

United Nations University

Institute for the Advanced Study of Sustainability

**Fukushima Global Communication Programme
Final Report**



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UNU is committed to the ideals and practices of environmental sustainability, and is an ISO140001 certified institution.

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Photography

Cover: Soichiro Mihara / Namie, Fukushima Prefecture, October 2013

pg. 2: Guido van Nispen

pg. 5, 13, 18, 31, 32: Ana Mosneaga

pg. 6: UNISDR

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Designed by MORI DESIGN INC., Tokyo

Printed in Japan, July 2016.

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ISBN 978-92-808-4571-6

e-ISBN 978-92-808-4566-2



THE GLOBAL GOALS
For Sustainable Development

Background



Tomioka, Fukushima Prefecture – A sign forbidding entry to the evacuation zone drawn after the nuclear accident

Background

Japan has been facing a range of difficult challenges in recovering from the compound disasters of the Great East Japan Earthquake, tsunami and the Fukushima Daiichi nuclear accident of March 2011 (hereafter 3.11 disasters). These challenges cut across multiple policy areas and academic disciplines, raising complex social, economic, political, legal, scientific and environmental questions.

Deep socio-economic issues have emerged following the 3.11 disasters, which have been affecting the ability of people to rebuild their lives, as well as the wider processes of recovery planning and implementation. Five years after the disasters, communities and individuals are still faced with lingering challenges of protracted displacement, loss of livelihoods, disruption of communities, and uncertainty about the future. In fact, the nature and scale of such issues has only become clearer as the years have passed. At the same time, efforts to rebuild and enhance preparedness for future disasters have focused heavily on reconstruction and consolidation of physical infrastructure, with human and social consequences of the disaster receiving less attention.

The radiological contamination resulting from the Fukushima Daiichi nuclear accident and related safety concerns are also complicating the recovery process. The accident has highlighted the urgent need to find better ways of communicating about, and discussing, radiation issues in Japan and beyond. There is a pressing need to identify and implement effective and appropriate forms of risk communication, which will allow people to make informed decisions to protect their present and future wellbeing. With the incidence and severity of natural disasters expected to increase in future due to climate change, it is more likely that technological disasters, including nuclear accidents, will be triggered. As such, the impacts of the nuclear accident and the policy responses implemented hold particularly important lessons for disaster risk reduction measures across the globe.

The Fukushima Global Communication Programme (FGC)

A research initiative of the United Nations University Institute for the Advanced Study of Sustainability (UNU-IAS), the FGC programme examined the impacts of the 3.11 disasters on people and society, and the challenges of the recovery process in Fukushima. The main areas of research were (i) displacement and livelihood recovery, and (ii) issues of risk and information provision related to nuclear disasters.

The FGC programme was implemented over a three-year period, from April 2013 to March 2016. It built upon previous UNU research in related areas, including the project “Human Security and Natural Disasters”. The FGC programme was funded by the Nuclear Regulation Authority of Japan, and overseen by an independent High-level Advisory Committee (HAC) comprising leading experts on the issues addressed by the programme.

The programme produced findings of relevance to policymakers in Japan and other countries, focusing on the social dimensions of nuclear accidents, as well as more generally on disaster recovery and risk reduction. In researching these issues, the FGC programme adopted a human-centred perspective, drawing on the human security approach. This emphasizes the interdependence between the various dimensions of insecurity that disasters pose for people’s lives, offering a holistic lens for analysing different patterns of risk, vulnerability and agency that affect the post-disaster recovery process and discussion of nuclear issues. The FGC programme focused on the complex social and technical dimensions of the Fukushima nuclear accident and conducted research in two main areas: (1) prolonged displacement and livelihood recovery and (2) risk communication issues.

Activities and Methodology

The FGC Programme applied an interdisciplinary approach through research in Fukushima and collaborative research with international experts, engaging a broad network. In doing so it connected analysis of the situation and recovery process in Fukushima with relevant international debates.

The initial focus of the programme in its first year was on building networks for research and dialogue, and disseminating relevant information to the public. This was carried out through activities such as public events and the production of a series of video interviews with leading experts, including Dr. Richard A. Meserve (former Chairman, United States Nuclear Regulatory Commission) and Dr. Kiyoshi Kurokawa (Head, National Diet of Japan Fukushima Nuclear Accident Independent Investigative Commission).

In its second and third years the programme prioritized conducting research and disseminating the resulting findings, analysis and policy recommendations through publications and presentations. Qualitative field research, including interviews and focus group discussions, were conducted in a number of municipalities in Fukushima prefecture, gaining rich and detailed insights from residents and local government representatives from communities displaced by the nuclear disaster, as well as civil society organizations supporting evacuees. Expert consultations with UN and other international organizations were undertaken through several research missions, focusing on issues such as disaster risk reduction (DRR), crisis response and displacement. Extensive literature reviews were conducted by compiling and analysing relevant Japanese and international sources including academic research papers, policy documents and media reports. The FGC programme organized an international research workshop in November 2015 (see page 25), which engaged leading international experts to analyse issues of risk communication in the context of nuclear accidents. A number of symposiums and seminars were also organized throughout this research phase, presenting a diverse range of perspectives on issues addressed by the FGC programme to public audiences in Japan, with an emphasis on interactive discussion.

