LOCAL POPULATIONS FACING LONG-TERM CONSEQUENCES OF NUCLEAR ACCIDENTS:

LESSONS LEARNT FROM FUKUSHIMA AND CHERNOBYL

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FOREWORD

“Even though four years and six months have passed since the Great East Japan Earthquake and Tsunami disaster and the Fukushima Nuclear Power Plant Accidents, Namie Town people are still experiencing severe difficulties in their life after the mandated evacuation of all 21,000 residents that has resulted in scattered displacements away from their hometown within and across the prefectural borders. They experience precarious and temporary living conditions without a clear perspective for the future and without fair support and compensation to rebuild a meaningful life.

We have demanded of the central government and the Tokyo Electric Power Company (TEPCO) to take adequate measures in order to restore and to recover the lives of evacuees, but their responses have been very slow. Almost all evacuees face severe anxiety and feel extreme stress about their lives in the future. The number of disaster related deaths has increased to 370, including deaths in solitude.

These conditions are connected to a breach of fundamental human rights. Article 25 of the Constitution of Japan, which is a leading peace-oriented constitution in the world, states ***"All people shall have the right to benefit from the minimum standards of wholesome and cultured living. In all spheres of life, the State shall endeavour to promote and extend social welfare, security and public health."***

The Constitution of Japan also states ***"All people shall be respected as individuals. Their right to life, liberty, and the pursuit of happiness shall, to the extent that it does not interfere with the public welfare, be the supreme consideration in legislation and in other governmental affairs"*** (Article 13). Those who suffer because of the nuclear disaster have been deprived of their right to the pursuit of happiness. We, Namie Town Municipal Government must strive to recover these fundamental human rights. At the same time, we would like to request of everyone to thoroughly think whether humans should continue using nuclear energy that is not at all inexpensive, considering the costs of decontamination, compensation and radioactive-waste disposal, as well as its harmful environmental impacts.

I welcome the publication of this document that presents the outcomes of European and Japanese research on our deep and complex post-accidental problems. It is based on the experience of people suffering from the nuclear disaster and confronted with the threat of long term radioactive contamination in their day-to-day life, that we, Japanese people, share with the populations affected by the Chernobyl accident. It also takes stock of the experience

of people and organisations supporting the efforts of these populations to reconstruct a viable, dignified and meaningful life.

The recovery and reconstruction vision of our Namie Town stems from the following fundamental ideas: ***"Even though our people are displaced from our hometown, they are all Namie Town people"***, ***"We will regenerate our hometown Namie"***. The Namie Town Municipal Government will continue making its best efforts to assist townspeople to make a suitable choice for the recovery and reconstruction of their livelihoods, along with reconstructing infrastructure and monitoring the progress of thorough decontamination work (for which the central government is responsible) for the recovery of an appropriate environment for human livelihoods.

We respect the freedom of choosing where to live (i.e. coming back or settling in to another area) as a fundamental right for every townsperson. Therefore, the townspeople are entitled to receive support and fair and immediate compensation from the central government and from TEPCO, in order to rebuild their lives at individual and community levels. In addition, we are planning to seek opportunities to bring new types of industries, for example, to be a hub of renewable energy industries, in order to secure stable employment for townspeople. We kindly request assistance from EU and other international communities on this matter.

We have been facing many challenges. Your continued support is essential for us to carry out our responsibilities as a local public administrative office. ”

Tamotsu Baba,
Mayor of Namie Town
12th November 2015

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SUMMARY

The present report draws lessons from the experience of actors directly engaged in the mid- and long-term response to the consequences of a nuclear accident. It compares the post-Chernobyl context in Norway and Belarus, and the post-Fukushima context in Japan. In both contexts, local actors directly affected by post-accident situations as well as experts, authorities and NGOs (non-governmental organisations) supporting local populations have valuable insights to share. The report grounds on the work of the PREPARE European research project, the ETHOS European project, the CORE international cooperation programme, the FAIRDO project and the field experience of several NGOs as citizen based initiatives flourishing in democratic countries.

Nuclear accidents and their consequences severely disrupt the capacity of local actors to fulfil most of their basic needs (access to safe food and environment, housing, social relations, education of children, healthcare – in particular for elderly people...), whether they are living in a contaminated area or temporarily or permanently

relocated. Unlike the trigger of natural catastrophes, the source of this disruption – radioactive elements – remains persistent over the long term on contaminated territories, and return to the living conditions that prevailed before the accident is not an option. For affected people and families, the different economic, environmental, health, social, personal and family issues that arise cannot be addressed separately. They face the post-accident situation as a whole, and have to find their own ways through its irreducible complexity.

Complexity also arises with the disruption of the usual political and social mechanisms of coordination. Whereas upper levels of decisions are expected to bring support, information, expertise and means, many decisions and actions stay in the hands of local actors. The spreading of distrust impedes the building of a consistent multilevel societal response. The power of public authorities is challenged and economic activities like farming, herding, fishing, etc. are in danger. Local people and communities seek to recreate the conditions to access trustworthy and reliable information that is meaningful in their particular context, to understand the situation and to build relevant action. The capacity of local actors to build a response to the crisis, at a personal and community level, also depends on their capacity to build new forms of cooperation among themselves and with other actors.

Authorities, experts, NGOs, professionals and other actors are also confronted with the complexity of a post-accident situation, although unlike local populations they are not living this complexity to the same degree in their personal day-to-day life. There is a broad gap between the complexity of a post-accident situation and the modern organisation of public and private bodies in specialised silos able to tackle specific dimensions (health, radiological protection, environment, economy…) of a complex issue. The structural inability to address the situation in a holistic way may trigger various adverse and paradoxical effects. These other actors too must learn to think and act in a multi-actor, multi-layer and non-linear system of information and action, in which multiple public

and private actors from the local to the international level play a role and influence the response to the post-accident situation.

Failing to address complexity puts the whole system of actors at risk of entering a vicious circle of doubt, distrust, isolation and despair, where the social resources for action are destroyed. Where social distrust spreads, controversies are unavoidable. However, such controversies do not necessarily result in chaos and a worsening of distrust. They can also be seen as social processes which can, under favourable conditions, enable an assessment of the solidity and reliability of different pieces of information. By working through controversies, separating facts and values, all the actors participating in the post-accident context may trace a limit between what seems to be certain or at least reasonably reliable and what is more uncertain and questionable.

The experience gathered in this document shows that recovery processes after a nuclear accident are above all social processes which interact with technical, health, radiological protection, environmental and economic issues. While public policies, expertise, economic, financial and social support remain essential, recovery is made by people. They rebuild their personal and community life by addressing the multiple issues confronting them. They find new resources for understanding and action, individually and together. In the recovery process, the autonomy, resilience, capacity of action and freedom of choice of people and communities are therefore key elements.

Recovery is the outcome of the intermingled transition paths of local actors, authorities, experts, professionals and other public or private organisations, who progressively address complexity, build their own response to it and take into account (or not) the effect of their interactions. These paths are non-linear in a post-accident situation characterised by uncertainties, incomplete information and the need for non-specialised actors to manage radioactive contamination in their day-to-day life. Experimentation, trial and errors, revision of objectives and strategies are unavoidable.

Another dimension cannot be overlooked: mourning for the pre-accident situation to which there can be no return. These various paths interact while the post-accident situation unfolds. They can mutually reinforce or on the contrary hinder or undermine each other. Transition paths of local actors aim to recreate an overall quality of life in which radiological protection is only one dimension among others. Rebuilding a "life worth living" is their central concern for the long term.

Public policies can influence in a positive or negative way the social cohesion of the concerned communities at local, regional and national levels. The way public policies take into account the values of social cohesion (dignity, truth, honesty, justice, equity, solidarity, democratic culture) impacts the ability of the actors to build individual and collective response paths. Good policy integrates as a priority the preservation of the cohesion of the affected community. Solidarity between directly affected local communities and the national community (and possibly the international community) is a key condition of recovery after nuclear accident. Freedom of choice (e.g. to stay or leave, or to come back or not) is a major value. It is necessary to avoid discrimination and to provide equitable support to people who, for their own reasons, do not follow the mainstream.

The experience gathered in this document reveals three different phases of the post-accident situation, as the diversity of stakes and the complexity of recovery issues unfold. The first phase is the deployment of public policies aiming at protecting the populations, focussed on health and radiological protection criteria. In the second phase, decision-making processes are opened to the participation of citizens and stakeholders who refine and adapt public strategies aiming to rebuild economically viable, humanly dignified and socially meaningful living conditions. The third phase is a transformation of the governance system that takes into account the emergent nature of recovery processes. In this third phase, public policies aim not only to protect citizens but also to enable and support citizens and local communities in building their own life projects. These phases represent a shift of focus of

public authorities' strategies as well as of the goals of citizens and local communities, evolving from a concern of managing risks to a larger perspective of restoring human life quality (which includes risk management but is not limited to it).

Post-accident situation are too complex to be successfully framed, controlled or governed by traditional mechanisms of authority and expertise. Recovery must be recognized as a social process, and cooperation is needed to create favourable conditions for this social process to develop and make progress. There is no one-size-fits-all solution and public policies should accommodate multiple solutions. Public authorities, experts, NGOs, citizen initiatives, professionals, foreign institutions and other actors can support (or conversely block) this dynamic. Support will include: ensuring transparency on the situation and its assessment, preserving the margins of manoeuvre of the local actors, safeguarding social cohesion of local communities, supporting the initiatives of local actors and professionals, providing tools and processes for bridging the transition paths of the different actors, and making room for pluralistic assessment of the post-accident situation and overall responses.

SHORT PRESENTATION OF EXPERIENCES OF ACTORS ADDRESSING COMPLEXITY OF POST-ACCIDENT SITUATIONS

These vignettes briefly present the different actors and projects on whose experiences this document is based. A more detailed presentation of these experiences is provided as an annex.

Post-accident situations lived by local populations and by actors supporting them

TETSUYA ISHIKAWA

is living in the Date City contaminated area. He lived the difficult challenge of returning home to Fukushima Prefecture after a temporary relocation of his wife and children to another prefecture. As a project of life, this constitutes a personal and family transition path that is non linear and involves complex decisions for himself, his wife and children with multiple aspects such as protecting the family health, the provision of safe food, maintaining his job, preserving family bonds with his parents, the preservation of his identity and attachment to his native land, etc.

MUNEO KANNO

is the director of the Non-for-Profit Organisation "Resurrection of Fukushima" and farmer in Iitate village (a village evacuated after the accident and to which people have not yet returned). With the members of this NPO, he developed several projects to face challenges resulting from the accident and to build a transition path at the local community level. The philosophy that constitutes the framework of his action can be summed up by the sentence ***«We must protect gifts from the Earth which are blessings from Nature».***

NÆJLA JOMA

is living in the municipality of Snåsa, in the Nord-Trøndelag County in Norway. He belongs to the Sami community. Since the Chernobyl accident, as a reindeer herder farmer, he has to deal with the severe constraints associated with long term contamination of the herding areas. According to him, the authorities supported the Sami community by implementing public policies anchored in the Sami traditions and helped to adapt the traditional production methods to the new context.

INGER EIKELMANN

is Head of section High North of the Norwegian Radiation Protection Authority (NRPA). The Chernobyl accident is at the origin of long-term radioactive contamination in Norway that has severely affected the reindeer meat production of the Sami communities. NRPA has developed and implemented the Norwegian policy as regards reindeer meat production & consumption after the Chernobyl accident. Societal aspects were of particular significance when adjusting permissible levels in foodstuffs in the case of reindeer meat. Norwegian authorities managed a complex trade-off while implementing countermeasures in order to control the intake of contamination associated with the consumption of reindeer meat while preserving the Sami culture and traditions of reindeer herding.

MASAHARU TSUBOKURA

is a member of the Institute of Medical Science of the Tokyo University and a physician. His scientific speciality is leukaemia and bone transplantation. When the accident occurred, he volunteered to work in Minamisoma General Municipal hospital. It is important for him to share his experience of providing medical assistance and information for residents in the Minamisoma area, located 23 km from the Fukushima Nuclear Power Plant (NPP).

THE ACRO (ASSOCIATION FOR MONITORING OF RADIOACTIVITY IN THE WEST OF FRANCE)

is a French NGO created after the Chernobyl accident, which operates a laboratory for citizen watch on environmental radioactivity. It is carrying out citizens' expertise. After the Fukushima disaster, many questions coming from Japanese citizens or French citizens living in Japan were transmitted to ACRO. Answering the needs of citizens in the Japanese situation has been adopted as a strategic priority, and ACRO has notably produced some 600 analysis of contaminated environmental samples sent from Japan. It supported the creation of a citizen laboratory for the control of radioactivity in Japan that is a member of a global network of measurement stations.

DR HIROSHI SUZUKI

is a Professor Emeritus of Fukushima University. He is currently advising authorities of Namie Town, a community that is among the most affected in Fukushima district, has been evacuated and to which the inhabitants have still not returned. He is also cooperating with several other local communities in the Fukushima region. Dr Suzuki is an expert of urban planning and rehabilitation strategies. He was scientific coordinator of the FAIRDO project. He participated in the PREPARE project and notably in the Tromsø seminar (2014) where he presented the "reconstruction vision" elaborated by the Namie town office in 2012 and the community involvement process in Namie Town's decontamination and recovery process.

