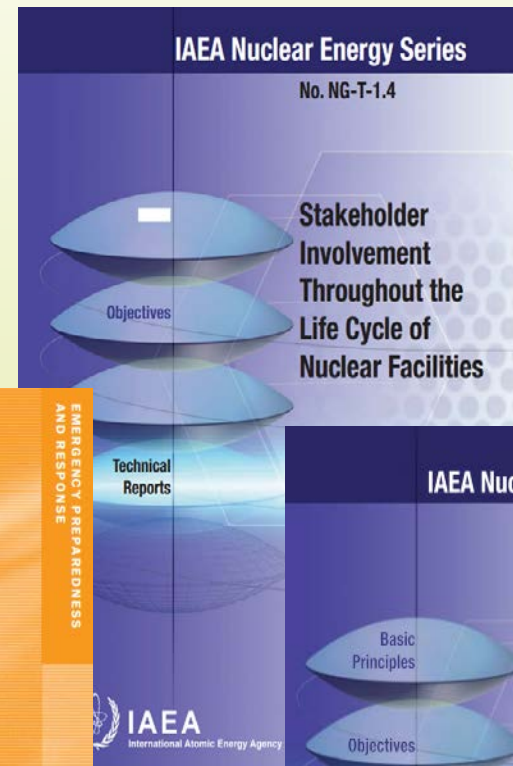
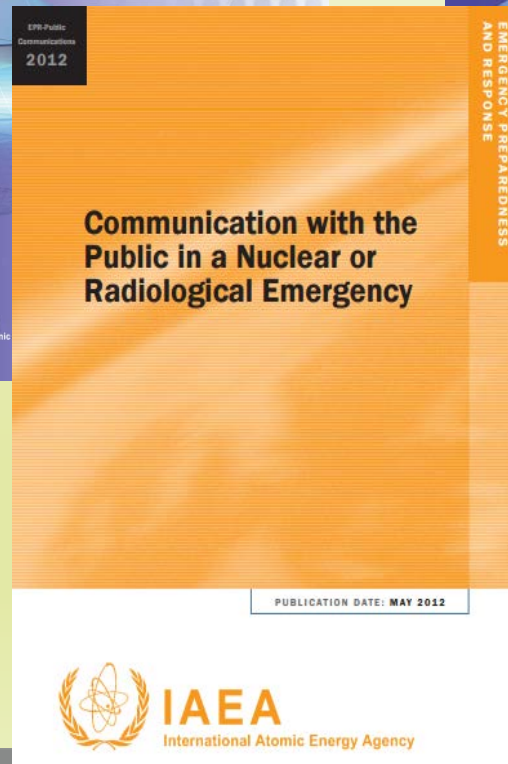
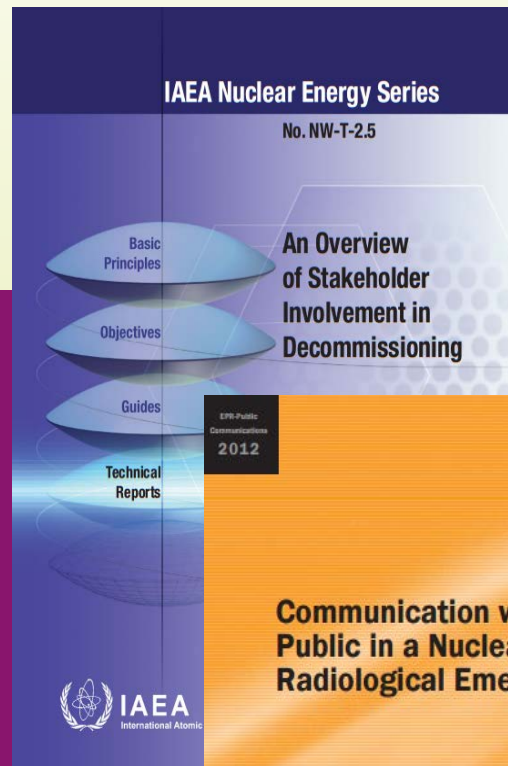
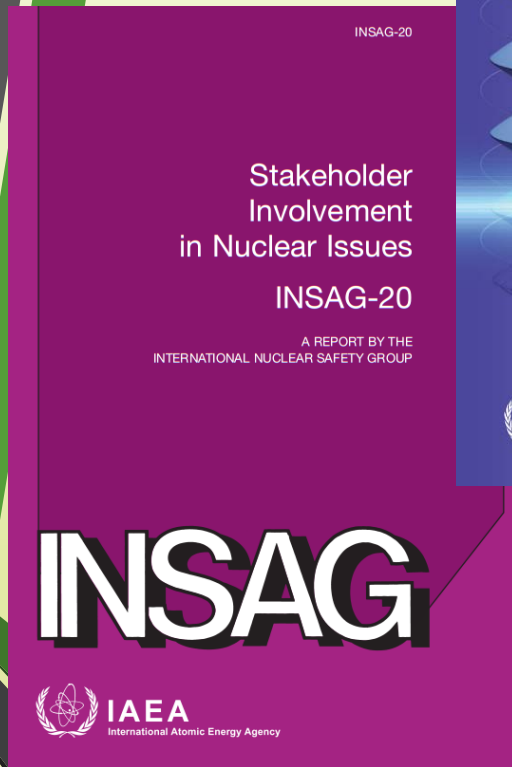
- Exchange of information between an organization and its stakeholders

IAEA Safety Standards

A process for public and stakeholder engagement is recommended or noted in many Standards.