Table 1: Summary of FGC Activities (April 2013 – March 2016)

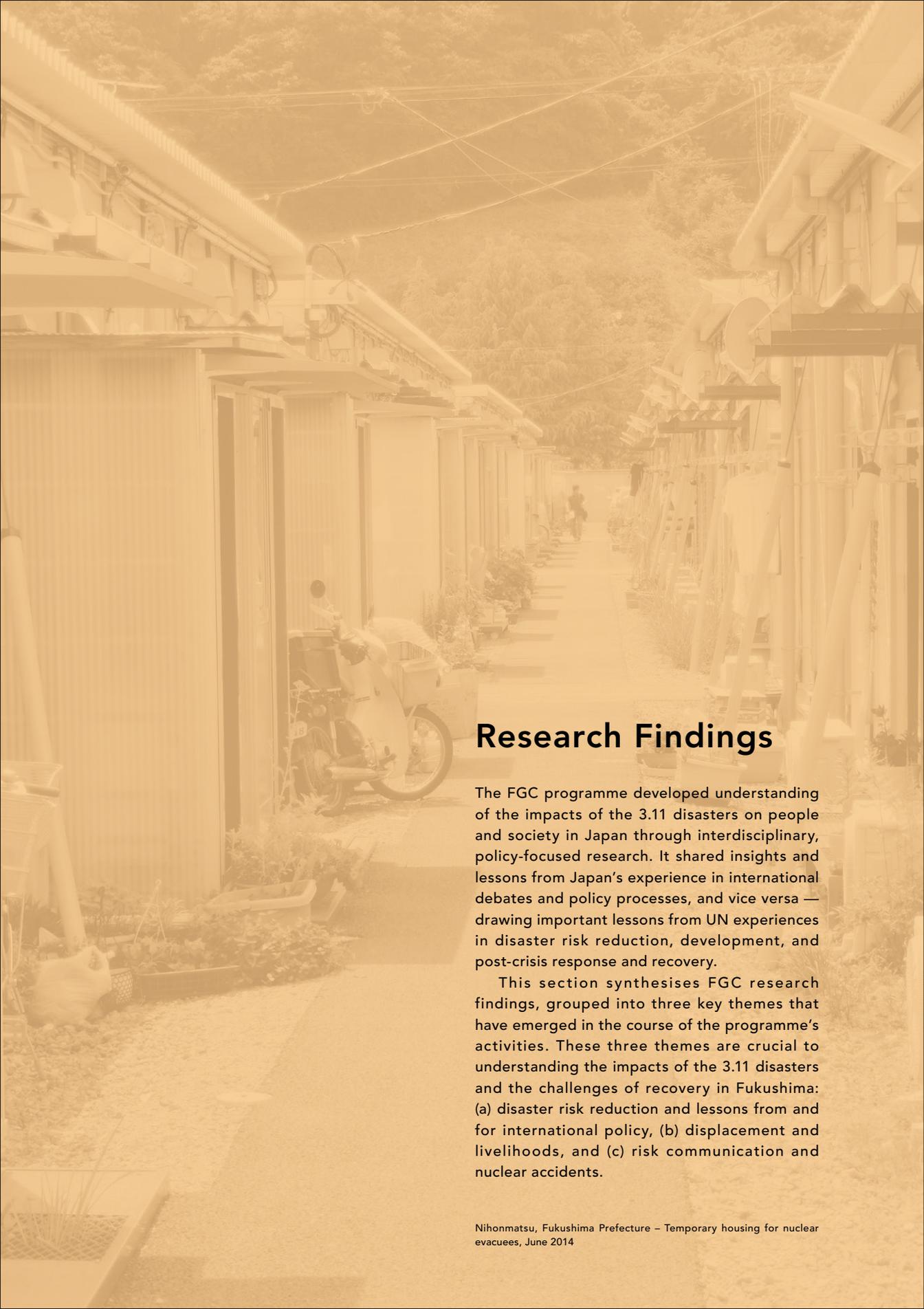
Activity	Number	Locations
Public Events	11	Fukushima City / Sendai Tokyo / Yokohama
International Expert Consultations	5 research missions (40 experts in total)	Geneva / New York / Vienna
Policy Dialogue Sessions	5	Tokyo / Fukushima City
Fieldwork (Interviews, Focus Group Discussions, Site Inspections)	12 research missions (114 informants in total)	Fukushima Prefecture and 2 Other Prefectures Hosting Evacuees
Lectures and Conference Presentations (at non-FGC events)	7	Arlington, USA / Barcelona, Spain Geneva, Switzerland / Giardini-Naxos, Italy Maastricht, The Netherlands Fukushima City / Tokyo
High-Level Advisory Committee Meetings	9	Tokyo / Fukushima City / Yokohama

The FGC programme actively disseminated its research findings and policy recommendations to experts and the general public through a range of communications mediums, in addition to the public events described above. FGC policy recommendations were published in three UNU-IAS Policy Briefs. This peer-reviewed publication series is targeted at high-level international policymaking and debates, aiming to provide decision-makers with actionable recommendations. The briefs were disseminated through UNU's global networks in both digital and printed formats. An FGC Working Paper Series was launched in the second year of the programme, with a total of 21 papers published, authored by FGC researchers and external experts from the programme's research networks. These papers were published digitally on the FGC and UNU websites, and printed versions were distributed at FGC events. In addition to these publication series, FGC research was published in several articles in leading academic journals. A summary of FGC outputs is provided in table 2 below.

An FGC website was designed and launched (with both English and Japanese versions), providing a platform for promoting FGC activities and sharing their outputs. This was complemented by publication of a number of online articles throughout the three years of the programme, which were posted on the UNU website and the *Our World* web magazine in both English and Japanese. A full list of FGC outputs is provided in Appendix 2.