DR TAKEHIKO MURAYAMA

is a member of the Department of Environmental Science and Technology in the Tokyo Institute of Technology. He focuses his research on environmental policy, planning risk evaluation, management of environmental risk and assessment of social dialogue in decision-making processes. He has studied the siting process of disposal facilities for radioactive wastes in surrounding regions of Fukushima prefecture. He was involved in the FAIRDO project and participated in the PREPARE Seminar in Tromsø (2014).

PR. KENJI NANBA

is deputy director of the Institute of Environmental Radioactivity in Fukushima University, executive advisor to the President. His expertise is in the area of microbiology and his research before the accident was dedicated to micro-organisms in soil and also in water systems. His engagement on environmental radioactivity is linked with the Fukushima accident. It is a personal decision. On March 2011, he decided with several professors of the Fukushima University to start an initiative of environmental monitoring. He was involved in the FAIRDO project.

Supporting populations building their response to a nuclear accident: ETHOS, CORE and FAIRDO projects

THE ETHOS PROJECT (1996-2001)

aimed at developing a participatory approach to the rehabilitation of living conditions in the contaminated territories of Belarus. It was based on a cooperative methodology involving local inhabitants and a multidisciplinary group of French researchers. It started in the Olmany village (a voluntary relocation zone in the contaminated areas) in Belarus and was then extended to four other villages in the Stolyn District (Brest region). This approach was meant to complement the post-Chernobyl program of the government of Belarus. ETHOS was undertaken as a part of the European Commission Radiation Research Program, in cooperation with local, regional and national Belarusian authorities.

THE CORE (COOPERATION FOR REHABILITATION) INTERNATIONAL PROGRAMME (2003-2008)

was created in order to support the efforts and initiative of local inhabitants in the contaminated territories of Belarus in order to improve their living conditions. CORE addressed 4 priority areas: health protection, economic and rural development, development of a practical radiological protection culture, education and memory of the accident. The inclusive governance of the CORE program involved local governments and local populations of the affected areas as well as regional, national and international organisations.

FAIRDO
(ACTION AND RESEARCH ON EFFECTIVE DECONTAMINATION REFLECTING THE CIRCUMSTANCES OF THE CONTAMINATED REGIONS)

is an action research project launched in June 2012 in Japan to offer timely and appropriate advice and guidance to national, prefectural and municipal governments, supporting the effective implementation of initiatives for full scale decontamination undertaken from 2012 onwards, in the post-Fukushima context. FAIRDO formed a team of interdisciplinary experts from Japan and overseas, notably Institute for Global Environmental Strategies (IGES) as main coordinator, and European researchers who played a central role in the EURANOS and NERIS projects. The FAIRDO project was funded by the Environment Research and Technology Development Fund (1ZE-1203).

INTRODUCTION

Nuclear emergency and post-emergency situations produce complex challenges regarding nuclear safety, radiological protection, radioactive waste management, but also for almost all activities of society and lifestyles (in the contaminated areas and beyond) that are affected by the unfolding of the accident with potential dispersion of radionuclides in the environment and in goods.

Recalling that ***"displacement nearly always generates conditions of severe hardship and suffering for the affected populations"***, United Nations' Guiding Principles on Internal Displacement give guaranties to the concerned persons. In particular, ***"competent authorities have the primary duty and responsibility to establish conditions, as well as provide the means, which allow internally displaced persons to return voluntarily, in safety and with dignity, to their homes or places of habitual residence, or to resettle voluntarily in another part of the country. Such authorities shall endeavour to facilitate the reintegration of returned or resettled internally displaced persons."*** On the latter point, the

guiding principles stress that ***"special efforts should be made to ensure the full participation of internally displaced persons in the planning and management of their return or resettlement and reintegration."***

To support the capacity of affected inhabitants of contaminated areas to protect themselves, the UNECE Aarhus Convention (1998) guarantees access to information, public participation in decision-making and access to justice in environmental matters. This Convention, addressing environmental decision-making in general, also specifically addresses crisis situations, stating *(article 5.1.c)* that:

"In the event of any imminent threat to human health or the environment, whether caused by human activities or due to natural causes, all information which could enable the public to take measures to prevent or mitigate harm arising from the threat and is held by a public authority is disseminated immediately and without delay to members of the public who may be affected."

This report has been prepared by a group of academics and experts involved in several recent studies and projects addressing long-term post-accident radioactive contamination management in partnership with local inhabitants, local governments and national experts. Among ongoing projects, PREPARE[1] (2013-2016), supported by the European Commission, is completing a review of the conditions and means for local inhabitants to build a response to long-term consequences of nuclear accidents. Another meaningful research in Japan is the "Fukushima action research on effective decontamination operation" (FAIRDO[2]) that was undertaken from 2012 to 2014 by a group of Japanese researchers addressing the current status and issues at decontamination sites in the Fukushima context.

This document aims to give the reader a grasp on the reality of actual post-accident situations in the post-Fukushima context in Japan

and also in the post-Chernobyl context in Norway and Belarus. It grounds on the experience of people directly engaged in these contexts (see case studies in annex). This document specifically focuses on the populations living in or returning to contaminated areas. However, many people were forced to evacuate or left on their own in order to protect themselves from the radioactive pollution of these accidents. Many chose to relocate permanently to other places, where they will not be confronted by radioactive contamination. None of these choices is an easy one. Relocated people also face complex situations and suffer degradation of their living conditions. Ensuring actual freedom of choice both at the level of individuals and families and at the level of local communities requires not only institutional and legal frameworks granting it, but also actual access to information and expertise, financial schemes, and technical and methodological support for the construction of individual and collective choices.

The experience gathered in this document demonstrates how social processes deploy at the individual and community level in order to build the conditions for local populations affected by a nuclear accident to understand their own situation, access information, fulfil their needs, build their choices and reconstruct a meaningful life. It also shows how public policies can support (or conversely hinder) this societal process of recovery.

1. The PREPARE European research project (2013-2016) is notably studying the issue of information and participation of the public in nuclear emergency and post-emergency situations. It has produced both empirical information on how recovery processes unfold in Japan and in Norway, drawing the lessons on how the concerned people, families and local communities can build their own response to the consequences of the accident. PREPARE has received funding from the European Atomic Energy Community Seventh Framework Programme FP7/2012-2013 under grant agreement n° 323287.

2. In Japan, the FAIRDO project (Fukushima action research on effective decontamination operation) is an action research project launched in June 2012 to offer timely and appropriate advice and guidance to national, prefectural and municipal governments, supporting the effective implementation of initiatives for full scale decontamination undertaken from 2012 onwards, in the post-Fukushima context. It was coordinated by the Institute for Global Environmental Strategies (IGES). FAIRDO formed a team of interdisciplinary experts from Japan and involved a partnership with European experts from the NERIS network.

1

SECTION

COMPLEXITY OF POST-ACCIDENT SITUATIONS UNDERMINE THE EFFICIENCY OF TRADITIONAL POLICIES AND GOVERNANCE SYSTEMS

Local populations are confronted by the high complexity of a post-accident situation and the disruption of all areas of everyday life

In a nuclear post-accidental situation, the local populations are facing the disruption of their day-to-day life as a result of the short and long-term consequences of the accident. Local populations have to make numerous daily life choices (including the choice to leave with their family the affected area or to return). They must cope with invisible contamination as well as with a whole range of unfamiliar issues. Many new questions are dilemmas: leaving (for another place) or living in (returning to) a contaminated environment both drastically disrupts daily life and is a source of stress. There's no good solution. Food habits are also modified. In addition, such complex decisions have to be taken in uncertainty about the effects of the pollution and a lack of trustworthy information: "where shall I live with my family? What can we eat? How shall I continue to earn my living when many activities have been abandoned? Can I create the conditions for a healthy life for my family? How will my children get a proper education? What will be our social life when so many people have quit the area? How shall I talk about the future with my family? How can elderly people access medical care and social welfare services? …" (See fig. 1 below)

Inhabitants of contaminated areas are therefore facing strong complexity while their basic needs can hardly be fulfilled: feeding, housing, caring health, working, accessing education, leisure, connection to nature, social relations, breaches of their culture and history. The future of families and the relationships between generations are also damaged. Unlike natural catastrophes, the source of destabilisation, radioactive contamination, remains significantly present for a very long period (several generations at least in the case of some radionuclides).

For a person or a family, the different economic, environmental, health, social, personal and family issues that arise are not separable and cannot be addressed separately. They face the post-accident situation as a whole.

Complexity also arises with the disruption of the usual political and social mechanisms of coordination that are shaken by controversies, wherein the rationales of expertise are exposed to question. Whereas upper levels of decisions are expected to bring support, information, expertise and means, many decisions and actions stay in the hands of local actors. A spreading breakdown of trust impedes the building of a consistent multilevel societal response. Local populations thus have to recreate the conditions to access (and sometimes build by themselves) trustworthy and reliable information that is meaningful in their particular context, to understand the situation at the individual and community level and to build relevant action. The capacity of local actors to build a response to the crisis, at a personal and community level, also depends on their capacity to build new forms of cooperation among themselves and with other actors (e.g. experts and resource providers).

Figure 1 - disruption of all aspects of day-to-day life in a post-accident situation

• For Tetsuya Ishikawa, resident of Date, the Fukushima accident constituted a tremendous disruption of personal and family life. Basic human needs such as living together with his family, feeding his children, enjoying his life environment with his family or knowing which environment he wants his children to grow up in were suddenly jeopardised. Evacuating was only a temporary solution and the family's ties with their hometown led the Ishikawas to settle back in Date City and find practicable ways of life despite the contamination.

• For Næjla Joma, Sami reindeer herder, the Chernobyl fallout represented not only a major disruption of his family's economic means of subsistence but also raised questions about his family's health and the future of his children, when a fundamental trait of Sami culture, reindeer herding, was jeopardised by the situation of contamination.

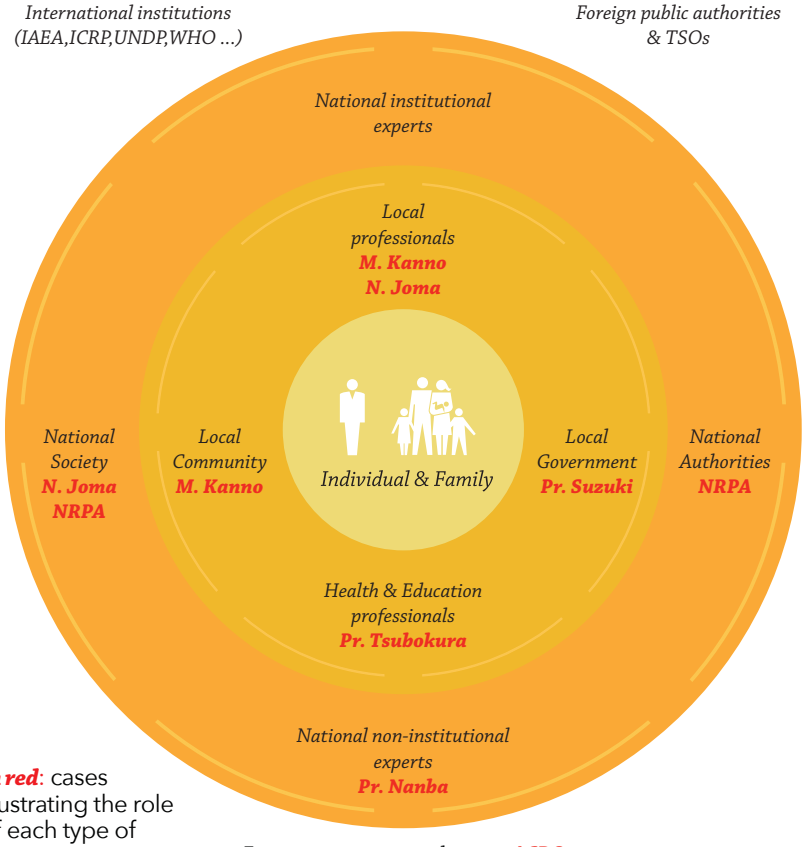
• Muneo Kanno is a farmer from Iitate village, which has been evacuated for a period of still unknown duration. Residents were resettled in different locations, severely affecting the social bonds within the local community and even ties within families. As the perspective of settling back to Iitate is still uncertain, Muneo Kanno's non-for-profit organisation struggles to keep the local community vivid and to foster the revival of the town's economic and social life.

• There are also many cases of people in Japan who chose to relocate themselves away from the territory polluted by the Fukushima disaster. Some others who were forced to evacuate now face the hard decision of whether to come back or not as the evacuation order is to be lifted soon. Opinion polls show that many of them will not come back. Some of them just started a new life. Some are trying to keep links with their original communities. These people do not benefit from support programs as do those who chose to come back, which raise questions regarding their actual capacity to make a free choice. Even for the people originating from the so-called "difficult to return zones", there is no specific policy to help them to rebuild a new life elsewhere.

Other actors are also confronted with complexity

If local actors and local communities are confronted by a high level of complexity, other stakeholders and decision-makers have also to cope with difficult issues and with a complex system of information and actions, integrating many types of actors at different levels from the local to the international level *(see Fig. 2 below)*.