Other IAEA publications



Who are stakeholders?

Stakeholder: Anyone who holds a **vested interest** in an issue and which the organization has an obligation to acknowledge:

- Members of “the public”, as groups or individuals, holding a vested interest in an issue or decision-making process;
- Commercial / business interests, trade unions, and suppliers;
- Governmental authorities at the national, regional and local level;
- News media, professional and academic organizations (scientific community);
- National and local NGOs;
- Different stakeholders have different degrees of influence on decision-making processes (from opinion seeking to controlling influence).

Definitions

- Actual Risk (Quantitative, Objective, Intellectual)
 - What we know
- Perceived Risk (Qualitative, Subjective, Emotional)
 - What we feel
- Understanding **both** is essential to effective risk communication and to promote public acceptance

Risk Communication

- Communication with the purpose to develop a common understanding of factual information, and to influence decisions or behaviours by addressing stakeholder interests.
 - Need to address both intellectual needs (information) and emotional needs (feelings);
- Risk communication plays an integral role in shaping individual risk perceptions as well as behaviours for risk aversion, reduction, or acceptance.

Incorporating Risk Perception Into Risk Communication

Why Address Perceived Risk?

- Communicating actual risk by sharing scientific results
 - is necessary
 - but not sufficient to secure public acceptance or to assuage public concerns;
- Understandable data (maps, reports, analyses) address intellectual needs for information;
- Communications need to address emotional needs (**fear, dread, stress**).