Table 2: Summary of FGC Outputs (April 2013 – May 2016)

Output Type	Main Target Audience(s)	Language(s)	Number Produced
FGC Working Papers	Academics, Policymakers	English or Japanese	21
UNU-IAS Policy Briefs (Peer-reviewed)	Policymakers	English and Japanese	3
Academic Journal Articles (Peer-reviewed)	Academics	English	3
Newspaper and Online Articles	General Public	English and Japanese	8
Video Interviews	Policymakers, General Public	English	5
Contributions to Publications by Other Organizations	Policymakers, Academics, General Public	English	1



Research Findings

The FGC programme developed understanding of the impacts of the 3.11 disasters on people and society in Japan through interdisciplinary, policy-focused research. It shared insights and lessons from Japan's experience in international debates and policy processes, and vice versa — drawing important lessons from UN experiences in disaster risk reduction, development, and post-crisis response and recovery.

This section synthesises FGC research findings, grouped into three key themes that have emerged in the course of the programme's activities. These three themes are crucial to understanding the impacts of the 3.11 disasters and the challenges of recovery in Fukushima: (a) disaster risk reduction and lessons from and for international policy, (b) displacement and livelihoods, and (c) risk communication and nuclear accidents.



1 Disaster Risk Reduction: Lessons from and for International Policy

Tohoku area, Japan – Damage caused by the 3.11 disasters, March 2011

The global policy agenda with most relevance to the aspects of the 3.11 disasters addressed by FGC is that of disaster risk reduction (DRR). The FGC programme undertook analysis current trends in the DRR agenda applicable to the 3.11 disasters, and also contributed to the development of this global agenda through disseminating findings and recommendations based on FGC research in Japan.

Interviews were conducted with DRR specialists in a number of UN agencies (including UNISDR, UNEP, OCHA, UNDP, IAEA and OHCHR) and other international organizations (including IOM, IDMC, IFRC, WEF and the World Bank). The FGC programme contributed to a number of high-level global events focusing on DRR issues, including the Third UN World Conference on DRR (WCDRR) of March 2015, held in Sendai, Japan.

The Evolving DRR Landscape

The aim of DRR is to identify and reduce the risks of disasters, by minimizing vulnerabilities and the adverse impacts of hazards. While a relatively new concept, it builds on well-established practices and approaches in fields such as disaster and emergency management. The visibility of DRR as an international policy issue has increased owing to the sheer magnitude of disasters that have occurred during recent years, but it remains extremely difficult to achieve legally binding agreements in this area.

UNISDR was established in 1999 to coordinate DRR activities. The Hyogo Framework for Action (HFA, 2005–2015), adopted in 2005, provided the first global plan for DRR with clear priorities and targets. In March 2015 its successor framework was adopted at the WCDRR, the Sendai Framework for DRR 2015–2030, as a non-binding agreement aiming for “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” (UNISDR 2015b, 12). The Sendai Framework sets a strategic direction for international, national and local level efforts to reduce disaster risks for the 15 year period between 2015 and 2030. The seven global targets of the framework include “substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030” (target D) and “substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030” (target G).

IAEA:	International Atomic Energy Agency
IDMC:	Internal Displacement Monitoring Centre
IFRC:	International Federation of Red Cross and Red Crescent Societies
IOM:	International Organization for Migration
OCHA:	Office for the Coordination of Humanitarian Affairs
OHCHR:	Office of the High Commissioner for Human Rights
UNDP:	United Nations Development Programme
UNEP:	United Nations Environment Programme
UNISDR:	United Nations Office for Disaster Risk Reduction
WEF:	World Economic Forum

Further advancing DRR efforts will require the integration of the DRR agenda into other global agendas, especially the Sustainable Development Goals (SDGs) and the Paris Agreement on climate change. Clear and workable targets and indicators are needed for mainstreaming DRR into the policy frameworks of national governments and the international donor community. However there remains a lack of cooperation between the different agencies involved in DRR, and a lack of coordination of DRR activities across the UN system. The main challenge for DRR efforts is sustainability, which depends upon engagement of local communities in disaster prevention, response and recovery activities, promoting local ownership and ensuring that local knowledge is reflected in these activities.

Disaster risk reduction is "the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events." (UNISDR 2009)

A key trend in DRR is the recognition of the ongoing nature of disaster risks, and an associated shift from managing disasters as discrete events to managing risks that evolve and accumulate. The disaster management sector, addressing emergency responses, has been well developed over many years, and is needed more than ever. However, with increasing acknowledgement that risks are inherent to social and economic activity, DRR is now being reinterpreted — with disasters seen as the result of unmanaged risk. The Global Assessment Report on DRR (UNISDR 2015a) proposes three mutually supportive approaches: (i) prospective risk management to avoid the accumulation of new risks; (ii) corrective risk management to reduce existing risks; and (iii) compensatory risk management to strengthen resilience to risks that cannot be reduced. Accelerating this shift requires promoting the idea of risk-aware investment among the national institutions such as Ministries of Finance, as well as the private sector. The private sector is ready to play a greater role in DRR, but this requires a conducive regulatory environment to be established. In particular, soliciting greater focus on DRR from the private sector requires collaboration with the insurance industry, backed up by tax policies.

Nuclear Accidents and the DRR Agenda

The consensus within the DRR community is that technological hazards such as nuclear accidents must be addressed through a multi-hazard approach, considering sequences of risks that can trigger such hazards and their impacts on the surrounding communities and environment. There is increasing acknowledgement of the need to adopt a multi-hazard approach, and it is emphasized in the Sendai Framework. DRR experts consulted by the FGC programme repeatedly emphasised the need to open up the safety culture in the nuclear industry so that it accommodates the concerns of the surrounding communities.

Nuclear accidents and similar hazards were not among the leading topics during WCDDR, or during the preceding stakeholder consultations (initiated in March 2012) and intergovernmental negotiations (launched in July 2014). Apart from one session on technological hazards, the nuclear accident in Fukushima received relatively little attention in the official segment of the conference.