Figure 2 - A complex and multi-layer information and action system



In red: cases illustrating the role of each type of actor

The power of public authorities is challenged by the disruption of the social equilibrium. They were not prepared to face the arising complexities and their first reactions might be intended to preserve their power. Citizen initiatives are sometimes seen as a threat rather than a solution. For central and regional authorities in charge of post-accident management, complexity arises in the possible conflicting goals and inconsistencies of their various remits, whereas authorities and public policies are most often organised in specialised silos. Trade-offs may be required (e.g. protection of health vs. safeguarding of economic or social activities) that can only be achieved in the local contexts by the people themselves. The design of post-accident public policies therefore requires a level of devolution to and cooperation with local actors. In particular, health protection and radiological protection policies impact other vital dimensions of the life of populations, which are also of concern for public actors: economic activities, social cohesion, the capacity of local actors to fulfil their needs by themselves. There are also cases where authorities have no answer to the questions of the local actors (e.g. because of lack of the appropriate resources at their level or because of lack of knowledge).

For experts, complexity lies in different factors. They are aware of uncertainties on the short term – regarding the characteristics of the accident – but also on medium and long term, for instance regarding the effects of low doses and long-term contamination on health and the environment. Moreover, a variety of fields of expertise need to be mobilised together to answer the questions raised by the populations. These questions are multidimensional, while expertise is organised in a sectored and specialised way. A third factor of complexity for experts lies in the fact that their role is not purely technical but also social as they are confronted by a diversity of interactions: between experts (inside and outside institutions), with authorities, with local populations, with media. The experts may be called upon to play a diversity of roles: understanding, characterizing and assessing the accident and its consequences, modelling and forecasting, explaining and communicating, advising decision-makers, advising

citizens, alerting on wrong development, criticizing, decisions… These roles may fit or contradict with the statutory requirements placed on the expert as an authority, technical support organisation, industry representative, academic, NGO, consultant. The credibility and the authority of some experts in charge of protection against radiation are challenged by the accident. Some adapt themselves to the new situation while some others refuse to accept the emergence and influence of new actors.

Some economic activities are endangered by post-accident situations. This is the case for farmers, herders, fishermen, … and electricity production companies. These groups are lobbying public authorities in order to preserve their activities or profits. Economic interests can sometimes conflict with the interest of ordinary people. When some groups and individuals will benefit from the post-accident situation, they might exercise influence that hinders recovery in order to serve their own interest. Professionals and businesses face complexity when seeking sustainable operating conditions, harmonizing new constraints linked to the post-accident context, restoring added value and working towards renewed trustworthiness and transparency with the various stakeholders. In a globalised market economy, goods and services are highly dependent on the choices of consumers. Therefore, even limited radioactive contamination of a territorial environment can entail important consequences of economic activities as it jeopardises the relationships with consumers.

- Norwegian authorities saught to addressed health, radiological protection and economic issues after the Chernobyl fallout polluted Norwegian territories. However, they soon discovered that they were confronted by a much more complex problem: how to ensure sustainable continuation of the Sami culture and way of life?

- In the ETHOS project, a team of experts (including radiological protection experts) directly confronted by the complexity of the

post-Chernobyl situation at the scale of a village, worked directly with the local population. They had to change the way expertise was built and delivered in order to answer the needs of the villagers and find with them means to answer their own questions (Is the milk given to the children contaminated and how? How can we lower the level of contamination in the food? How can we increase the revenue from our farming activity? etc.)

- In Japan, central authorities did not provide the local population with micro-scale contamination mapping. This detailed mapping was produced by citizens or by local authorities, sometimes separately, sometimes in cooperation.

The risk of a vicious circle of doubt, distrust, isolation and despair

Long-term radioactive contamination impacts multiple dimensions of the life of the inhabitants. The complexity of the situation lies in the fact that each affected dimension (heath, environment, social cohesion, business, leisure, education) cannot be addressed separately from the others. Public policies "in silos" are impeded from addressing efficiently the actual multidimensional problems encountered by the population.

A nuclear accident reveals failures and shortcomings of nuclear safety systems. As a consequence, it challenges the trustworthiness of the national experts and politicians who supported nuclear energy. Even when the accident occurred abroad and where there was no nuclear energy (like in Norway), the magnitude of the impacts faced by local people can jeopardise social trust and the credibility of public authorities.

In many cases public institutions and operators actually contribute to jeopardizing social trust and their own credibility, by tending

to withhold information or failing to acknowledge the reality of the radioactive release (intentionally or not). The citizen efforts to monitor the radioactive releases and fallout are often undervalued. Even in the post-accident phase, many shortcomings are reported such as institutional lack of capacity and will to manage the situation in a transparent manner.

In post-accident contexts, the efficiency of conventional public policies is impeded by the breaking of social bonds and the arising of distrust in the population vis-à-vis the various kinds of political, professional and scientific authorities. Local actors and communities are often left without social recourse, creating thus isolation and despair among the victims.

Moreover, in a system of expertise and information characterised by the diversity of expertise sources and institutional positions of experts, and the multiplicity of information channels including social media and mass media, people face contradictory information. They have to build up their own assessment of the situation. This process takes time.
Controversies do not necessarily bring chaos. They instead may aid people to assess the reliability of information and information sources, by helping to reveal the elements and rationales of disagreement and to assess the commonalities and differences between disagreeing experts and information sources. Conversely, controversies in which experts disqualify each other's opposing views may not gather the necessary elements for people to make their own assessment. Trustworthiness of information for people and families confronted by the consequences of a nuclear accident does not lie only in the level of trust of one actor towards a given source, but is also the result of the interactions between the different experts and information providers.

While attempting to rule the actions of local actors with standards, public policies may paradoxically reduce the margins of manoeuvre necessary for the local actors to address the complexity of their situation and to recreate the conditions under which their needs can be fulfilled and their lives recover meaning.

Instead of the traditional approach which blindly seeks for a single solution and aims to (forcibly) reach a consensus, it is important to have round-table discussions that enable stakeholders to express and respect different opinions and priorities, and identify multifaceted solutions. Experts play a key role by calmly, professionally and effectively facilitating discussions between government officials and citizens.

There are many illustrations of this situation, where for instance local people do not trust authorities views on the assessment of the level of contamination or on the risk entailed by living in (or conversely being evacuated from) a contaminated area, leaving people alone in front of uncertainty. Regarding the question of complexity, one can for instance observe in several contexts of long term contamination the difficulty of public policies to address in a comprehensive way the question of preventing exposure, the goal of restoring living conditions together with achieving a proper level of transparency on the rationales of choices and trade-off vis-à-vis the public.

After the Fukushima accident, many citizen initiatives emerged because the authorities were discredited. Even the Japanese Prime Minister did not trust his administration and TEPCO's because of the failure to acknowledge the triple meltdown. Failures to acknowledge the situation continued in post-accidental phase: leaks of radioactive water into the ocean were only acknowledged in 2013 and it took one year for the authorities to inform the population about the dust dispersal from reactor n°3.

Citizens also performed measurements with radiometers but this was first considered as «amateur work» by the authorities before they acknowledged the results in October 2011. Authorities still are hesitant to acknowledge the worries of the population that are disqualified as «harmful rumours». But citizens forced the process to be more open. They did their own mapping in parallel with the authorities' work and set up measurement stations to control foodstuffs and internal contaminations. As a result, contamination

maps are well known and there is no longer any scandal related to suspected food contamination.

The inappropriate withholding of information by the Japanese government and TEPCO and associated confusion in the initial disaster-response phase severely affected not only evacuation of citizens and communities but also the process of disaster reconstruction and recovery. The Fukushima accident has triggered and enlarged feelings of anxiety, frustration, distrust and anger, leading to fractures and tensions between/within communities and families.

In Norway, trust in the NRPA was questioned by some Sami who saw their living conditions threatened. They cross-checked NRPA radioactivity measurements by having samples tested in Sweden. Confirmation of the reliability of NRPA measurement was a factor in the process of building trust between NRPA and the Sami communities.

2

SECTION

RECOVERY IS A SOCIAL PROCESS

Recovery processes are made by people

The main driver of post-accident recovery is people themselves at personal, family and community levels. The possibility for the local actors to access reliable and trustworthy information, according to their needs, and to build their own responses to the consequences of a nuclear accident depends not only on their own skills and resources but also on their capacity to build new forms of cooperation in a context in which the traditional patterns of trust are jeopardised and in which there is a lack of meaningful indicators supporting assessment the situation. The societal dimension of the local response to a post-accident situation is therefore of key importance.

The rebuilding of projects of life for their families and communities is at the core of the concerns of local actors. It integrates human and social dimensions, questions of health protection or economical viability, and includes capacities to regain autonomy and dignity – individually and as a community. Recovery is not only an issue for people staying or returning to contaminated zones but also for people rebuilding their lives in a new place.

- In Norway, recovery of the Sami community was made possible by the construction of new relationships with health and radiological protection authorities, exchanges with other Sami communities in neighbouring countries and the building of a social consensus within the whole Norwegian community to save the Sami culture as a national priority.

- The CORE programme recognised the key role of local actors in recovery and aimed to support initiatives by local actors, partially devolving governance of the recovery process.

Recovery is made of intermingled transition paths

Taking into account the social nature of recovery, one can observe that the response to a post-accident situation intermingles several parallel transition paths towards recovery:

- The personal/familial paths through which each person or family affected by a post-accident situation tries to understand the situation, creates visibility on the possible choices (including the alternatives of staying, leaving or returning to their home in the contaminated area) and progressively rebuilds a new way of life taking into account the new situation;

- The local community path through which the local actors (local authorities, professionals, families, …) build together a community response despite potential destruction of social bonds by the post-accident situation. There is no assumption here on the degree of coherence and vitality of the territorial response to a post-accident situation, which can range from chaos to a cohesive and resilient response of local communities. The challenge here for the local community members is to share common views on the situation and its future, trying to bring together the various stakes for the different categories of actors while taking advantage of the resources available from other governance levels.

- The path of central and regional authorities in charge of post-accident management, which deploy public policies, countermeasures, strategies, resources, regulations, standards, incentives, cooperation with local actors, … in order to fulfil their duties according to their respective mandates.

- The path of institutional and non-institutional experts mobilising scientific and technical resources to provide elements of information and interpretation useful for the families, local communities and central and local authorities. Experts' interactions (among themselves as well as with other stakeholders) can alternatively enable local actors to build trustworthy and pluralistic information

or on the contrary hinder the recovery process as a result of the absence of sound dialogue among the various components of expertise.

• The path of professional sectors (e.g. rice production, reindeer production, industrial sectors, …) that try to rebuild viable operations, mobilising their own means and expertise as well as resources brought by authorities or institutional and non-institutional experts. These paths are non-linear in a post-accident situation characterised by uncertainties, incomplete information and confrontation of non-specialised actors with contamination management issues in their day-to-day life. They include an irreducible dimension of experimentation, trials and error, adaptation of the frameworks of comprehension of the situation, revision of objectives and strategies. In many cases, these paths include a dimension of mourning vis-à-vis the situation previous to the accident, to which there can be no return. The various paths interact as the post-accident situation unfolds. They can mutually reinforce or on the contrary undermine each other.

Transition paths have to be viable (politically, socially, financially, …) at each step for each category of actors.

Transition paths of local actors aim to recreate a global quality of life in which radiological protection is only one dimension among others (e.g. economic, social, cultural dimensions). Rebuilding a "life worth living" is for them a central concern for the long term.

Crowdsourcing and citizen-led measurement systems represent a potential for monitoring of radioactivity at the local level far beyond that offered by institutional capabilities. In the post-Fukushima context, citizen initiatives to perform measurements were at first disregarded by authorities, then were tolerated and even sometimes encouraged (e.g. by providing measurement devices to citizens to identify hotspots within their municipality). Development of a practical and contextualised radiological protection culture among local residents was facilitated by health professionals *(see the experience of Dr.Tsubokura)*.

• Tetsuya Ishikawa's experience shows a personal and family transition path made of successive choices, from initial evacuation to relocation in another area and eventually return to the hometown.

• Naelja Joma's experience shows a transition path made of destabilisation, defiance, testing authorities, and then aiming at rebuilding meaningful living conditions.

• Muneo Kanno's initiatives through the non-for-profit organisation "Resurrection of Fukushima" aim to build a recovery path at the level of the local community.

• In the three above-mentioned experiences, the concept of project of life at family and community levels is at the core of local concerns.

• The experience of the Norwegian Radiation Protection Board shows trial and error in the construction of Norwegian's policy for reindeer herding. In this context, constructive interactions were built between national authorities and the Sami community.

• The ETHOS project, the CORE programme and the FAIRDO project are different attempts to build bridges between the transition paths of various actors at different levels.

Public policies are able to support or on the contrary to hinder the transition path

Public policies can influence in a positive or negative way the social cohesion of the concerned communities at local, regional and national levels. The evacuation policies can for instance weaken the social bonds within a local community depending on how they are organised. The economic compensation schemes based on radiological protection criteria can generate frustration, local conflicts and also weakening of social bonds among

in habitants. The allocation of compensations can generate situations perceived as unfair when for instance two neighbours receive treatments significantly different when only minor differences are observed in the measurement of their radiological situations.

Public policies can conversely integrate as a priority the preservation of the cohesion of the affected community. The way public policies take into account the values of social cohesion (dignity, truth, honesty, justice, equity, solidarity, democratic culture) impacts the ability of the actors to build individual and collective pathways towards cohesion.