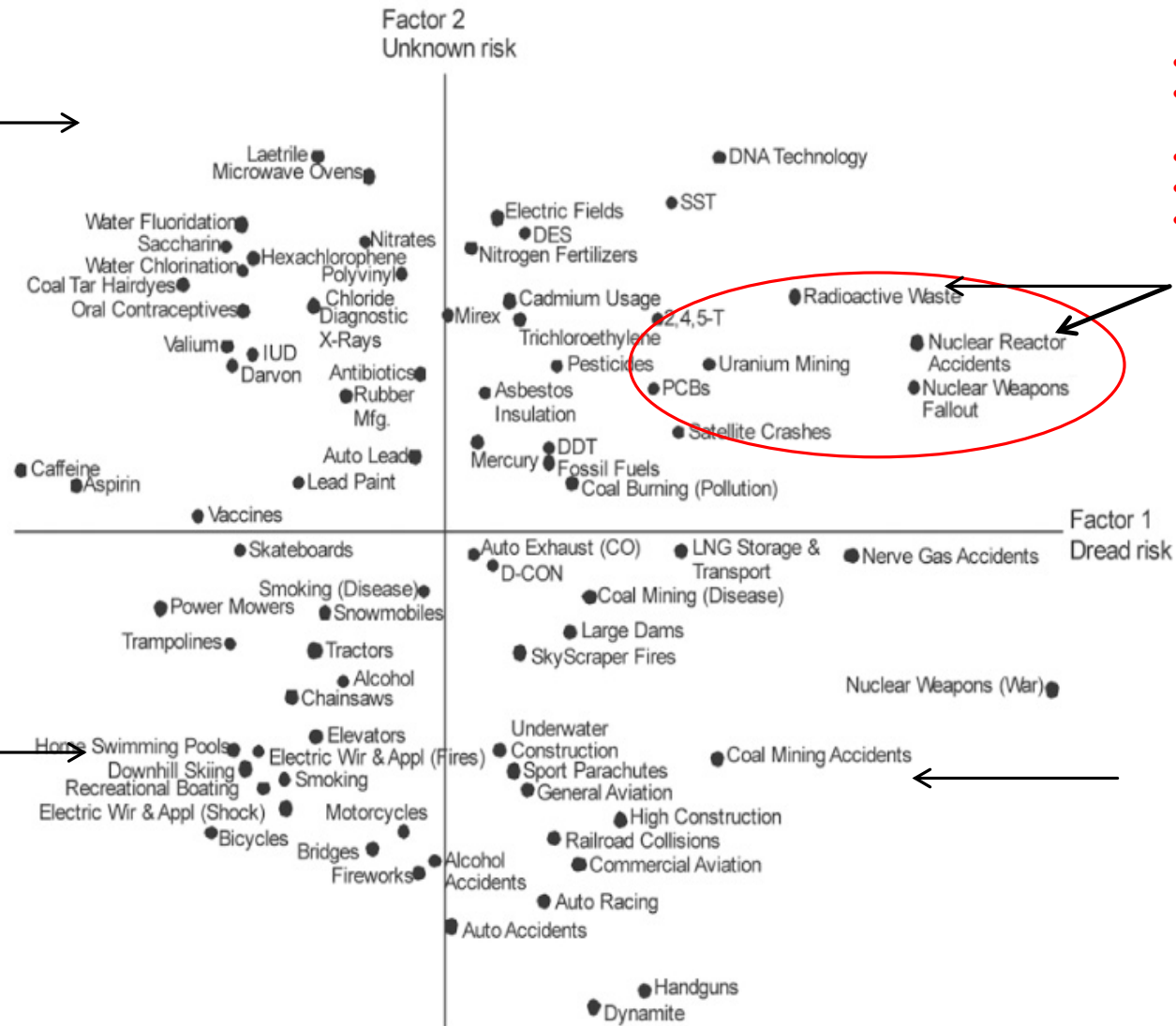
Risks and Risk Communications

- **Actual risk** (reality) is quantified, usually by dose calculations and/or probabilities;
- **Perceived risk** (belief, attitude, judgement and feelings) is subjective for the individuals and quantifiable in a population and individuals;
- The study of actual vs. perceived risk, especially regarding 'nuclear' is well established (e.g. Slovic, et. al.), but the utilization of perceived risk for public communications in RWM situations is lacking.

Figure 2 - Location of 81 hazards on Factors 1 and 2 derived from the interrelationships among 15 risk characteristics. Each factor is made up of a combination of characteristics, as indicated by the lower diagram. Source: Slovic et al. (1985)

- Controllable
- Not dread
- Not global catastrophic
- Not fatal consequence
- Low risk to future generations
- Voluntary

- Observable
- Known to those exposed
- Immediate effect
- Old risks
- Risks known to science



- Not observable
- Unknown to those exposed
- Effect delayed
- New Risks
- Risk unknown to science

- Uncontrollable
- Dread
- Global catastrophic
- Fatal consequence
- High risk to future generations
- Involuntary

Examples of Risk Communications without Addressing Risk Perception

Well known mistakes in public communication from Chernobyl

- People need information linked to their own lives;
- People need clear messages from sources they trust on:
 - Health effects of radiation;
 - Living with radiation; and
 - Healthy lifestyles in general.
- People want Yes/No answers, not probabilities like “ $5,5 \cdot 10^{-7}$ ”.
- Perceived risk of an activity is greater when the activity is seen as evoking fear, terror, or anxiety, or irreversible adverse effects
- People need a clear message from their governments on the future of local economies and national social protection systems.
- **People ignore information if it does not correlate with their concerns or beliefs.**

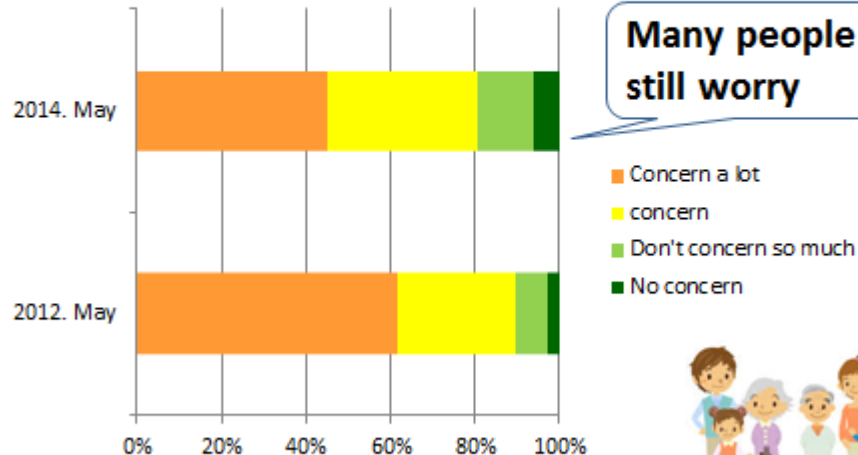
Multiple Consequences of the Accident:

- Fear of cancer and other medical complications;
- Rumours and anecdotal reports;
- Intelligible communications about radiation;
- Contradictory information from “reliable sources”;
- Distrust in authority;
- Ecological and socioeconomic disruption (unemployment, etc.);
- Social stigma;
- Media coverage (not always fair and balanced);
- Psychological consequences:
 - Health related anxiety,
 - Excess morbidity from depression,
 - Post-traumatic stress disorder (PTSD),
 - Alcoholism and abuse of other substances,
 - Long-term threat to health, including next generations
- **After accidents involving radiation, fears start early and the emotional toll goes on for years.**

Perceived Risk Remains in Japan

Fukushima Public Opinion

Do you worry about your family's health due to **external** exposure?