“Accidents at industrial installations and nuclear facilities, whether due to human error or through the cascading effects of natural hazards, can have dire and lasting human, societal, economic and environmental consequences.”

Summary Report for the WCDRR Working Session “Technological Hazards: From Risk Reduction to Recovery” (UNISDR 2015d, 1)

The Sendai Framework, however, includes technological hazards in its scope — which represents some progress. Whether the post-2015 framework for DRR should focus only on natural hazards or also cover technological and biological hazards was a hotly debated issue in the discussions leading up to the WCDRR. The inclusion of such hazards, with, for example, a presentation by the Government of Japan on the experience of dealing with the March 2011 nuclear emergency, marked a long-awaited start to the process of sharing lessons from Fukushima. In practice, nuclear emergency preparedness remains a highly specialised and closed field. This has been one of the reasons for the lack of discussion of these issues before and during the WCDRR. Opening up this field requires engagement with local communities, and open communication about potential risks.

In the specific area of nuclear accidents the IAEA has an international role for preparedness and response, with a legal basis in international conventions on notification of nuclear accidents and international cooperation in assistance and support. Since the Fukushima accident there is now greater interest in peer reviews and expert assessment, showing a realization that “we cannot have business as usual”. The tone of peer reviews has also become tougher, particularly with regard to compliance with the international legal framework.

Following the Fukushima accident, IAEA’s Operational Safety Review Team (OSART) has revised its guidelines for severe accident management. Most countries have requested OSART review of their

nuclear action plans [but not all]. This review looks beyond the nuclear plant per se, by for example examining the corporate structure of the operators. The Inter-Agency Standing Committee on Radiological and Nuclear Emergencies (IACRNE) met in December 2011, concluding that the international emergency response system as a whole had proven effective in the context of the Fukushima accident, but it needed improvement through regular engagement and exercises by the public information officers of international organizations



Fukushima Daiichi Nuclear Power Plant – IAEA experts inspect water storage tanks, November 2013

Displacement and the DRR Agenda

The Sendai Framework also makes an important step forward in recognising displacement as one of the most severe consequences of disasters, albeit not explicitly linking these to technological hazards. The references to disaster-induced displacement is especially important for reflecting lessons from Fukushima’s nuclear disaster, where regaining a normal daily life remains a distant goal for many displaced people.

Displacement experts interviewed by the FGC programme considered Fukushima as a “living example” that underlines the importance of addressing displacement holistically: not only addressing it as a matter of prevention and preparedness but also as an issue of longer-term recovery and resilience. Specifically, experiences from Fukushima and other large-scale disasters at industrial facilities indicate a pressing need for measures to rebuild livelihoods, compensation mechanisms, relocation schemes and environmental remediation operations from the very early stages of recovery. Similarly, these experiences suggest that decision makers are likely to be faced with the pressing need to address these issues early in the post-disaster recovery process through enactment of relevant legal, policy and institutional mechanisms.

“ Droughts, floods, earthquakes, as well as climate change, environmental degradation and technological disasters induced by natural hazards force millions of people to move within their own countries and across international borders.”

Summary Report for the WCDRR Working Session “Preparing for Disaster-Induced Relocation” (UNISDR 2015c, 1)

Risk Communication and Public Participation

The Sendai Framework contains some references to assessing and communicating disaster risks, including in relation to industrial accidents such as Fukushima. The Framework emphasizes improving access to multi-hazard disaster information, and the need to monitor, assess and understand risks and share such information.

“...in order to reduce disaster risk, there is a need to address existing challenges and prepare for future ones by focusing on: monitoring, assessing and understanding disaster risk and sharing such information and how it is created...”

Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR 2015b, 11)

The experience from Fukushima suggests that risks posed by occurrence of technological disasters at the important industrial facilities should be openly communicated to the residents of the surrounding communities. Public participation should be encouraged on a regular basis and planned for in the process of formulating the disaster risk reduction strategies, emergency preparedness plans and post-disaster recovery measures through allocation of sufficient resources, close coordination between the involved stakeholders and transparent moderation of the consultation processes.

With regard to public participation, the framework broadens the list of relevant stakeholders that governments should engage with in the design and implementation of relevant policies by including “women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the community of practitioners and older persons” (p.5).

As a cross-cutting point, the Sendai Framework also acknowledges the overall need for “a more explicit focus on people and their health and livelihoods and regular follow-up” (p.6), thus promoting a more human-centred approach to communicating risks and managing hazards.

“Disaster risk reduction requires an all-of-society engagement and partnership. It also requires empowerment and inclusive, accessible and non discriminatory participation, paying special attention to people disproportionately affected by disasters”

Sendai Framework for Disaster Risk Reduction 2015-2030 (UNISDR 2015b, 13)

The Role of Science and Technology

Research, scientific and technical information have a key role to play in DRR, which is acknowledged in the Sendai Framework (UNISDR 2015b, para. 25g). In particular, the shift towards managing risks rather than disasters will require a better understanding of risk. There is a need for research on the causes and nature of disaster risk and on disaster impacts and reduction measures, as well as methodologies for risk assessments.

On 27–29 January 2016 the global DRR science and technology community gathered at a UNISDR-hosted conference in Geneva, which resulted in the Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030, as well as a Science and Technology Partnership comprising over 65 organizations. The FGC programme contributed to the conference and presented FGC research findings, which received significant interest from international DRR experts. FGC participation also helped to highlight the need for research on nuclear and technological hazards, which were identified as one of four priorities for DRR research by the conference (UNISDR 2016, 3).