- The evacuation policy of Iitate village in Japan (see the experience of Muneo Kanno) was essentially based on radiological protection criteria, resulting in the split of the village in three different categories depending on the dose rate, breaking up the local community and weakening social and family bonds.

- In Norway, post-Chernobyl public policies were notably based on a notion of national solidarity with the Sami population (see the experience of Naelja Joma, Inger Eikelman and Astrid Liland). A double standard allowing reindeer meat was adopted in order to maintain its consumption both by Sami consumers and by the general public.

- The international CORE programme (2003-2008) for the rehabilitation of living conditions in the contaminated territories of Belarus created room for dialogue between policy makers and local actors, taking into account the existence and lessons of local projects in the development and implementation of public policies in a non-democratic context.

3

SECTION

LESSONS LEARNT

From managing risks to rebuilding life, a three-step recovery process

The experience of post-accident path of the concerned categories of actors suggests the existence of different phases of the post-accident situation, as the diversity of stakes and the complexity of recovery issues unfold. Those three successive steps can be described as follows:

1. Deploying public policies aiming at protecting the populations, focussed on health and radiological protection criteria[1]. During this phase, local actors and independent experts develop autonomous self-protection actions (spontaneous evacuation, monitoring…). A question for the short-term response is how public policies can connect with emerging social initiatives to mutually reinforce their efficiency.

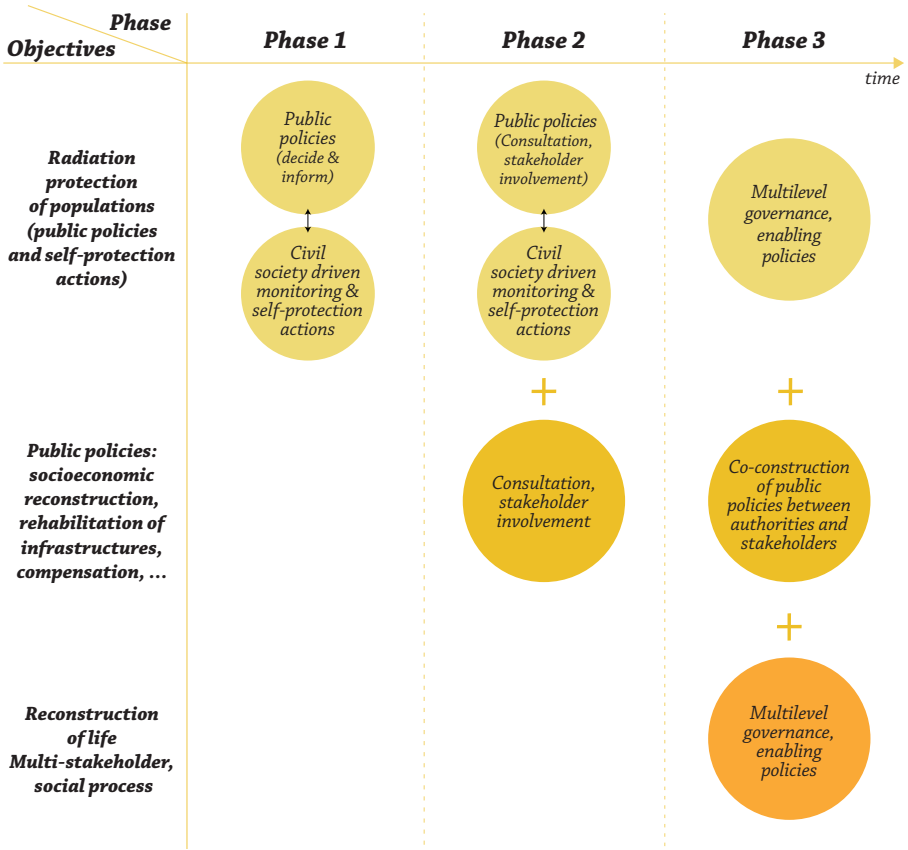
2. Acknowledging that there is no return to the previous state and opening decision-making processes to the participation of citizens and stakeholders in order to refine and adapt public strategies aiming to rebuild economically viable, humanly dignified and socially meaningful living conditions[2]. In this phase, public policies aiming at protection of populations also adapt, making room for stakeholder input.

3. Transforming the governance system in order to take into account the emerging nature of recovery processes. In this third phase, public policies aim not only to protect citizens but also to enable and support citizens and local communities (which are not limited to local governments) in building their own project of life. Devolution mechanisms are introduced in the post-accidental management, to stimulate and encourage citizen initiatives, and to adapt public policies in order to increase synergies[3].

1. See the experience of Muneo Kanno, Naelja Joma, Prof. Suzuki, Dr. Murayama.
2. See the experience of Prof. Suzuki and Dr. Murayama.
3. See ETHOS, CORE, FAIRDO, Muneo Kanno and Naelja Joma.

The above three steps represent a shift of focus of public authorities' strategies as well as of the goals of citizens and local communities *(see figure 3 below)*, evolving from a concern of managing risks to a larger perspective of restoring human life quality (which includes risk management but is not limited to it).

Figure 3 - Public policies enabling social processes of recovery



Moreover, the process of recovery cannot deploy without connections to the issues of how to avoid being confronted by a similar situation in the future.

This includes:

- Implementing emergency and post-emergency preparedness provisions,
- Implementing Public Information and Participation provisions around existing nuclear activities as well as around post-accident management (in the perspective drawn by the UNECE Aarhus Convention in Europe), in order to engage civil society in decision-making on nuclearsafety and radiological protection and to enhance safety culture.
- Re-examining the justification of the activity that is at the origin of the accident, in the wider perspective of a sustainable energy policy.

A key challenge: supporting a social dynamic of recovery

Post-accident situation are too complex to be framed, controlled or governed by traditional mechanisms of authority and expertise. Because of this complexity, recovery processes cannot be reduced to the implementation of good public policies. They mainly constitute a social process interacting with technical, health and environmental issues. The initiatives of actors lying outside the traditional governance system constitute in this context a major resource. It is therefore necessary to create favourable conditions for this social process to develop fruitfully, enabling adapted responses to the complexity of a post-accident situation. There is no one-size-fits-all solution and public policies should accommodate multiple solutions (e.g. preserving individuals' options to eat food within the contamination limits or to choose a higher level of precaution by having food with a contamination level which is below the maximum admissible level).

Acknowledging the societal nature of post-accident recovery processes does not necessarily mean that such a social process will effectively and successfully develop. Various actors can bring support or conversely bring obstacles to this dynamic: public authorities, experts, NGOs, citizen initiatives, professionals, foreign institutions… Taking stock of the various experiences presented in this document reveals several ways of supporting recovery dynamics:

- **Safeguarding social cohesion of local communities**, a key resource for recovery: public authorities at national or regional levels as well as experts or NGOs can help the recovery process by taking into account the effect of their actions on the social cohesion of affected communities and incorporating key social values, such as dignity, truth, honesty, justice, equity, solidarity, democratic culture, throughout their implementation. In particular, solidarity between local communities affected by the consequences of a nuclear accident and the national community (and possibly the international community) is a key condition of recovery processes. However, freedom of choice (e.g. to stay or leave, or to come back or not) cannot be ignored for the sake of social cohesion. It is also necessary to avoid discrimination and provide support in equal measure to people who refuse to follow the mainstream.

- **Preserving the margins of manoeuvre of the local actors:** protection policies have to set clear regulatory and normative framework for radiation protection. However, the way radiation protection is implemented should also leave sufficient margins of manoeuvre for actors to organise themselves and mobilise their capacity of initiative: protection should be achieved not only for people but also with people (and avoid being achieved against them). For instance, radiation protection policies in the field of food production should set standards for the maximum admissible contamination of food, but should leave the producers free to choose their own ways to comply with the standards. Developing new margins of manoeuvre goes with local actors developing a "practical radiation protection culture", which is a degree of

understanding of their specific situation, of contamination transfer mechanisms in their own context, access to measurement capacity and a capacity to develop their own strategies, possibly with the support of other actors (in particular experts). These strategies are grounded not only on the existing standards but also on their own analysis of the situation, on some experimentation in their own context and on the information that they deem reliable and trustworthy. This also implies to recognize the possibility (and legitimacy) for local actors to set their own protection objectives, which could be more stringent than the existing standards. For instance, a mother can seek to give her children food that is uncontaminated, or that is contaminated at a lower level than the maximum admissible contamination levels.

- **Supporting the initiatives of local actors and professional:** the construction of transition paths by local and professional actors can be supported in different ways. Providing these actors with financial and material resources can help them to find a sustainable path of recovery by lowering the obstacles to experimentation. The additional costs entailed by the situation of contamination (e.g. measurement costs, counter-measures…) should be supported over the long term in order to avoid economic depletion. Making available expertise and facilitation resources is an effective way of supporting local and professional actors (see e.g. the ETHOS and the CORE programme). These expertise resources can be brought by institutional or non-institutional or foreign experts. Taking into account the complexity of post-accident situations, the availability of a diversity of expertise resources is a real asset.

- **Transparency:** The information and data related to the disaster that are available to public authorities should be disclosed as early as possible, letting people know when there are uncertainties and acknowledging when knowledge is missing (according to the recommendations for implementation of the Aarhus Convention). There is a strong need for a system for prompt and transparent information communication during emergencies. Publishing data alone is not enough. There is also a need for reviews and analysis of

the available data to find general trends that could help the decision. The conclusion of such work should be done in a pluralistic way, explaining consensus and dissent.

- **Making room for pluralistic assessment:** on the long term, an evaluation process involving the various stakeholders should be created to assess the rehabilitation policies and affect the supporting funds.

- **Bridging the transition paths of the different actors:** while the various actors confronted by the consequences of a nuclear accident are building their own transition path based on their own choices and trade-offs, these paths can interact in a positive or negative way. It is therefore important that the various actors could have regular rendezvous points where they can share their views and their experience, evaluate the emerging outcomes of the interactions between their initiatives and have the opportunity to agree on common objectives. It is notably important that the different types of actors can take part in the decision-making processes related to standard setting, infrastructures reconstruction…. Such interactions can be facilitated through forums in which private and public actors can frame together issues, build a common understanding of the situation and agree on common strategies (or at least identify subjects on which they disagree). The multi-level governance frameworks can usefully create interactions between local and regional initiatives and upper-level actors and policies. Facilitation and mediation resources are therefore of primary importance for enabling the creation of synergies between the transition paths of the different types of actors.

Enabling synergies between public policies and emerging initiatives

As soon as supporting conditions are set up for the development of a social process of recovery, emerging initiatives can not only co-exist with public policies but also complement and be in synergy with them.

Public policies can ground on the powerful capacities of social groups and communities to address complex issues of protection and recovery. As much as possible they have to create a favourable enabling environment, with post-accidental recovery policies based on subsidiarity with mechanisms of devolution enabling local actors to lead the process of recovery.
The several experiences presented in this document demonstrate the capacity of people, families and local communities to contributing effectively to their own protection as well as to the recovery process.

The public authority's role in the governance system has to evolve while the post-accidental situation unfolds. A progressive reconfiguration of the governance regime should address the needs of the local actors and professionals enabling their initiatives to become the primary energy of the recovery process. Public authorities and their experts have to develop capacities and skills of facilitation in order to support the social recovery processes.

Recovery requires new solutions, which means that the priorities of the research policy should be reconsidered. Experts involved in the recovery activities should be involved in the new governance. Citizen science should also be supported.

Along the development of the post-accidental situation, local actors and communities have to build their own evaluation and to gather in this perspective reliable information of both technical and

non-technical nature. This entails the recourse to other knowledgeable actors (e.g. physicians or educators) having relevant expertise that are able to validate translate, contextualise and give meaning to the technical information in the context of the local actors, thus providing great added value as soon as conditions are met for mutual trust.

Linking local people to independent sources of information by no means replaces the public authority's role and duties in providing the population with accurate information on the post-accident situation. It contributes to paving the way to the rebuilding of social trust as soon as the conditions are met for a sound dialogue between institutional and non-institutional experts.

CONCLUSION

As demonstrated by the experiences gathered in this document *(see annex)*, nuclear accidents and their consequences confront people with an issue that is at the same time of economic, sanitary, environmental, social, ethical, cultural and familial nature. This complexity cannot be legitimately addressed in the place of local people or on their behalf, as they are the only ones capable of and legitimate in balancing all these dimensions. Thus, post-accident situations fundamentally challenge the modern ways of understanding our environment, building decisions, public policies and taking public and private action, which consist of separating issues into different sub-questions that should be addressed by specialised organisations or experts.

Nuclear accidents and their consequences confront people, institutions and structures with irreducible complexity and force them to imagine new ways of building their understanding of the situation, building a new life that will be different from that known before the accident, whatever their choice – to return or to rebuild their lives in a new place.
Because of the extreme complexity of post-accident situations, societies and institutions cannot be prepared for nuclear accidents and their consequences in the usual meaning of preparedness, reserving resources and setting up routines, and procedures that can temporarily replace jeopardised systems of decision and action in order to facilitate a return to normality.

In effect, in these situations, it is important to acknowledge that recovery processes are not only a matter of management, decisions, standards, resources, infrastructures and expertise but also rely heavily on the capacity of local actors to build new networks, social resources, trustful relations and governance schemes. Recovery is above all made by people, and their capacity to think and act together is as important as their individual capacity of action. In the recovery process, autonomy, resilience, capacity of action and freedom of choice of people and communities are key elements.