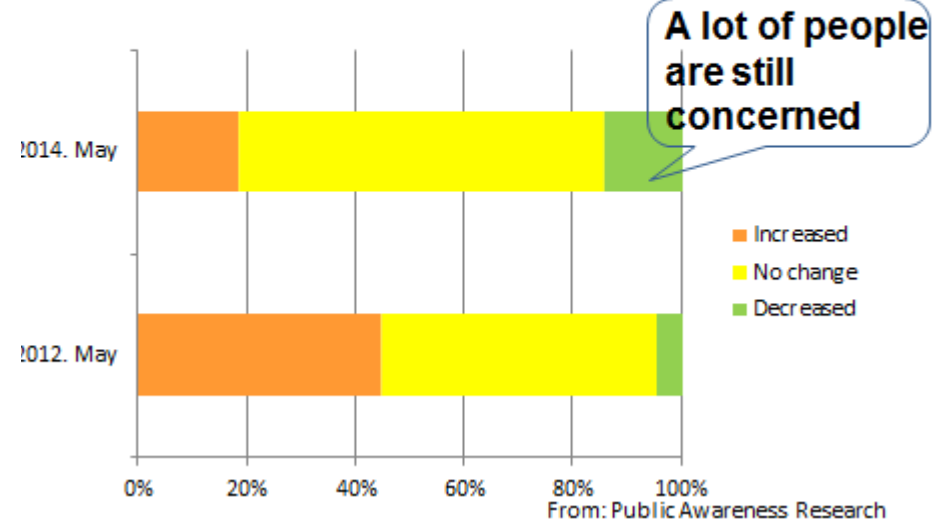
Many people still worry



From: Public Awareness Research

Fukushima Public Opinion

Has your concern about health issues due to **internal** exposure changed?



A lot of people are still concerned

From: Public Awareness Research

4. Current Situation in Fukushima ~Kido Dam~

The mud is 13,300 Bq/kg

But radiation was "NOT DETECTED" in tap water
So it's **SAFE**



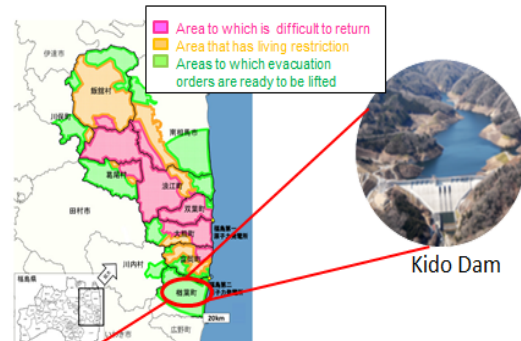
Government

Really SAFE?



Citizens

Current Situation in Fukushima ~Kido Dam~



Naraha town

Reference: Ministry of Economy, Trade and Industry

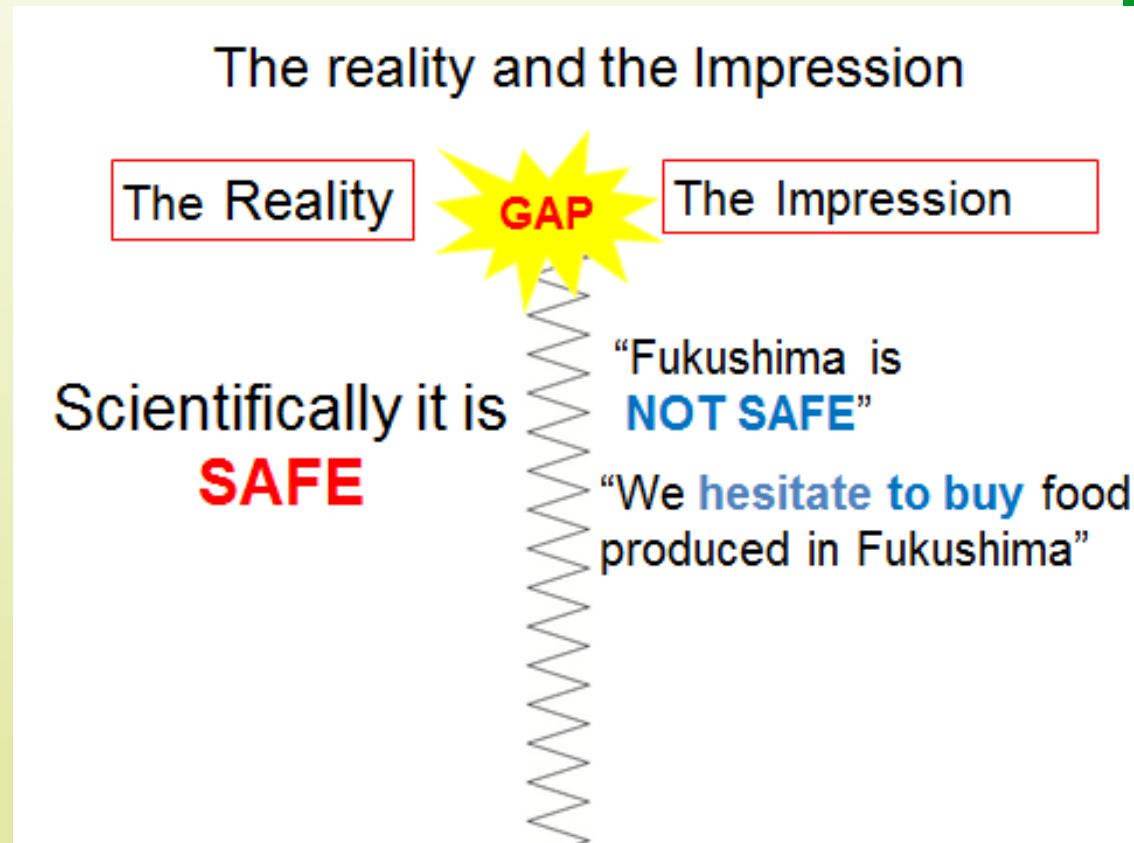
Question

If you were one of the citizens, would you drink that water?