Transition from Relief to Recovery

There has been a long-standing discussion within the international community about the need to improve the transition from crisis response or humanitarian relief to the longer-term recovery and development process, but it is noted that “the outcomes of interventions continue to be problematic” (Chandran et al 2015, 5). In the DRR policy context, many countries have plans for immediate response to disasters, but not for the longer-term recovery. This policy vacuum means precious time is lost setting up recovery mechanisms in the aftermath of disasters. There is also a “recovery gap” in international funding, largely due to structural constraints in the humanitarian system — with funding cycles usually short term (1–3 years), and with no funding available for preparedness before the disaster strikes.

Within the DRR community, much discussion on this issue has centred on capacity building so that when disasters reoccur people are able to “bounce forward” or to “build back better” – both terms being increasingly adopted by the international organisations working in the area following the 2004 Indian Ocean tsunami that calls for “the restoration of communities and assets in a manner that makes them less vulnerable to disasters and strengthens their resilience” (UNISDR 2015e, 1). UNDP has also popularized the term “early recovery”, although practitioners working in the field of humanitarian assistance and DRR consulted by the FGC programme noted that it remained unclear whether this should be seen as an approach or as a coordination mechanism for different stakeholders working in transitional contexts between relief and recovery.

An FGC panel discussion at the WCDDRR focused specifically on the response-to-recovery transition, considering lessons from Japan’s experience in terms of recovery planning in the displaced communities, meeting the needs of persons with disabilities, the provision of medical care, housing and job creation schemes, and relevant issues of accountability. In particular, it highlighted the need for inclusive policy formulation that can meet the evolving needs of affected people. A series of FGC Working Papers by the presenters were published after the panel.

Japan's experience with relief-to-recovery transition after the March 2011 earthquake, tsunami and nuclear disasters has also shown that response and relief measures carry long-term implications for the recovery process. For example, in the process of crafting the institutional and legal framework for environmental remediation of the areas affected by the nuclear accident in Fukushima, decontamination became closely linked to other critical questions such as reorganization of evacuation zones and adjustment of compensation schemes. In practice, however, too much attention was focused on quick implementation of decontamination without proper coordination with the other elements and in effect this has deepened people's distrust in public authorities.



Tohoku area, Japan - Japan Self-Defence Force members unload bottled water for 3.11 survivors, March 2011

The relief-to-recovery transition after Japan's triple disasters has also been marked by local variations in the pace of recovery. Most of the heavily affected coastal areas already suffered from depopulation prior to 2011, but the triple disasters has exacerbated this process. Many younger residents and families in their prime working age often felt frustrated by the slow-paced reconstruction to take off in the coastal regions and moved to urban centres in search of better housing, educational and/or work opportunities.

The experiences of Japan and other countries have shown that successful relief-to-recovery transition depends upon information-sharing and coordination between the relevant actors involved. There is a broader confluence of actors in the transition process, which hardly ever constitutes a linear process, and this leads to as much exclusion as inclusion. National ownership of the policy reorientation process during the transition is a fundamental prerequisite for recovery after a crisis situation, but greater stakeholder engagement at both international and sub-national levels and more flexible funds are needed to ensure that this process responds to the changing needs of affected populations. Reducing and further managing disaster risks should be the core, guiding principle, both in the immediate response to disasters (for example, in the form of risk assessments for the location of temporary shelters) and in the long-term process of recovering from disasters.

Mental Well-being and Disability in the DRR Agenda

There is an urgent need to integrate perspectives on mental well-being and disability into national and international DRR frameworks. As was clearly evident during and since 3.11, persons with disabilities face higher risks and are disproportionately affected by disasters, compared with the general population. These risks would be higher in those who experienced nuclear disasters, regardless of actual physical exposure to the radiation compared with other types of natural disaster. These conditions can have long-term consequences, medically, psychologically, socially and economically and can affect recovery and reconstruction if not addressed.

Despite being an area in critical need of attention, prevention and intervention concerning mental well-being and disability has, however, been frequently neglected in the discourse of the international community. Persons with mental or intellectual disabilities often suffer from insufficient inclusion in all aspects of DRR measures at both the policy and programme levels. UN system organizations including the UN Population Fund (UNFPA), the World Health Organization (WHO), the UN Children's Fund (UNICEF), UNDP and the World

Bank Group have been increasingly prioritising the integration of mental well-being and disability into their activities. There is also a consensus that achieving internationally agreed SDGs requires inclusion of mental and psychosocial well-being as well as the rights of persons with mental or intellectual disabilities.

The FGC programme organized an Expert Group Meeting on Mental Well-being, Disability and Disaster Risk Reduction (27–28 November 2014) at UNU headquarters in Tokyo. It was co-organized with the UNU International Institute for Global Health (UNU-IIGH) and the UN Department of Economic and Social Affairs, Secretariat for the Convention on the Rights of Persons with Disabilities (UN DESA/SCRPD), the World Bank Tokyo Development Learning Center (WB/TDLC) and the National Center of Neurology and Psychiatry (NCNP), Japan. The meeting produced a set of recommendations (UNU et al 2014) for incorporating mental wellbeing and disability issues into the global post-2015 framework for disaster risk reduction (see box). These recommendations resulted in the inclusion in the Sendai Framework of mental health services and psychosocial support as important measures for disaster recovery.

Involving community members, including persons with mental or intellectual disabilities, in planning, design and implementation, as well as monitoring of DRR measures, can enable disability-inclusive DRR to ensure accessibility for such persons. It is essential to learn from experience from community-based rehabilitation as well as community-driven development to tailor DRR measures that are culturally sensitive and more accessible. There is increasing recognition of the importance of having a support system for the families of, or support providers for, persons with mental or intellectual disabilities, both before and after disasters. It is also necessary to develop a support system to meet the needs of persons with mental or intellectual disabilities who have lost family members or support providers in disasters.