The deployment of such a social process of recovery cannot be decreed, nor is it guaranteed by the mere reconstruction of favourable economic and material conditions. Various actors like public authorities, experts, NGOs, foreign institutions, can bring support or conversely hinder this social process of recovery. The post-accident policies should however focus on enabling and supporting local people and local communities that engage this long and costly effort of rebuilding a life that is worth living. In this perspective, the implementation of Public Information and Participation provisions as drawn by the UNECE Aarhus Convention in almost 50 countries of Europe and Central Asia is a major step in enabling civil society engagement in the decision-making along the successive phases of accident management and recovery processes.

ANNEX - EXPERIENCES OF FUKUSHIMA AND CHERNOBYL POST-ACCIDENT SITUATIONS IN JAPAN, NORWAY AND BELARUS: REBUILDING A MEANINGFUL LIFE

Returning home to Fukushima from exile in another prefecture - Tetsuya Ishikawa, representative of residents living in the contaminated area in Date

Tetsuya ISHIKAWA is a citizen living in the Date contaminated area. He has two children; two boys who were 5 and 3 years old at the time of the Fukushima disaster. He decided to return to his home in Date with his family after 2.5 years relocation in Yamagata city. The area where the Ishikawa family lived surrounded by nature was contaminated. The earthquake destroyed their environment of lifeline and the water supply was interrupted for 10 days. Even if they wanted to evacuate, they could not refuel their vehicles as the gas stations were closed.

Facing these sudden changes in their environment, they had to deal with many factors. Regarding personal factors, Mr Ishikawa could continue his job but it meant having a duplicated life away from the new evacuated home of his family. Regarding environmental factors, he had no idea where to evacuate and when was the right time to do it. He had no other choice but to listen to the announcements made by the State and TEPCO while the protective measures to avoid radiation were difficult to understand. Around June 2011, the family were finally able to purchase a dosimeter and they performed measurements in the following months. The measured dose rates were ranging from 0.55 to 3.82 μSv/h nearby – the highest value was near his house, the lowest near his children's school.

In July 2011, the decontamination process ended, but the radiation levels did not go down significantly. At this time, his wife and his children were using the summer vacation from the kindergarten, on a short-term recuperation in Ito City, Shizuoka prefecture. During this period, the stress he experienced from the radiation contamination filled him with a despair he had never felt before.

No visible changes to natural environment meet the eye. But in reality, there were so many issues to which he could not find solutions (exposure 24h/day, food and internal exposure, effects on mental and physical growth, uncertainty regarding the future, and loss of hope). The two months he was separated from his wife and children felt for him like two or three years. His children experienced for the first time a life with only their mother. They became confident that a long-term evacuation could be possible after this first try during summer vacation. But he also noticed that his young children were very attached to the place where they grew up, played and learnt the basics. Fukushima was their home and they could not easily move from this place and live in a totally different environment. During the separation from his wife and children, Mr Ishikawa participated as a volunteer in the decontamination process in the Date area. He felt like decontamination work was meaningful to the local community and a means to take back the environment for the children to grow up in.

When the summer vacation ended in September 2011, his children were looking forward to returning home but their fear of radiation also increased. Finally, he decided with his wife to start a new life in a different prefecture and started planning a long-term evacuation. They found housing and a new kindergarten for their two sons in Yamagata City. There were many issues to deal with and notably high expenses due to the fact they could not sell off their old properties and they had to pay things like the electricity bill in both places. From November 2011, their lives at two locations started. These places were about 100 km apart, and the area was not easily travelled by car. The life in two different places was possible through the economic support for residences. At the same time, the risks of living this way were high. For example, during winter long driving hours increases the risk of having a car accident on winter roads. It was a trade-off between an evacuated place and a return home. Their life in the apartment in Yamagata lasted for about 2,5 years. There was no fear for radiation contamination in Yamagata, and they could live their lives normally. Children instinctively thought that this temporary situation would last

forever. It was therefore a difficult task to find the right timing to move back to Fukushima while they were amongst new friends and learning new playgrounds. Why go back to Fukushima? They had thoughts for the place they had left: Tominari district is an area surrounded by mountainous nature. In the spring there are beautiful flowers, in the summer there are a large variety of insects present, in other words one can truly experience the four seasons. And also, the people living there are all very kind and very sympathetic.

In thinking about the children's future, there was no end to his concerns regarding whether or not to move back to Fukushima. But they decided to come back. There are now many issues to deal with regarding risk management in home. In addition, it is difficult to raise children in Fukushima. The parents are worried for their health. Reality is harsh: they cannot play wherever they want. Education and playing are done at home because of the lack of schools and because of radioactive contamination. There are almost no children playing outside. When Mr Ishikawa decided for instance to do jogging with his children after evaluating the resulting exposure, it was very surprising for people. He and his wife want also to preserve the dreams of their children. His oldest son said his dream was to become a «grandfather.» As parents, they believe environment is a source of life for children and the most precious thing is to see their children acting like children.

Lessons learnt:

- A personal and family transition path that is nonlinear and guided by the questions and the specific context of the family.
- A need to be actor of his life and not only an object of public policies.
- An active access to various sources of information in order to build his own comprehension of his situation.
- The life project is the core of the transition path in an intergenerational perspective.

Experience of a Japanese farmer producing in the contaminated area - Muneo Kanno, farmer from Iitate

Muneo KANNO, director of the NPO (Non-for-Profit Organisation) "Resurrection of Fukushima" and farmer presented the challenges people are facing in the resurrection of Life and industry in Iitate village. The philosophy that constitutes the framework of his action can be summed up by the sentence «We must protect gifts from the Earth which are blessings from Nature». Science produced this great disaster. People from Iitate were living with nature and animals and it is not possible anymore. The point is to know how to deal with this situation. Resurrection of Fukushima identified 7 key challenges to be addressed:

- knowing the exact situation of nuclear contamination,
- recovery of home land and farm land,
- recovery of agriculture,
- recovery of industry,
- activities for health and medical care,
- dispatching a message to the world,
- the meaning of the action of the NPO Resurrection of Fukushima in Iitate Village.

Contamination levels in Iitate are between 30,000 to 1,000,000 Bq/m^2. Mr Kanno mentioned that the agriculture was eradicated and decommissioning the plant will take about 40 years. In these conditions, is it possible for people to come back and to resume agriculture? It is a great burden for the next generations and it is important to share the knowledge because the generations share a common destiny.

After the Fukushima accident, the whole village was evacuated and split in three different categories depending on the dose rate. It is the reason why Mr Kanno's family has been separated. Muneo Kanno stresses that the decontamination process is under the

responsibility of the State. People cannot decide for themselves. In 2014, residential areas were decontaminated. In 2015, it will be agriculture area. Forest and mountain are not considered for decontamination.

Muneo Kanno considered, as a victim, that he could and he had to contribute to the solution and decided to do something from his evacuated area. So, in June 2011, he began to work with M. Tao, who was director of "Resurrection of Fukushima" before M. Kanno, and he met him almost every weekend for more than three years. Presently, the core group of the NPO is constituted of about 15 members of all ages, all of them volunteers. It receives help from outsiders (notably universities but also authorities, villagers). The NPO has in total 250 individual members and 6 corporate members. The goal of the NPO is to reconstruct the human livelihood. The activities of the NPO are mainly located in the affected areas with affected people and consist of measurements and information.

In Japan, the bureaucracy is divided in sections and each section works on its own problem without collaborating with other sections. Mr Kanno considers that the State has no plan for the future after the decontamination work. For the NPO, this issue is on the contrary very important. There are various opinions in the group that has to adapt to the various needs and share the opinion of various villagers. Mr Kanno considers that there is a need to reinforce cooperation with universities and authorities. For instance, the NPO conducted monitoring in cooperation with administration. They performed mapping of radioactivity in order to make the presence of radioactivity visible and they now receive funds from the government to continue this activity. Regarding the results of measurements, there were low results for the aerosols but contamination in the first 5 cm of soil is still great and stays there. They also initiated a project to address the issue of wild boars that ruin farms. Before, the contamination level was up to 15,000 Bq/kg in the meat. Now, it is about 500 Bq/kg so the project will continue, but the main issue is still human health.

The future is unknown and uncertain. And young people are more sensitive to radioactivity. So, the NPO developed activities around health care. In Iitate, there is no death from radioactivity, but from the other consequences (psychological and social disruption) of the accident. People from the community try to keep contact via Internet but there is a need for an environment where people can live on their own.
To conclude, Mr Kanno underlined that the help from outside and abroad is appreciated and expressed his hope that many people could visit Iitate village to grasp the situation. It is not only a problem of energy, but for the whole life. A key point is the involvement of the villagers in the process. The NPO established for instance a reconstruction map with villagers. But they also want to establish an Iitate Research Institute open to the world with a community-based strength in order not to leave the state handling the situation alone. Iitate is very polluted now, but they want to implement a process to have a new bright future.

Lessons learnt:

- Evacuation policies had a deep impact on social cohesion.
- There has been a mismatch between short and mid-term public policies objectives (decontamination) and objectives of the local community (to rebuild and to elaborate a project for the future of the territory).
- The NPO "Resurrection of Fukushima" is an attempt to build a transition path at the local community level.
- The local authorities acknowledge that there is a need to work with local populations.
- The project for the territory is designed by local people in an intergenerational perspective (yesterday, today, tomorrow).

A Norwegian reindeer herder, Næjla Joma, Sami from Snåsa

Næjla JOMA is a reindeer herder from Snåsa municipality in the Nord-Trøndelag County, whose life and activities were affected by Chernobyl fallout. During a recent trip to Japan, he noticed similarities between his experience and that of Japanese people affected by Fukushima fallout. In particular he thought of the refugees in Fukushima hotel who had difficulties to find their place in their new life residence. One story reminded him of a similar experience lived by one of his relatives just after Chernobyl. The hairdresser was afraid to cut hair of the refugees and they had to go into another room not to frighten other customers.

Næjla JOMA belongs to the Sami people, who are living all over Norway. In the Snåsa area, there are about 2,000 to 3,000 people and most of them live from reindeer herding. The Chernobyl accident was not the first time the Sami population faced radioactive contamination issues. There was nuclear bomb testing before with radioactive fallout all over the Northern hemisphere and there was already a higher contamination level in the Sami population. The main reason is that the lichen absorbing the radiation constitutes the main winter food of the reindeers and reindeer meat consumption has a significant place in the Sami culture. During spring 1986, Sami people learned nevertheless two new words: Becquerel and Chernobyl. They could not taste it, only measured it and the levels were very high, up to 30,000 Becquerel per kilogram (Bq/kg) in reindeer meat.

Public authorities recognized the contamination and promised that people affected by Chernobyl fallout should not have to suffer from economic impact on their activities. There were lots of uncertainties. For instance, authorities were expecting about 5 years to go back to normal but they finally realized that it might take 20 to 30 years. Regarding health risks, the authorities mentioned that the cancer risk associated with radiation was similar

to smoking one cigarette per day. Even if information was transparent presenting the different possibilities and risks, affected people had still lots of interrogations and wories because the future was uncertain. Was there any future for there indeer herding and Sami way of life? What would become of the Sami way of live and their traditional food? Were they radioactive? What about their genetic heritage? Were authorities telling them the truth? During the first months after Chernobyl, Sami had doubts about the reliability and sincerity of measurements performed by the Norwegian Radiation Protection Authority (NRPA). In order to check the trustworthiness of NRPA, Sami people both cross-checked measurements of samples made by NRPA with other measurements of the same samples made in Sweden, which showed matching results. Sami people also gave to NRPA some samples of frozen meat of reindeers slaughtered before the Chernobyl accident. That is how they discovered that reindeer meat was already contaminated by nuclear bomb testing fallout. Progressively and through such testing, Sami people concluded that they could trust NRPA.

Sami eat reindeer meat every day, and also fresh water fish. Authorities gave them diet advice about the quantity of Becquerels they could eat. Reindeer meat should be below 600 Bq/kg and they had to clean-feed the reindeers before eating them. Fresh water fish was also very radioactive during the first year. Hunting was also limited. In 1988, authorities started Whole Body Counting once per year. Compensation of different kinds was proposed but mostly it was to enable purchase of alternative food. During the first slaughter season after Chernobyl, all the meat was over the limit of 600 Bq/kg. It took one year to organise countermeasures. For the second year, it was fine. Discussions between authorities and reindeer herders were about compensation for feeding the animals in a manner that is not the traditional way of Sami herding. In Sweden, the situation was similar, but not the policy. There were different contamination limits on both sides of the border. During that time, they also discovered that they have been eating radioactive reindeer meat for decades. The contamination came from nuclear bomb testing. Næjla Joma

also explained that contamination of the meat varies a lot from year to year depending on the diet of the animals.

Experts cannot do full predictions. This is why Sami people had to change the herding and the time of slaughtering. This raised questions for the future where some of the traditional Sami knowledge will be lost. Næjla Joma's children have lived their all life with Becquerel and compensation system. What about the next generation? It will take many years to reach a level of below 600 Bq/kg, the limit for consumption of other types of meat. In the Snåsa area, contamination levels are still about 1,000 Bq/kg. So, are the Sami able to go on living in their traditional way? They are still here, but they had to adapt their life, and changed some aspects of their culture. The way of living is in fact connected to way the authorities are handling the questions. Sami were eating radioactive food twenty years before Chernobyl accident. They are still eating «radiomeat» and it tastes still the same.