Fukushima Prefecture Actual and Perceived Risk

- Risk perceptions are still prevalent and recognized in FP
- We are addressing actual risk
- We should also address perceived risk

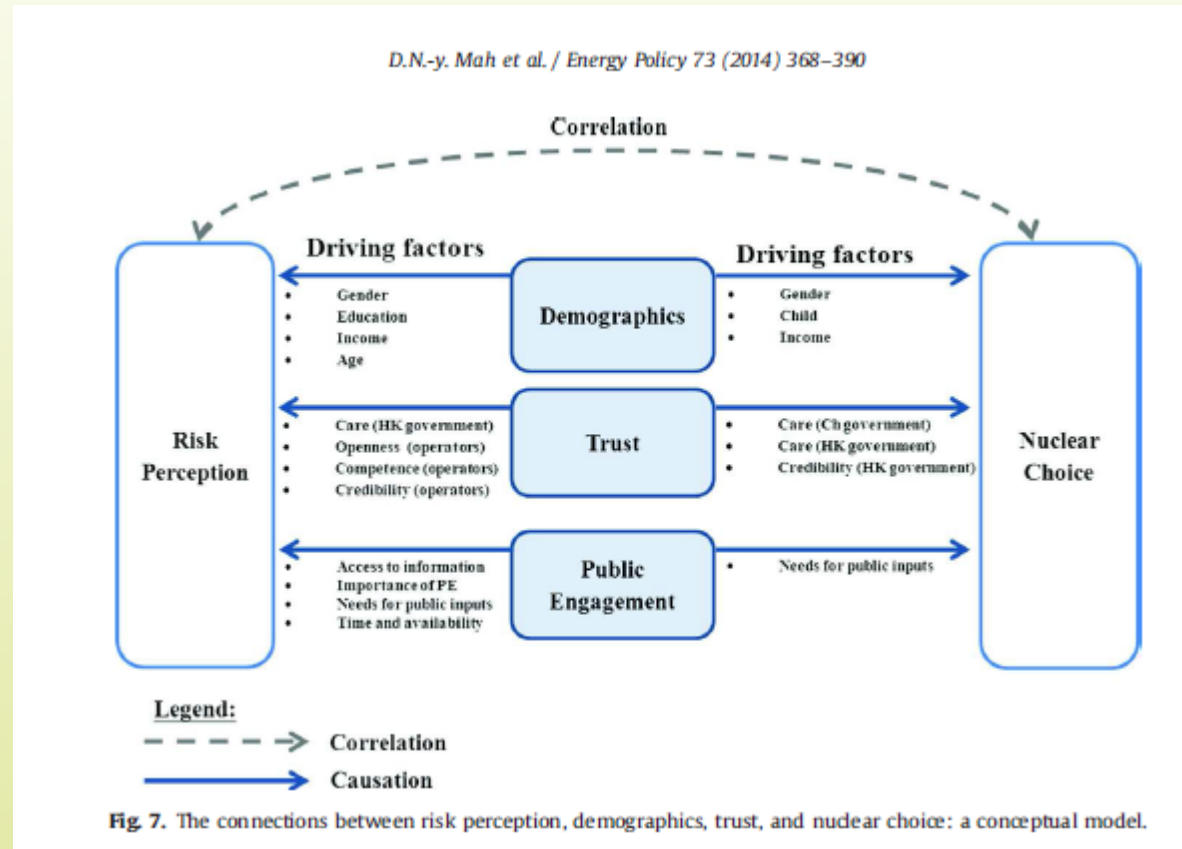


FUKUSHIMA
MEDICAL
UNIVERSITY

Measuring Risk Perception

- It can be quantified on a standardized scale
- Existence and strength of perceived risks can be assessed and correlated to specific demographic groups
- Risk Perception Factors are well vetted

Conceptual model of risk perception



Demographics, trust and perception of the effectiveness of public engagement are the major factors that explain

- high risk perceptions and
- opposition to nuclear related activities (remediation, waste treatment, etc.)

Complexity of the Risk Perception Factors

Risk perception factor (リスク認知に及ぼす要因)	Perceived risk of an activity will be greater when the activity is seen as: (知覚リスクの増大を引き起こすもの)	Risk perception factor	Perceived risk of an activity <u>will be greater</u> when the activity is seen as:
意志	無意識的又は意識的な負担を感じたとき	Volition	Involuntary or imposed
制御可能性	他者の支配下におかれている(自らコントロールできない)と感じたとき	Controllability	Under the control of others
慣れ	不慣れであると感じたとき	Familiarity	Unfamiliar
公平性	負担の分配が不平等で不公平であると感じたとき	Equity	Unevenly and inequitably distributed
利点	もたらされる利益が不明確で疑わしいと思ったとき	Benefits	Having unclear or questionable benefits
理解	十分な理解ができないとき	Understanding	Poorly understood
不確実性	どちらかといえば良くわからない又は不確実性が高いと思ったとき	Uncertainty	Relatively unknown or having highly uncertainty
起こりえることに対する恐れ	恐怖心(一般的なものから身がすくむようなものまで)や不安が呼び起こされたとき	Dread	Evoking fear, terror, or anxiety
可逆性	潜在的に取り消しのきかない逆効果があると思ったとき	Reversibility	Having potentially irreversible adverse effects
信頼性	信憑性に欠けると思ったとき	Trust	Requiring credibility
個人的な利害関係	人を自らにかつ直接的に危険にさらすと思ったとき	Personal stake	Placing people personally and directly at risk
倫理的/道徳的な性質	倫理的に好ましくない又はモラルに反すると思ったとき	Ethical/moral nature	Ethically objectionable or morally wrong

Additional issues to consider

- Which of these perceptions exist among the community?
- How strong are the perceptions?
- Which demographic groups does exist?
- What subgroup demographics exist?
- How they correlate to each other?
- How should messages be framed for the public, through which channels?
- Should they be captured in the Regulatory documents?
- What can we do to help?