Key Recommendations of the UN Expert Group Meeting on Mental Well-being, Disability and Disaster Risk Reduction, Co-organized by the FGC Programme

- 1 Ensure that DRR policies and programs always include mental well-being and disability as a priority.** The international community needs to include mental well-being and disability as a priority theme in all DRR frameworks. Humans are emotional beings; their mental health and psychosocial well-being play key roles in resilience, recovery and reconstruction. Integration of mental health and psychosocial well-being and the rights of persons with mental or intellectual disabilities makes DRR more effective, resilient and robust.
- 2 Add targets and indicators on mental health and psychosocial well-being in DRR.** The Hyogo Framework for Action 2* should include mental health and psychosocial well-being as transformative new targets and also as indicators to represent subjective well-being towards optimizing resilience of people and society.
- 3 Include persons with mental or intellectual disabilities in DRR.** Disability-inclusive DRR always has to ensure the inclusion of persons with mental or intellectual disabilities. Persons with mental or intellectual disabilities need to be included in disability frameworks and movements; they cannot be excluded from the benefits created by the progress made in DRR.
- 4 Develop guidelines on mental well-being and disability in DRR.** Practical global guidelines on mental well-being and disability in DRR should be developed in the United Nations system.
- 5 Include mental well-being and disability in all efforts related to peace and security, development and human rights.** Mental well-being and disability need to be mainstreamed in existing work to advance peace and security, development and human rights, including the upcoming Post-2015 Development Agenda**, to optimize resilience in response to disasters.
- 6 Establish a multi-stakeholder working group on mental well-being and disability in the United Nations system.** A multi-stakeholder focus group on mental well-being and disability should be established as part of the stakeholder group for DRR and sustainable development in the United Nations system.

* The “Hyogo Framework for Action 2” was the working title of the Sendai Framework for Disaster Risk Reduction 2015–2030, prior to its adoption in March 2015.

**The “Post-2015 Development Agenda” was the working title of the 2030 Agenda for Sustainable Development, prior to its adoption in September 2015.

Source: UNU et al (2014)

An aerial photograph showing a long, single-story row of prefabricated temporary housing units. The units are light-colored with dark roofs and are arranged in a neat line. A road with a white guardrail runs alongside the housing, with a light blue van driving away. The background shows a green, hilly landscape under a clear sky.

2 Displacement and Livelihoods

Miharu, Fukushima Prefecture – Prefabricated temporary housing for nuclear evacuees, June 2014

The FGC programme identified the situation of the people and communities displaced by the 3.11 disasters, and the challenges that they are facing in the process of restoring their livelihoods and rebuilding their lives, as one of its central research themes. In Fukushima displacement has had a profound impact on the recovery of the affected people and communities — and at the same time in international policy discussions there has been an increasing focus on displacement and livelihood issues.

Displacement, whether induced by conflicts or disasters, continues to be one of the greatest humanitarian and development challenges of the 21st Century. With estimates showing that the likelihood of being displaced by a disaster has increased by 60% between 1970 and 2014, disaster-related displacement has been gaining more international attention (IDMC 2015, 19). This increase is considered to be an outcome of three key mutually reinforcing trends: (i) a greater concentration of people in locations exposed to hazards, (ii) the increasing vulnerability of these people and (iii) the more frequent occurrence and intense nature of extreme weather events in the context of climate change (IDMC 2015). Consequently, the plight of people displaced by disasters is starting to gain greater recognition in the global policy agenda. The 2030 Agenda for Sustainable Development that was adopted by UN Member States in September 2015 highlights both disasters and displacement as key risks that “threaten to reverse much of the development progress made in recent decades” (UN 2015a, 5).

Displacement often carries devastating consequences for the affected people and communities as they leave behind their familiar environment, social ties and livelihoods. Once the immediate shock that has triggered displacement passes, securing livelihoods becomes a pressing issue as it plays an essential role in the process of recovering daily lives. People’s ability to restore their livelihoods and rebuild their lives in a changed environment is thus considered paramount for resolving displacement situations. Noting the importance of focusing on livelihood recovery early on, the UN Secretary General’s Report for the World Humanitarian Summit has called for a fundamental shift in the approach to displacement, from “meeting immediate humanitarian needs to one that preserves the dignity and improves the lives and self-reliance of displaced persons” (UN 2016, 22). It has been noted that to be truly effective such a shift has to be better informed by “the complexity of livelihood strategies open to displaced people, the barriers they face and the steps they are taking on their own” (Crawford et al 2015, 3).

In Japan, the large-scale displacement induced by the 2011 earthquake, tsunami and — above all — radioactive contamination following the nuclear disaster has been one of the most visible consequences of the disasters. The damage incurred by the triple disasters, coupled with frequent delays in recovery efforts, has exacerbated out-migration from many of the affected communities in Northeast Japan that had already been suffering from depopulation prior to 2011. As displacement becomes increasingly protracted, it is threatening the very existence of these communities by damaging their social fabric, exacerbating labour shortages and leading to closure of businesses and institutions that are vital for the recovery of critical socio-economic functions and people’s livelihoods.