Lessons learnt:

- Confidence in the authorities is questioned, tested and reaffirmed.
- There is an explicit commitment of the authorities to support those affected in the reconstruction of economically viable, humanly dignified and meaningful conditions of life and work (starting with the notion of economic viability through economic compensations and integrating then the issue of dignity by rebuilding conditions to produce food that can be eaten)
- The process in which Sami people investigated their own situation after the Chernobyl accident included getting access to various sources of information, expertise and measurements.
- The transition path of the Sami included an historical perspective, notably by: an anchorage in the Sami traditions and an adaptation of traditional production methods to the new context, the discovery of past contamination from atmospheric testing and the issue of transmission of Sami culture and lifestyles for future generations.

Taking on board societal values while setting standards for reindeer meat in the Norwegian post-Chernobyl context: the experience of the Norwegian Radiation Protection Authority (NRPA)

In Norway, the cultural & societal dimension of the Chernobyl post-accidental situation was a major concern for the public authorities since the radioactive contamination was a major threat to the continuation of the traditional Sami reindeer herding. The setting of permissible levels of radioactive contamination in reindeer meat in Norway had to take into account the protection of the Sami population (with a high level of reindeer meat consumption) and the protection of the Norwegian population (with a small level of reindeer meat consumption) on the one hand, and the necessity to maintain the reindeer herding activities in the long term as a essential part of the Sami culture. In this perspective NRPA had to set up in partnership with professional organisations a viable strategy for managing the quality of the food chain in a long-term perspective.

Before Chernobyl, there were no pre-existing limits of contamination applied to food. In May 1986, authorities set a temporary limit of 300 Bq/kg and then, in June 1986, 600 Bq/kg for basic foodstuffs and 370 Bq/kg for milk. The fallout of Chernobyl contaminated lots of foodstuffs but the highest level was found in reindeer meat (150,000 Bq/kg in 1986) while freshwater fish and goats' meat levels of contamination were respectively 30,000 Bq/kg and 2,890 Bq/kg at the same time. The reason for the differences lies in the higher transfer of radiocaesium from fallout to lichen than to green fodder. Reindeer are free ranging animals, feeding in natural pastures only. Reindeer herding is a fundamental and integral part of Sami culture and identity. This activity brings a spiritual and cultural connection to nature. A level of 600 Bq/kg for total caesium in reindeer meat would mean a complete liquidation of reindeer herding in Norway,

which would lead to the extinction of the Sami culture, which was acknowledged as an important part of Norwegian culture and history. In order to preserve the Sami culture, the authorities decided to raise the limit for reindeer meat (and also for game and freshwater fish) to 6,000 Bq/kg for the general population while a specific limit of 600 Bq/kg was maintained for the Sami population. It was possible to do so in terms of radiological protection because the average consumption of reindeer meat of the general Norwegian population is about 0.5 kg/year, whereas the average consumption of reindeer meat in the Sami community is around 50 kg per year.

Authorities implemented other countermeasures to be able to decrease the limit and to preserve Sami health. They also developed live measurement processes for the animals. Clean feeding of animals before slaughtering was implemented (a caesium binder like Prussian blue could hardly be used by the Sami due to animal welfare issues) and the slaughter time in reindeer husbandry (based on seasonal variations in diet) was changed. Authorities experts also gave dietary advice (cooking procedures to reduce caesium in food for instance) and monitored the internal contamination for the Sami with whole body counts (WBC) at regular intervals. It was a way to both realize measures and establish dialogue between the experts and the Sami. The dose averted by the countermeasures was estimated to represent almost a 90% reduction.

In 1994, the general limits were reduced to 3,000 Bq/kg because of the natural decay of the contamination. Further reduction to 1,500 Bq/kg as in Sweden or even to the 600 Bq/kg limit applied to other food was discussed in 2001 and 2009 after assessments performed on the request of food and health ministries. It was decided not to decrease the limit for this would not meet the ALARA (As Low As Reasonably Achievable) principle. More precisely, the consumption for general Norwegians remains low so the radiation exposure is minimal. The countermeasures used by the Sami population are also sufficient to ensure internal doses below 1 mSv/year in general and there is no loss of market value.

There is no export of reindeer meat, which means no conflict with values set by the European Commission. Decreasing the level would mean re-introducing countermeasures and burden for the Sami. It would introduce inequity between groups because only the Sami would be impacted by such a decision and it would represent a consequent additional cost to pay new compensation and build or rebuild corrals and fences to proceed to clean feeding. To conclude, changing permissible levels can be seen as a countermeasure and the decision to increase or decrease them is based on different scientific and societal criteria: public health aspects, consumer trust, producers needs and views, cultural and economic aspects, availability of technical countermeasures. This kind of decision should be considered in an ALARA perspective where all the costs/damage and benefits should be weighed appropriately.

Lessons learnt:

- Solidarity between local communities and national community is explicit and integrated in the implementation of public policies.
- These public policies include an objective to preserve the Sami culture that goes beyond radiological protection and health issues and that includes economic, social and cultural aspects.
- There is an explicit commitment of the authorities to support those affected in the reconstruction of economically viable, humanly dignified and meaningful conditions of life and work (starting with the notion of economic viability through economic compensations and integrating then the issue of dignity by rebuilding conditions of producing marketable foodstuffs).
- Building standards is not only a technical process but also a political and social one.
- The monitoring system put in place in Norway supported the transition processes of persons and communities.
- Local health networks played a key role in helping people build their understanding of their own situation and contextualise expert information and recommendations.

Experience of providing medical assistance for residents in the Minamisoma area - Masaharu Tsubokura, Tokyo University, Minamisoma Hospital

Masaharu TSUBOKURA is a member of the Institute of Medical Science of the Tokyo University and a physician at the Minamisoma General Municipal Hospital. His scientific speciality is leukaemia and bone transplantation. He started working in Tokyo Hospital but when the accident occurred, he volunteered to work in Minamisoma Hospital, which has 230 beds and is located 23 km from the Fukushima Nuclear Power Plant (NPP). He has provided medical assistance and information for residents in the Minamisoma area, whose population decreased from 70,000 to 10,000 habitants just after the disaster. 638 people died from the tsunami, which represents 1% of the city. The population was gathered in evacuation camps where he helped as a volunteer. Four days after the disaster, the area knew a food shortage due to the absence of supply because of radiation. Two months after the disaster, Dr Tsubokura started organising radiation seminars for local people. 150 seminars were held in Minamisoma. He felt he had to organize radiation seminars, even if it was not his specialty because the population had no basic knowledge or information on radiation (some of them confused Sievert with Shield Belt for instance) and there was no radiation expert in the area.

There were few dosimeters in the city, but photographic films were exposed to radiation. There was no information relating to daily life protection. People had questions about tap water, safety of local food, etc. But there was no information during 2 or 3 months. This led to distrust toward experts. Many experts stayed silent because of fear of criticism. Masaharu Tsubokura personally faced a lot of stress because of criticism. He notably suffered facioplegia and could not smile for two months because of stress.

Masaharu Tsubokura started the Whole Body Counting (WBC) program 4 months after the disaster. He asked NPPs to provide WBC devices but they refused. He got one from a uranium mine and performed as a volunteer 20,000 WBCs, representing approximately one third of those done in Japan within the first year after the disaster. The results illustrated that internal exposure is rather limited in Fukushima. He tried to publish the data, but government was afraid of public confusion and experts said that he was not a specialist. Newspapers chose to publish the catchiest information. They spoke about the 5% of people who were contaminated, while he would have like them to focus on the 95% without detectable contamination. It was a great disappointment for him because local people did not want him to broadcast the whole data and after the publication of the articles, some said that he had created a prejudice for Fukushima people.

Then, he chose another way and performed small-size radiological protection seminars with direct communication with people, which he performed 100 times. But many people lost interest in the problem within a year and, after three years, there is no evolution: the same questions are asked and there are still people, especially students with self-destructive comments such as "I will die from cancer", "I will not have babies", etc. As the attendance in the seminar decreased, he decided to add WBC to the seminars. He also conducted opinion polls and one of the results was that 60% of Minamisoma residents refused to eat food from Fukushima Prefecture. After the programme, the number has dropped. Finally, his current issue for information sharing is finding a place and finding new ways to reach people because, with the current seminar style, it is no longer possible to reach out to the people he needs to reach. The fact also is that not many people or organizations are showing their interest in this process. This is the reason he perceives school education as very important. Masaharu Tsubokura notably made a leaflet and participated in the development of baby WBC. The measurement shows that now all children are below a limit of 50 Bq for the whole body. These WBC are a good opportunity to discuss with mothers.

He also gives seminars in preschools.

Finally, Masaharu Tsubokura connects the current situation of the area with its history: after the Boshin war at the end of the 19th century, during which the Fukushima area was defeated, the main castle was destroyed. The area has been underdeveloped since. This could be also why the NPP was implemented in Fukushima. While one of the most difficult problems to deal with after the disaster is social distrust towards specialists and governments, the roots of distrust were sometimes derived from the historical feud. To understand the situation, it is important to know local history.

Lessons learnt:

- This system of measurements and interpretation of results of the body contamination was implemented in an autonomous and decentralized way.
- In this system, there was a key role of the local health networks providing answers to the need of information but also of interpretation and contextualisation of the information regarding the specific situation of persons or families.
- Persons and families made their own choices regarding their protection strategy, and a diversity of strategies was developed.
- Dr. Tsubokura's connection between the Fukushima catastrophe and the Boshin war shows a construction of meaning by inscribing the situation in a longer historical perspective at the community level.

Supporting people protecting themselves: the experience of the French NGO ACRO in Japan

ACRO (Association for monitoring of radioactivity in the West of France) is a French NGO created after the Chernobyl accident, which operates a laboratory for citizen watch on radioactivity in the environment, carries out citizens' expertise and issues a quarterly newsletter in French entitled «l'ACROnique du nucléaire». All its measurement results and expertise reports are systematically published. ACRO is accredited by the French Nuclear Safety Authority and also participates in several official committees at the local and national levels. After the accident at the Fukushima Dai-ichi NPP, ACRO's General Assembly decided to postpone all other activities to put the priority on supporting affected people in Japan. In the first years of the disaster, ACRO carried out about 600 analyses on samples sent from Japan. The first ones were collected in March 2011 in Iitate-mura. A large variety of samples was sent, in relation to the questions of the citizens (food, fish, many urine samples, house-dust…). ACRO supported the foundation of a citizen laboratory in Japan. This laboratory is a member of a network supported by the Takagi Foundation. ACRO also answered many questions coming from citizens living in Japan.

Support given to the Japanese NGOs is based on a bottom-up approach that constitutes the philosophical foundations of ACRO's actions: start from the questions of the population and stakeholders, provide results that are reliable and trusted (ACRO laboratory is accredited for Quality Assurance), and help populations to decide on their own.

After the accident, many citizen initiatives emerged in Japan because the authorities were discredited. Even the Japanese Prime Minister did not trust his administration and TEPCO because of the failure to acknowledge the triple meltdown. Failures to acknowledge

the situation continued in the post-accidental phase: the leaks of radioactive water into the ocean were only recognised in 2013 and it took one year for the authorities to inform the population about the dust dispersal from reactor n°3.

People thus needed access to alternative sources of information and found them notably on Internet and social media. Social media were also used to communicate about damages or inform that they were safe, gather information and express opinions. Discussion groups too were created to exchange information on the protection of the children. But, at some point, the population needed an access to measurement, and experts who could answer to their specific problems. Individual dosimeters were provided to monitor children and pregnant women first and then to the whole population in Fukushima (while not in other contaminated prefectures). Citizens also performed measurements with radiometers but it was first considered as «amateur work» by the authorities before they acknowledged the results in autumn 2011. Food monitoring requires specific devices that are more expensive. Several hundred measurement stations were opened in Japan. Some of them formed networks to exchange information and improve the quality assurance of the results. Authorities still hesitate to acknowledge the worries of the population that are disqualified as «harmful rumours». But citizens forced the process to be more open. They did their own mapping in parallel with the authorities' work. As a result, contamination maps are well known and there is no scandal any more related to food contamination. Nevertheless, Fukushima products are still boycotted.

On the contrary, closed processes such as decontamination engaged in the evacuated areas, for instance, continue to generate scandals. Investigations carried out by the Asahi daily news pointed out that waste was dumped into rivers or beyond the decontamination zone, and high-pressure water was used without collection of run-off. The investigations also showed multiple issues related to exploitation of decontamination workers. Dose rates were not checked for some workers who manipulated radioactive

materials, work contracts violated the law, a risk bonus was not paid to workers, etc. In addition to the waste management issue, there are still big challenges that have to be debated.