Risk perception factor	Perceived risk of an activity <u>will be greater</u> when the activity is seen as:
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Personal stake	Placing people personally and directly at risk
Ethical/moral nature	Ethically objectionable or morally wrong

Relevance to Fukushima Prefecture

Background

- Massive amounts of monitoring data is available:
 - Multiple sources, multiple types of data
- Supports expert determination of actual risk i.e. “doses are within safe levels”
- Used for reporting doses ($\mu\text{Sv/h}$) as safe and/or comparable to other places:
 - Intended to convince people there is no health concern
 - Websites
 - Communications for perceived risks are limited
- **Is this approach effectively improving public acceptance?**
- **Is it aiding MS to make progress?**
- **Does it help MS to gain public confidence?**

Which of the risk perception factors might be relevant to the sub-populations of the Fukushima Prefecture?



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Psychological Effects (Fukushima Medical University survey)



Workers measure the radiation levels of sacks of unpolished rice in Nihonmatsu, Fukushima Prefecture, on Oct. 13, 2015. | KYODO

Fukushima researcher says region still 'stigmatized' by 2011 disaster

REIJI YOSHIDA
Staff writer

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EPIDEMIC OF FEAR

A bumper crop of thyroid abnormalities in Fukushima children, including cancer, has perplexed scientists and alarmed locals

By Donald Normile

The March 2011 meltdown at the Fukushima Daiichi Nuclear Power Plant caused extensive human suffering—evacuations, emotional trauma and premature deaths, disrupted jobs and schooling. What they have not caused, as far as radiation-related illness among the general public, and few specialists expect dramatic increases in cancers or other ailments. The nuclear crisis just a tenth of the radiation emitted by the Chernobyl disaster, winds blew much of that out to sea, and evacuations were swift. Yet one wave of illness has been linked to the disaster—the ironic result of a well-intentioned screening program.

Months after the disaster, Fukushima Prefecture set about searching the thousands of thousands of thousands of children and teens for signs of radiation-related cancers. The screening effort was unprecedented, and no one knew what to expect. As when the first round of exams started turning up thyroid abnormalities in nearly half of the kids, of whom more than 100 were later diagnosed with thyroid cancer, a frenzied erupted.

One result, says Kenji Shibuya, a public health specialist at University of Tokyo, was “overdiagnosis and overtreatment,” leading dozens of children to have their thyroids removed, perhaps unnecessarily. Activists interpreted the findings as evidence of the dangers of nuclear power. The large number of abnormalities appearing so soon after the accident “would indicate that these children almost certainly received a very high dose of thyroid radiation from inhaled and ingested radioactive iodine,” anti-nuclear crusader Helen Caldicott wrote in a post on her homepage.

Scientists emphatically disagreed. “The evidence suggests that the great majority and perhaps all of the cases so far discovered are not due to radiation,” says William Williams, a thyroid cancer specialist at University of Cambridge in the United Kingdom. In journal papers and in a series of letters published last month in *Epidemiology*, scientists have attacked the alarmist

interpretations. Many acknowledge that baseline data from uncontaminated areas were needed from the outset and that the public should have been better educated to understand results and, perhaps, to accept careful waiting as an alternative to immediate surgery. But most also say the findings hint at a medical puzzle: Why are thyroid abnormalities so common in children? The “surprising” results of the screening, Williams says, show that “many more thyroid cancer cases than were previously realized must originate in early life.”

NUMBERS OF CHILDREN got Japanese authorities worrying about thyroid cancer. The fallout from that April 2010 accident included radioactive iodine, which settled

everywhere. The day after the meltdown, Japanese authorities evacuated some 150,000 people living within 30 kilometers of the plant, and a week later they started screening for contaminated food. In addition, Fukushima residents were offered iodine tablets after the accident to block absorption of any radioactive iodine that managed to find its way into the food supply.

In 2010, WHO estimated that the 13 to 20 millirems (mSv) of exposure in the first year after the accident in the least-affected areas might result in minuscule increases in cancer rates. (Worldwide, people receive on average 2.4 mSv per year from background radiation; a medical chest x-ray delivers about 0.1 mSv.) WHO noted that females have a 0.5% lifetime risk of

developing thyroid cancer; it estimated that the highest exposures in the Fukushima area raised that risk by an additional 0.5%.

The initial round of thyroid screening, started in late 2010, was simply to provide baseline data, as any radiation-induced tumors were not expected to emerge for at least 4 years. Children with nodules larger than 1.0 mm or cysts bigger than 20.1 mm underwent a second, more detailed examination and, if necessary, fine needle aspiration. After the initial screening, children will have their thyroids examined every 3 years until age 10 and every 5 years after that.