FGC research has explored the relationship between such issues and processes by examining policies and practices addressing displacement and livelihood recovery, from the perspectives of key stakeholders involved in the recovery of the affected communities. As outlined in Table 3, field research involved in-depth interviews and focus group discussions with residents and local

government representatives from the communities displaced by the Fukushima nuclear disaster and with civil society organisations supporting nuclear evacuees in Fukushima and in other parts of Japan. In addition, numerous expert consultations were undertaken through research missions to international organisations and through regular engagement with national and international policymakers, practitioners and researchers working in the area of crisis response, humanitarian assistance and disaster risk reduction, as well as recovery and development of crisis-affected communities. Insights gained from the fieldwork and expert consultations were put into context through an extensive review of relevant policy documents, statistical data, research literature and media reports on the topics of displacement and livelihoods in the context of disasters and other crisis situations.

Table 3: Main research activities on displacement and livelihoods

Main Research Activities		Number of Informants
Fieldwork in June and September 2014	Interviews with local government representatives from all 12 municipalities that comprised the evacuation zones established by the government in 2011.	25
	Focus group discussions with residents from 4 displaced municipalities, which were completely evacuated after the 2011 accident.	23
Fieldwork in June–July 2015	Interviews & focus group discussions with representatives of support organisations for Fukushima evacuees (many of whom are evacuees themselves) based in different parts of Japan.	27
	Consultations with representatives of international organisations in New York (May 2014)	10
Research Missions	Consultations with representatives of international organisations in Vienna (May 2014)	9
	Consultations with international organisations in Geneva (October 2014, October 2015 and December 2015)	21
		Total 115

Addressing Protracted Displacement and Searching for Durable Solutions

Globally, disasters are one of the main causes of displacement. An average of 26 million people have been displaced by disasters each year since 2008 (IDMC 2015, 19), the vast majority of whom are internally displaced persons (IDPs). The UN Guiding Principles on Internal Displacement define IDPs as people displaced by “armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border” (UN 1998, 5). However, the dominant perception among high-income countries has been that displacement only affects countries in the developing world. While the largest share of IDPs is recorded in developing countries, the mass displacement that followed March 2011 disasters in Japan served as a clear reminder that displacement can become a serious issue even in the world’s richest countries.

Over 470,000 people were considered displaced by Japan’s 3.11 disasters. Five years later, the official count of evacuees stands at some 174,000 persons (Reconstruction Agency 2016). The largest number of evacuees came from Fukushima prefecture, which suffered the most severe impacts of the nuclear accident at the Fukushima Daiichi power station. Their number peaked in May 2012, reaching 164,865, and as of April 2016 the count was still 97,333 people (Fukushima Prefectural Government

2016a, 3). Although they are not generally referred to as such in Japan, the situation of Fukushima's nuclear evacuees clearly represents an IDP issue.

There is no legal IDP status under current international law, and the UN Guiding Principles, although regarded as an important instrument for addressing internal displacement, have no binding power. Yet recognising displaced people as IDPs is important, as the Guiding Principles clearly articulate their rights to durable solutions. The concept of a durable solution is further elaborated by the instruments developed by the Inter-Agency Standing Committee (IASC) – a humanitarian coordination mechanism comprising both UN and non-UN actors. According to the IASC Framework for Durable Solutions: “a durable solution is achieved when IDPs no longer have specific assistance and protection needs and [...] can enjoy their human rights without discrimination resulting from their displacement” (IASC 2010, 5).

The IASC framework, as well as its Operational Guidelines on the Protection of Persons in Situations of Natural Disasters (2011, 46), recognise three principal settlement options towards achieving a durable solution:

1. sustainable reintegration at the place of origin (hereinafter referred to as “return”);
2. sustainable local integration in areas where internally displaced persons take refuge (“local integration”); and
3. sustainable integration in another part of the country (“relocation” or “resettlement”).

Displacement in the context of disasters is often assumed to be short-term and temporary in nature, but this does not hold true for many disaster-induced displacement situations, and the process of finding durable solutions is far from straightforward. Radioactive contamination from severe nuclear disasters, in particular, leads to prolonged displacement situations in which affected areas remain unsafe for habitation for years if not decades. This poses complex questions for policy, legal and institutional frameworks concerned with residency, housing, land and property issues, and with service provision in the realms of healthcare, education, employment and welfare.

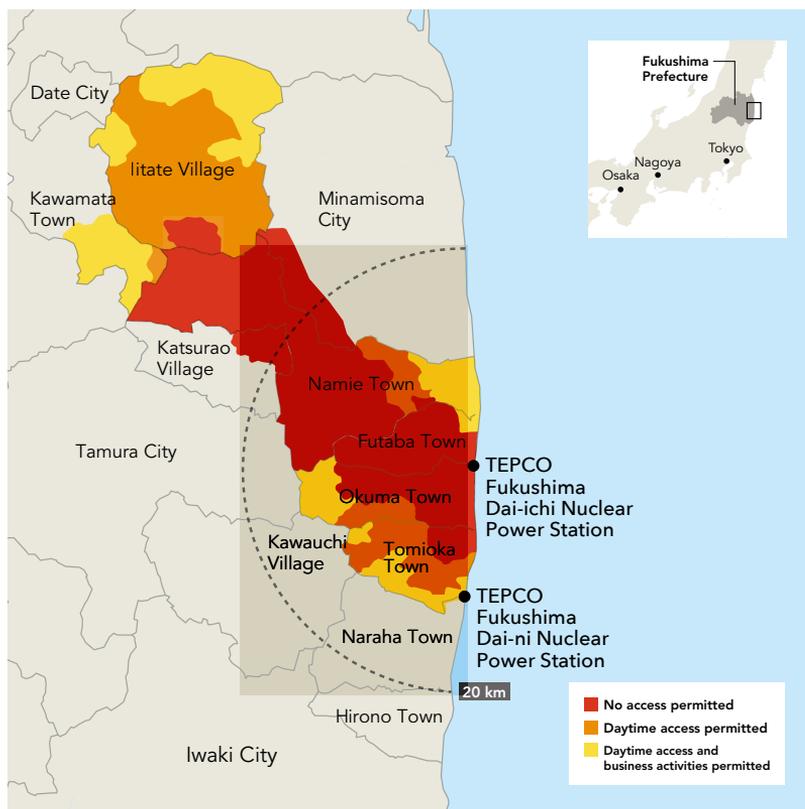
The living arrangements of many Fukushima evacuees exemplify such challenges. According to a survey conducted in early 2016, respondents from Fukushima have on average moved 4.6 times since the disaster (NHK 2016, 8). Frequent moves often led to changes in household structures, with younger family members typically moving into a different type of temporary accommodation than the elderly. In the areas which have been reopened for residence since the nuclear accident, some people spend a few days a week in their original place of residence and the other days in their place of evacuation. Similarly, some families live separately, with fathers often returning to the original place of residence for work, while the mother and the children remain in the place of evacuation.