One of the most difficult questions is related to the limits set by ICRP (International Commission on Radiological Protection) for evacuation in emergency situation. The 20 mSv/y level adopted by the Japanese government was not accepted by many citizens and there were about 36 000 "self-evacuations" in October 2011. ICRP recommends going back to the 1 mSv/y limit without any calendar nor any suggestion of how to achieve such a goal. But Japanese authorities keep the 20 mSv/y limit for the return of the population. On the contrary, regarding contaminated food, the limits have decreased in order to recover consumer's confidence.
Regarding the decontamination process, results are disappointing. The dose rate naturally decreased by 45% during the first 3 years without doing anything. In comparison decontamination did not significantly improve the results. Consequently, Japanese authorities changed their policy, and handed personal dosimeters to the population, asking them to adapt their way of life in order to decrease the burden of radiation. This is a failure of the sovereign mission of the State to protect its citizen. Many people cannot accept the idea of monitoring everything. This is not a future for the children. There is a need to consult the population in order to establish new solutions, taking into account that there is no unique path and whatever the solution, some people will refuse it. The fact is people deserve to know the truth in order to choose their own path and they also need time to mourn their previous life. Equal support should be provided to all people without any discrimination, whatever their choice: coming back or relocating.

There are people, groups, companies that tried to benefit from the chaos and cheat the weakened populations. When ACRO first published its measurement results, several companies contacted the NGO because they thought that measurement could be a good business to develop in Japan. However, ACRO's measurements were provided free of charge.

It is the duty of the state to protect vulnerable people.

Lessons learnt:

- Authorities should tell the truth to citizen, even if it is difficult.
- Citizens are not only objects of public policy aiming at their protection; they are active players in their own protection strategies.
- In this perspective, it is important that citizens have access to measurement capacities (and capacities to interpret these measurements) in order to answer their own questions. The information needed by the citizens differs from the information needed by public authorities.
- The existence of measurement capacities and expertise resources independent from the authorities and nuclear operators is a condition for citizens to assess the reliability and trustworthiness of the institutional measurement system.
- There is no one-size-fits-all solution. Any policy should take into account the plurality of decisions and diversity of views without any discrimination.
- The State should protect weakened citizen against groups or companies that try to benefit from the disaster, sometimes by illegal means.

Community involvement in the decontamination and recovery process in Namie Town - Hiroshi Suzuki, Fukushima University

Regarding the responsibilities related to the Fukushima situation, the populations of the affected areas could not get effective information for evacuation from central government and consequently almost all mayors of municipalities were forced to decide to evacuate or not and determine alone the way to organise evacuation. For instance, Namie town office got a government order for evacuation to a distance of more than 30 km without any information on the direction of radioactive plume, which had already spread over to the north-west. As a result, many people of Namie evacuated tragically in this direction towards Nihonmatsu-shi. The information given by the central government on safety standards related to radioactive exposure were also so ambiguous that they generated deep confusion and a long-term distrust among people and municipalities.

The accurate control and disclosure of transparent information at initial stage must be one of the most important issues for disaster governance. One of the most severe results of this confused evacuation is the distribution of temporary housing estates that are scattered over about 30 places in many municipalities of Fukushima Prefecture. This has caused severe problems. For example, dispersed evacuees of Namie Town couldn't support each other as members of the same community. Regarding the reconstruction and recovery, Namie Town is one of the most affected by radiation, and among what are called "difficult-to-return areas".

For the natural disasters of earthquake and Tsunami, the recovery schemes presented two main stages: support for evacuees and then reconstruction of damaged homeland. The nuclear power plant accident itself necessitates an additional stage, an incredibly long period for recovery. These three stages involved a huge

number of stakeholders who have to rehabilitate their territory but are divided and segmented notably due to evacuation orders based on radiation dose, which created conflicts of interests. The management of these conflicts has become an important issue.

Namie town office elaborated a "Reconstruction Vision" on 19th April 2012. Among evacuated Namie people, the opinions were divided between return and resignation. The number of evacuees who desired to return to their homeland gradually decreased. Elderly evacuees wanted to come back again as soon as possible but some of young generation families who were so anxious for child care, education and getting a new job had already decided to restart their lives at other places. As a matter of fact, evacuees had to restart their lives in temporary houses at many places. So the Reconstruction vision stated the highest priority and most important reconstruction issue should be livelihood rehabilitation of Namie people even out of Namie Town, rather than reconstruction of hometown Namie. The Reconstruction vision proposed a project aiming at temporarily maintaining Namie communities for evacuees outside Namie Town. But, the negotiation and coexistence with other municipalities and host communities have been difficult notably because it was not clear that evacuees could get basic public services.

Namie territory also faced severe difficulties for decontamination because of the existence of many forest areas and rapidly flowing rivers. Central government decided that the target decontamination level was 1mSv/year but some municipalities wanted to change it to 5mSv/year. This controversial issue increased people's anxiety regarding radioactive contamination and raised a serious issue of risk communication. The decontamination process also produced lots of contaminated waste and central government planned to store it in interim storage facilities on the territories for 30 years, while the final disposal should be outside Fukushima Prefecture.

Two years after the accident, a second "Reconstruction Plan" was elaborated. This Plan foresaw lifting the evacuation order in the near future and proposed a recovery and reconstruction

program for Namie Town. This second step Reconstruction Plan was included in the Zone Preparing to Lift the Evacuation Directive. In Japan, a reconstruction scheme for natural disaster (with financial compensations) has been developed. The Namie reconstruction committee argued about this scheme. Evacuees from the difficult-return area claimed they couldn't return to their homeland for long time and they wished to benefit from the same scheme as the "Group Relocation for Disaster Mitigation". But the Reconstruction Agency explained that the scheme couldn't apply to a nuclear disaster. In the reconstruction plan, a project of "Namie homeland residence" was included, where evacuees from Namie should be able to stay several days when they come back to their hometown to visit their ancestral graves or to attend events. The plan intends to reuse the temporary wooden housing for the "Namie hometown residence" which was built for the evacuees from the nuclear disaster.

The process of recovery and reconstruction after the nuclear disaster has been very complicated and concerned various stakeholders. Now, the various stakeholders are divided by many factors: safety of radioactive contamination, effectiveness of decontamination, classification of areas by radioactive dosage, compensation, extent of return hope, etc. It is necessary to establish a social system of solidarity, cooperation and integration striving toward human security and to create social spaces for overcoming the nuclear disaster.

Lessons learnt:

- Evacuation entails important disruptions of the social links among the evacuated local communities, especially in the case of Namie where the evacuees were relocated in many different places.
- It was important to preserve the social resources of the connections between the members of the evacuated Namie population led to the proposal of tools for temporarily maintaining Namie communities for evacuees outside Namie Town.

Siting process of disposal facilities for radioactive wastes in surrounding regions of Fukushima prefecture - Takehiko Murayama, Tokyo Institute of Technology

During and after the Fukushima accident, lots of radioactive substances were discharged, which contaminated the atmosphere, mountain and agricultural areas, etc. This created a problem of waste management (all the more when the public authorities decided to start a decontamination process), not only in Fukushima, but also in other prefectures. Issues include management of mud from sewage and filtering water, incineration ashes, agricultural by-products, etc. There is a great amount of contaminated waste to deal with. The different types of wastes are sorted and different solutions are implemented depending on the category of waste. Inside the evacuation areas, the radioactive waste is stored in intermediate facilities. Outside evacuation areas, wastes under the limit of 8,000 Bq/kg are managed with the general waste. For the most contaminated waste, the national government has decided to have a special control on it.

The distribution area of contaminated wastes is larger than the Fukushima prefecture and spreads in other prefectures around. For the less contaminated wastes, the disposal procedure is distinct for the burnable and non-burnable waste. The first is transported to facilities for burning before being deposited in landfills, while the second is directly transported to landfills. But at the end, the problem is the same: finding where to implement landfills.

Regarding the types of landfills, for contaminated waste (from 8,000 Bq/kg to 100,000 Bq/kg), authorities decided to implement landfills with water treatment facility where percolation water is captured and treated. For waste over 100,000 Bq/kg, closed type facilities are preferred. In the nomenclature in Japan, there are two kinds of waste: industrial waste (company produced

waste) and municipal solid waste. In the Fukushima accident context, TEPCO is responsible in principle for the first and the prefecture government level is responsible for the other waste (with one landfill site to be created in each concerned prefecture). In fact, there were conflicts on these definitions and the national government is finally responsible for the site procedure.

The first step of this procedure was to establish a list of negative criteria excluding landfill areas taking into account the views of national authorities and of the regional level. This aims to exclude sites not safe enough against natural disasters, facilities that would compromise natural environment or damage national heritage. After that, a positive list was defined taking into consideration the size of the area.

Then, candidate sites were selected according to four criteria coming from an evaluation of the «understanding of local communities»: wildness of candidate sites, distance from drinking water intake, distance from living environment, volume and location of radioactive waste.

Finally, on-site surveys were conducted as announced. Municipalities and the Prefecture were ordered to cooperate with the national government (by giving opinions and reports on designated waste). At the local level, the Prefecture gave explanations on the process to municipalities that broadcast the information to the citizens. The national government took the final decision and noticed the selected sites.

Early 2014, Yaita City in the Tochigi Prefecture (the area with the most contaminated waste) has been selected. Locals were surprised by the announcement because of the lack of communication notably regarding the detailed evaluation carried out by experts and inadequate correspondence of the site with the selection criteria, considering each Prefecture's situation. Yaita municipality pointed out major problems such as risk of earthquake because of an active fault and the danger of radioactive pollution to river sources. Harmful rumours circulated. As a result, the siting process in Yaita

City was ended on 25 February 2014.
The announcement of a second selected site in Shioya Town was suddenly announced on July 2014. This led to the foundation of opposition group in August 2014 and there was a severe conflict between the national and local governments and demonstrations of local citizens supported by the municipality, notably on 9 November 2014. National government organized a meeting to collect mayors' opinions on safety of the facility, impact in terms of negative reputation, evaluation methods, fundamental policies and the fact that one site for each prefecture is very difficult for local people and that temporary storage is under responsibility of national government, because it is quite hard to build consensus landfill sites. Mayors gave also their opinions on the discussion process. They pointed out that it would be necessary to consider other methods and tools rather than mayors meetings in the decision-making process. They underlined the significance of the publication of maps and documents as evidence of decisions and the need to have a plurality of experts (adding experts of social psychology and public administration for instance) in the composition of expert committees.

Lessons learnt:

- The siting process shows a need to change the decision making process from DAD (Decide, Announce and Defend) to a participatory process based on transparency, reconsidering the role of each stakeholder and taking into account procedural fairness, distributional equity and risk reduction. There is a need for adaptive management and flexibility.
- There is a very important issue of solidarity between the local communities hosting waste management facilities, the other contaminated local communities and the national communities.
- This issue is not explicitly addressed in the decision-making process.

An independent monitoring of the radioactive contamination in the Fukushima area after the accident, Pr. Kenji NANBA, Fukushima University

Pr. Kenji NANBA went to the Fukushima University in 2005 where he is now working, but his family lives in Narashino-shi, Chiba. Before the accident he had no specific knowledge regarding radioactivity (no more than one can expect from a general academic scientific education, basic knowledge). His engagement on environmental radioactivity is linked with the Fukushima accident. It is a personal decision. He is now the deputy director of the Institute of Environmental Radioactivity in Fukushima University.

On the 11th of March 2011 Pr. Nanba had just come back from a field survey with students in the Tochigi area when the earthquake started. By 14th March, the situation became very critical regarding the Fukushima Dai-ichi NPP. The Fukushima prefecture released some environmental measurements within the prefecture.

The national government disregarded the estimation of land contamination of the SPEEDI decision support system until 24th March. The national government reported that no harm was to be expected from radiological exposure outside the 20km evacuation zone, but then encountered distrust from the public. That was a big issue in the National Parliament.

On 19th March 2011, several professors of the Fukushima University decided to start an initiative of environmental monitoring. They decided, on their own initiative to start a detailed mapping of the radiological contamination.

Having no particular expertise on radiological matters, the team of teachers connected itself to the University of Tokyo online network and thus had access to scientific publications from a large collection of journals on Environmental Radioactivity & Radiological

Protection. Lots of other Internet sources were found to be useful. Pr. Nanba started to gather reports on the Chernobyl accident in order to identify what would be the post-accident situation, to identify the potential harm on human health according to the dose level. His scientific culture helped him and he managed to raise his knowledge on radioactive issues on that basis.
Some colleagues managed to borrow radiological measurement devices from other Universities or from some departments of the administration in the Fukushima Prefecture. However, it was found difficult to convince colleagues to lend their devices for this purpose.

From 25th March, 10 colleagues of the Fukushima University (gathered in two-person teams, one measuring, the other recording the data) started measurements in different areas of the Prefecture using taxi transportation. They managed to perform measurements in order to cover the prefecture area outside the 20km prohibited zone. Faculty members from department of Environmental System Management, to which Pr. Nanba belongs, had capacities and skills regarding mapping and using GPS devices that were very useful in this context. One professor also had access to a geographical information system.

The emissions of radioactivity from the NPP were regarded as more or less stabilised after March 22nd or 23rd, according to official sources. However, Pr. Nanba and his colleagues prepared to evacuate with students at any time during March & April and managed to have a fuel reserve for about 100 km.

During the measurement campaign in the field, most of the radiological exposure of the Fukushima University team was received outside the car and therefore they tried to limit their outside exposure, remaining as much as possible in the car when not making measurements. They also paid attention to soil samples, not carrying them with hands, nor touching them with their clothes, wearing gloves and helmets.

By end March, the measurement campaign of the team was completed. A high radioactive plume from the NPP towards the northwest was clearly identified. High radiation was found even outside the 30 km area in which population was evacuated on the basis of the 30 μSv/h criteria.