Results were released as screening progressed, and right from the start there were surprisingly high rates

of abnormalities. Findings from the initial round of screening, completed in April 2010 and released in August 2010, showed that nearly 50% of the 100,456 subjects had solid nodules or fluid-filled cysts on their thyroids. Another studies elsewhere had hinted that tiny thyroid cysts and nodules were common in all ages. But “specialists

300,476

Number of Fukushima residents 18 and under whose thyroid screening results were available as Science went to press.

50%

Approximate fraction of those screened with solid nodules or fluid-filled cysts on their thyroids.

110

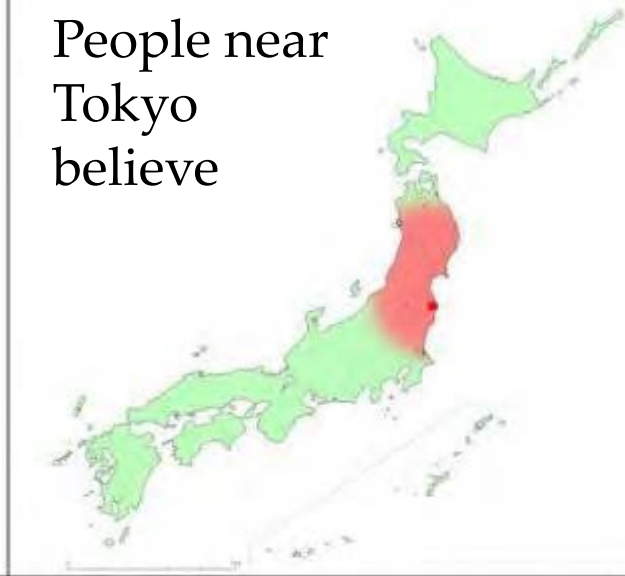
Number of thyroid cancer cases identified by December 2014 as a result of the screening.

MISCONCEPTION (PERCEPTIONS) OF CONTAMINATION EXTENT

People in FP
believe



People near
Tokyo
believe



People in
Hokkaido
believe



People in
Osaka &
Kyoto
believe



People in
Okinawa
believe

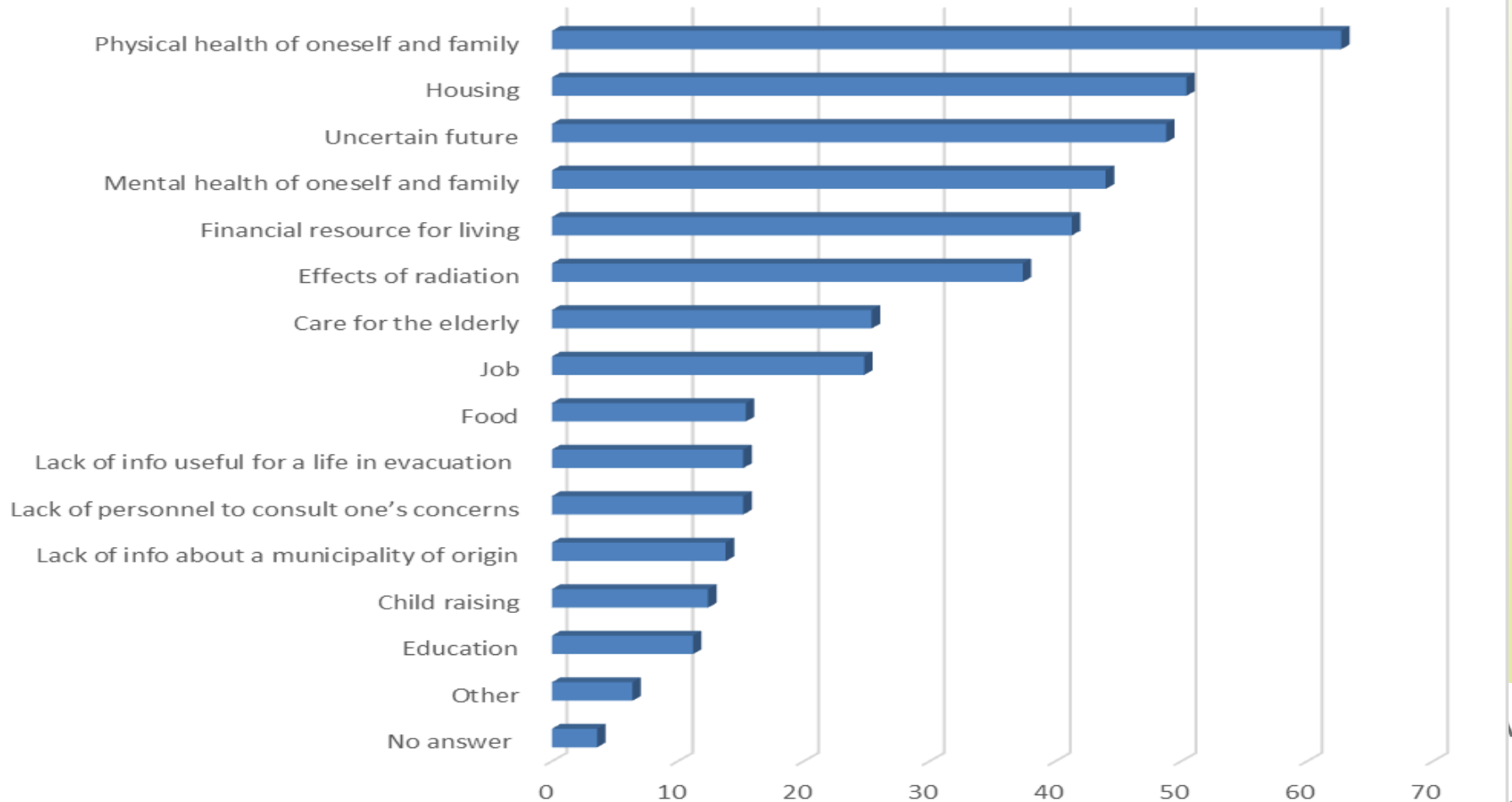


The World
believe



FY2014 Opinion Survey of Evacuees Current Concerns

% n = 18767 households



Source: Fukushima Prefectural Government

Understanding and uncertainty



Perceived risks of an activity is greater when the activity is seen as poorly understood, unknown and uncertain

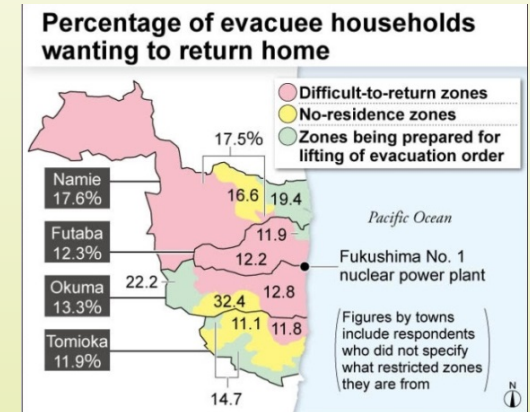
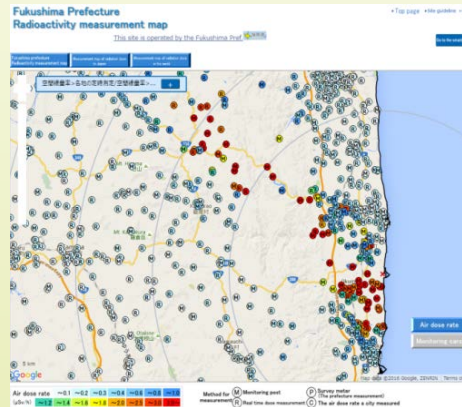


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Ethical/moral nature	Ethically objectionable or morally wrong

Way forward

IPARSC “Nutshell” picture

Actual Risk Assessments



+ Assessments of Perceived Risks



Fukushima Revitalization
relevant information

震災・原子力災害、復興情報はこちら

ふくしまからはじめよう。

Future From Fukushima.

Prime goal of the cooperation

- Provide support to the MS in securing public acceptance of remediation measures by addressing and integrating public risk perception with actual risk assessment of the population in the regions;
- Foster trust and acceptance (between stakeholders, operator and the affected population leaving in the affected areas);
- Ensure transparency through well documented professional judgments and with tailored risk communication based on perception of risk.

Planned activities

1. Collect and analyse experience from other countries;
2. Develop the MS specific framework for acquiring the risk perception data;
3. Acquire and develop risk perception survey by one or more methods;
4. Conduct risk perception survey, data analysis;
5. Incorporation the RPF results, into the final communication products.

Expected Outcome

1. Knowledge enhancement (a better understanding of, and context for, the technical data related to the remediation and waste management),
2. Informed decision-making (the incorporation of new data and understanding into more rational decision basis regarding the remediation and waste management initiatives),
3. Behavioural change (enabling choice and comfort with personal decisions affecting the return to normal life by resident and returning evacuees),
4. Consensus building (stronger cohesion and agreement among groups holding influence on the progress or direction of the remediation and waste management initiatives),
5. Public acceptance (improved regard and support for the role of the MS in the priorities and approaches to the remediation and waste management efforts).

Conclusions

- Population-based estimates of risk (dose) are difficult to convert into precise statements of individual risk:
 - The individual bases opinion and action on *perceived* risks;
 - Perceived risks are usually expressed through emotions (fears, anxiety, etc.) of consequential effect(s), not a given dose:
 - Latent cancers, childhood health, food and water safety, social stigma, economic security, etc.
- Monitoring data and dose reports are factual and necessary to assess actual risk, but insufficient to address perceived risk;
- Knowledge campaigns rarely convince people of the lack of concern...(experts lament “if the public just understood...”)
- If perceived risks go unaddressed, then the public remains unconvinced of the safety, and public confidence in the authorities is lost.

Take away message

- Education is important, but not sufficient to address perceptions of the affected population
- Need to understand perceived risks and demographics in order to:
 - shape risk communication for different demographic groups
 - improve public acceptance
 - reduce fear,
 - re-build trust

Thank you for attention!

The risk management is a two-way street: just as the public should take experts' assessments of risk into account, so should experts respect the various factors, from cultural to emotional, that result in the public's perception of risk (Paul Slovic).



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