The Fukushima University team decided to inform directly the local authorities of each locality about the results of their survey (rather than informing directly the media). Some local authorities were very reluctant to release this information whereas others immediately offered to make it public. Local authorities were subject to high public pressure and blame from the population. Most local government representatives were shocked by the results. Most of them trusted the university team. One municipality mayor refused the information.

The Fukushima University team managed to present the results of its measurement campaign to the national government through a consultant. This contributed to the government decision to extend the evacuation area to outside the 30 km area.

The Fukushima University team agreed the principle of publication of their results with Local Governments. Most mayors immediately accepted. Only one mayor refused but the team managed to convince him within a few days.

Lessons learnt:

- The initiative taken by Prof. Nanba and his colleagues is a social process in which researchers and teachers act as citizens, outside of their institutional field of expertise, trying to build visibility on the contamination situation at the local level.
- This was a spontaneous initiative of monitoring outside of government channels trying to connect to the decision-making processes by reaching to mayors and to the national government.

Enabling local population in the rehabilitation of living conditions after Chernobyl the ETHOS project in Belarus (1996-2001)

In May 1996, the ETHOS project was initiated as part of the RODOS research project in the framework of the European Commission Radiation Research Program, in cooperation with local, regional and national Belarussian authorities in the post-accident context of Chernobyl. From 1996 to 1999, it took place in the village of Olmany (1,400 inhabitants) situated in the contaminated territories of Belarus (Stolyn district, Brest region) and then spread to four other villages in the same district until 2001. The ETHOS project aimed at developing a new approach to the rehabilitation of living conditions in the affected territories, based on joint work between inhabitants and scientists. This approach was meant to complement the official countermeasures implemented by the public authorities of Belarus.

The objective of the ETHOS project was to provide individuals, families and communities with means of evaluation in order to take appropriate actions in the context of environmental contamination (and at first to make their own decision of whether or not to leave the contaminated area).

Based on the population's priorities, the project developed several investigations involving the local population and the researchers in order to assess the impact of the contamination on the day-to-day activities in the villages and to identify possible strategies for improving the living conditions and reducing the radioactive exposure entailed by professional and private activities in the village.

A specificity of the ETHOS approach was to address jointly the goal of reducing the radiological exposure of the inhabitants on the one hand, and the objective of improving the living

conditions taking into account all the affected dimensions of day-to-day life in the contaminated area on the other hand. This was achieved within several working groups involving local inhabitants and professionals as well as researchers of the ETHOS team ("young mother group", "improving milk quality" group, "producing safe meat for the market" group, "youth video" group, "managing radioactive waste" group, etc).
Beyond the individual level, the ETHOS approach dedicated particular attention to the several stakeholders involved in the governance of the post-accident situation, at local, regional, national and international levels. It took into account the diversity of concerned actors (residents, health professionals, teachers, private farmers, public farms, regional authorities, Chernobyl Committee, etc.) and action levels (local, regional, national, international) that impacted the local situation. The ETHOS research team facilitated the building of relationships among different actors at local but also at higher levels of action.

The ETHOS project sought to develop with individuals, families and professionals a "practical radiological protection culture" based on relevant and accurate knowledge of the contamination of the territory (most of the radiological measurements being produced by inhabitants themselves). It was also based on the identification of pathways of circulation of radionuclides from the ecosystem to human beings (e.g. from pastures to people). This radiological protection culture has enabled the development by the inhabitants of new lifestyles and working practices that take into account the environmental situation and enable them to reduce their level of exposure.

The ETHOS project (1996-1999) demonstrated the feasibility and benefits of such approaches in the village of Olmany. The ETHOS 2 project (2000-2001) achieved the transferability of these practices to a network of local professionals (health professionals, education professionals, radiation monitoring professionals, and others) in four other villages of the Stolyn District.

Lessons learnt:

- ETHOS sought to develop protection strategies that ground on the practical needs and questions of the families at the local level.
- The local populations expressed the need to address jointly the goal protecting people with the one of restoring the living conditions, thus creating the conditions for a "life worth living".
- The ETHOS project was a cooperative strategy where people and families are considered as actors of their own protection (as a complement to the protection strategies implemented by the authorities).
- This facilitated cooperation between local communities and institutions (e.g. Belarusian Institute of Radiology, State farms, schools, etc.).
- The ETHOS project led to develop a shared practical radiological protection culture.
- Local health and education networks played a key role in the process.

Supporting recovery strategies of local actors, building synergy with public and private institutions: the CORE programme in Belarus

Building on the lessons of the ETHOS projects (1996-2001) and other international assessments of the post-accident situation, the CORE international cooperation program (COoperation for the Rehabilitation of living conditions in the contaminated territories of Belarus) was initiated in 2003. The objective of the programme was to test a new bottom-up strategy aiming at the rehabilitation of living conditions in 4 contaminated districts of Belarus while creating the conditions for regional, national and international institutions to support and contribute to the initiatives of local inhabitants, professionals and local communities. CORE supported projects developed in partnership with local actors in 4 thematic priority areas: health protection, economic and rural development, development of a practical radiological protection culture, education and memory of the accident.

The CORE program was based on an innovative governance structure with the following objectives:

- To enable the local, regional, national and international partners to share the understanding of the complex questions involved by the rehabilitation of living conditions.
- To support local initiatives and joint partnerships involving local, regional, national and international actors aiming at the rehabilitation of the living conditions in the selected areas.
- To facilitate integration between different thematic action areas (health, radiological protection, education and memory, economy and development of rural areas);
- To facilitate interactions between the different levels of governance of the post-accident situation (local, regional, national and international).

The CORE program involved the signatories of a common "Declaration of Principles" (end 2003) stating the willingness of some 30 international and national organisations to cooperate with local actors in the contaminated territories of Belarus after Chernobyl in order to enable and support them to develop initiatives and projects for the rehabilitation of their living conditions. The structures of the CORE program included different bodies with different functions in the chain of decision and action:

- The Preparation and Evaluation Committee bringing together the local, regional, national and international actors and experts in order to make a shared evaluation of the projects activities submitted to the CORE program for approval.
- The Approval Board involving local authorities together with national and international authorities and qualified persons, signatories of the CORE Declaration of Principles, sharing the responsibility of approving the proposed projects and the orientations of the activities of the CORE programme.
- The Coordinating Team, aimed at supporting and facilitating the action of different partners at the local, regional and national level and supporting the implementation of the governance structures of the programme.
- The Thematic Liaison Committees aiming to give public authorities in each of the 4 fields of action a feedback on the local initiatives, emerging needs and lessons learnt and to facilitate dialogue between different levels of decision.

Radiological protection in CORE

In the context of CORE's radiological protection field of action, a cooperative project was initiated in the district of Bragin (Southeast of Belarus) from 2004 to 2007. This project, inspired by the results of the ETHOS project, aimed at the implementation a radiological measurement system with the participation of health professionals and education, associations and people trained in dosimetry, in order to offer residents a tool to control their environment, their food, their internal exposure and to provide leeway to improve their own situation (in particular as concerns children).

Several food monitoring devices were deployed in villages of the district. In parallel, a practical radiological protection culture was developed among the population, especially among children, through the education system. Campaigns of whole body counting measurement were also carried out in schools and kindergartens. With the results achieved in reducing internal contamination of children, it was decided to extend the system to other villages over the period 2006-2008.

This system was developed to complement the existing radiological monitoring supported by various Belarussian authorities. It involved the establishment of a radiation quality control system, which mobilized people and local health professionals and education.

Lessons learnt:

- The rehabilitation of living conditions is an emerging process that relies on the social fabric at the local level. However, public authorities at the national level can provide a framework and facilitating conditions for this emergence.
- The priority is given to the emerging initiative in the recovery phase.
- There was a need for connecting the various actors engaged in recovery at the level of a territory, at the different other governance levels.
- The CORE programme acknowledged the necessity to create interactions among the various actions undertaken (e.g. education, health protection, radiation monitoring, agriculture,…) and developed governance structure to facilitate this.
- The CORE program created several forums to enable institutional and non-institutional actors to develop common understanding of issues and common goals and to enable public policies to facilitate local initiative (and not to hamper them).
- The CORE governance structures go beyond the usual

compartmentalized public policies and separation between territorial levels, thus enabling the management of complex post-accident issues.

Assessing decontamination strategies, integrating reconstruction, rehabilitation and regeneration of living conditions: the FAIRDO project

In June 2012, the Institute for Global Environmental Strategies (IGES), along with several universities including Fukushima University and European experts, launched the Fukushima Action Research on Effective Decontamination Operation (FAIRDO). To contribute to effective decontamination in Fukushima, FAIRDO mainly conducted interdisciplinary surveys in order to offer advice and guidance for effective implementation of initiatives for full-scale decontamination undertaken by the national, prefectural and municipal governments from 2012 onwards. FAIRDO was notably engaged in verification of simulation techniques and model development to support the formation of decontamination plans in accordance with regional conditions. FAIRDO addressed 3 different topics:

- **Effective governance of decontamination** (roles of the different stakeholders, financial mechanisms, evaluation mechanisms, information flows…). FAIRDO intends to make recommendations for a more adequate decision-making process and for effective governance of decontamination, including relevant laws and regulations.
- **Development of decontamination plans that reflect local conditions** based on experiences gained from Europe (RODOS European decision support system and radiological emergency management and rehabilitation strategies developed in the EURANOS and NERIS TP European research project).
- **Communication that promotes collaboration with local residents:** FAIRDO analysed the current risk communication on decontamination at selected sites and carries out a comparative analysis of its risk communication among municipalities and between lessons learnt in Europe and Japan. It also attempts to put risk communication into practice at the local level.

After one year of research activities aiming to sufficiently understand the current status and issues at decontamination sites, drawing on international experience and knowledge, and making practical recommendations, the experts engaged in FAIRDO realised that it was not enough to look at the mechanisms and effectiveness of the decontamination activities. They decided to review the issue of decontamination among the overall policies concerning reconstruction and regeneration of the hometowns as well as looking at the rehabilitation and rebuilding of the lives of the people affected by the disaster.

Decontamination activities need to be re-examined in the context of reconsidering the reconstruction of communities and clarifying the desired state of the region after decontamination is completed. Issues such as decontamination, rehabilitation of lives, compensation, and return to former homes, are intricately linked. There cannot be any prospects for restoration and rebuilding of lives if even one of them is left out, or unless one of these conditions is compromised to achieve another. It is necessary to look for methods to convince diverse stakeholders and build a consensus by discussing multiple related conditions in one place and untangling the issues that are found at all stages of decontamination. This includes planning, communication and consensus building and implementation.

Regarding the necessity of re-examining the scope of decontamination and the participation of residents in the decision making process, FAIRDO's main messages are:

- **An acceptable ambient/surface radiation level is one of many conditions required for rehabilitating the lives of those people affected by the disaster.** Decontamination needs to be conducted at appropriate levels that are balanced with measures that are in place to achieve other conditions.
- **The decisions of individuals and families regarding the rehabilitation of their lives should be treated with the utmost respect.** Additionally, public participation should be assured in the

collective decision-making process for reconstructing areas and regenerating communities. To respect the decisions of individuals or families, and ensure participation in consensus building, it is necessary to provide opportunities for exchanging information and having discussions.
In this perspective, FAIRDO aims at implementing different types of action:

- **Initiatives for participatory and consensus building** that include preparation of regional round table discussions (with all concerned stakeholders), utilisation of simulation tools such as RODOS model for plan formulation and consensus-building, utilisation of brief assessment for consensus-building on temporary storages.
- **Promotion of information exchange and information sharing between stakeholders to reduce the burdens of the decontamination initiatives.** It means the establishment of an information platform to share information produced by the municipal, prefectural and national governments, as well as other organisations and individuals. The information platform would be established and operated in close cooperation with a wider range of information sources.

Lessons learnt:

- There was a need for re-examining the scope of decontamination in relation to the overall efforts of reconstruction, regeneration of communities and rehabilitation of livelihoods, rather than just pursuing "more effective decontamination".
- To respect the decisions of individuals or families, and ensure participation in consensus building, it is necessary to provide opportunities for exchanging information and having discussions.
- Regarding the governance structures, tools are studied such as round tables including all concerned stakeholders and platform of exchanges of a plurality of information.

List of acronyms

ACRO	Association pour le Contrôle de la Radioactivité dans l'Ouest (Association for radioactivity monitoring in the West of France)
CEPN	Centre d'étude sur l'Évaluation de la Protection dans le domaine Nucléaire (Nuclear Protection Evaluation Centre)
CORE	Cooperation for Rehabilitation of Living Conditions in Chernobyl Affected Areas of Belarus
FAIRDO	Fukushima Action Research on Effective Decontamination Operation
IGES	Institute for Global Environmental Strategies
NGO	Non-governmental organisation
NPO	Non-for-profit organisation
NPP	Nuclear power plant
NRPA	Norwegian Radiation Protection Authority
PREPARE	European research project "Innovative integrative tools and platforms to be prepared for radiological emergencies and post-accident response in Europe"
SPEEDI	System for Prediction of Environmental Emergency Dose Information
TEPCO	Tokyo Electric Power Company
UNECE	United Nations Economic Commission for Europe
WBC	Whole body counting

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