There is a thin line between evacuation and displacement, and it is difficult to determine when displacement actually ends. As such, return to the original place of residence, local integration in the place of evacuation or resettlement elsewhere does not necessarily mean that the solution to a particular displacement situation has been found. To be deemed sustainable, each settlement option has to respect the right of IDPs to decide for themselves. Furthermore, the IASC framework underlines the importance of IDPs feeling safe and secure, having access to adequate housing and being able to return to normality — with access to basic services, livelihoods and employment without discrimination — as important conditions for any solutions to be considered sustainable.

Ensuring voluntary engagement of the evacuees, however, has not received sufficient attention in the response of the Government of Japan to the displacement situation in Fukushima. In the wake of the nuclear accident the government took into account the reference public exposure dose in the range

20–100 millisieverts (mSv) per year used for emergency situations by the International Commission of Radiological Protection (ICRP), and increased the annual dose limit for public exposure to radiation from 1 mSv, which is defined by the ICRP as a public exposure dose limit in normal situations, to 20 mSv per year (Cabinet Office Nuclear Disaster Victims Support Team 2013; Aoki 2015; Shimizu 2016). Meanwhile, the target of less than 1 mSv per year was kept as the long-term goal for the government's efforts to reduce public exposure to radiation, such as decontamination and monitoring activities (Cabinet Office Nuclear Disaster Victims Support Team 2013). Soon after the nuclear disaster, the government rushed to promote the return of displaced residents as the way of moving forward with recovery in Fukushima. It has since also set an evacuation standard at the level of 20 mSv per year and applied this for lifting evacuation orders and reopening an area as safe for residence (Aoki 2015). However, as the limitations of extremely expensive decontamination efforts became clear, it also became evident that large parts of evacuation zones were not likely to meet such criteria in the near future. This led the government to slightly revise its policy in December 2013, by adding some support measures for those seeking to “restart their lives elsewhere”, while maintaining its original emphasis on “speedy return” to the affected areas (Nuclear Emergency Response Headquarters 2013, 2).

Figure 1: Mandatory evacuation areas, July 12, 2016



Source: adapted from the Cabinet Office of the Prime Minister of Japan.

This is reflected in the reorganisation of the evacuation zones, which had the effect of creating different categories of evacuees. The different zones are distinguished based on the average level of radiation recorded in each district, but in reality radiation has not spread evenly and there are radioactive “hotspots” within as well as outside the zones, and even outside Fukushima prefecture. People displaced from the areas under evacuation orders are referred to as mandatory evacuees. In the early aftermath of the nuclear disaster, the evacuation zones set up around the damaged nuclear plant involved 12 municipalities, forcing over 110,000 people to leave from this area (Cabinet Office Nuclear Disaster Victims Support Team 2015). Since then, the evacuation orders have been lifted in some areas, and the current evacuation zones involve 8 municipalities (see figure 1), thus significantly reducing the official count of mandatory evacuees, although few people have actually returned or intend to do so. Despite this, the government has further announced that it intends to lift the evacuation orders from all of the remaining yellow and orange areas by March 2017. Although the government maintains that lifting of evacuation orders “does not mean enforcement of return for the [affected] residents” (Nuclear Emergency Response Headquarters 2015, 7), its support measures clearly remain more focused on those intending to return than those considering other settlement options.

In addition to evacuees from mandatory evacuation zones, it is roughly estimated that over 40,000 or 50,000 people have left other parts of Fukushima (MEXT 2011, 2), where radiation increased but the areas were not designated as evacuation zones. These people are often referred to as “voluntary” evacuees, but no official definition exists, which partly explains the lack of systematic data on this group. A significant portion of them are considered to be mothers with young children, who typically had their husbands staying behind for work reasons (Tomoyasu et al 2015).

Mandatory evacuees receive compensation according to factors such as the category of the area where they previously lived, the value of any property that they owned in the area, and their pre-disaster employment status. In contrast, voluntary evacuees received only limited one-time payments and are not entitled to the same assistance. This differing treatment has resulted in disparities between the evacuees in terms of compensation payments and relief measures, giving rise to tensions within the affected families and communities. Such tensions are further complicated by differences between those who evacuated within Fukushima and those who evacuated to areas outside Fukushima, between evacuees who were affected by the nuclear accident and those who were also affected by the tsunami, and/or between those from communities that had gained economically from hosting the nuclear power plants and those from communities that had not.

Social divisions have also deepened due to differences in perceptions of radiation risks and differing attitudes towards return. While many of the elderly residents wish to return to their homes and communities, some of them are hesitant to express such desires, knowing that their children and/or grandchildren are unwilling to do so. Underlying this is an inter-generational divide in the perception of return as a potential durable solution: the elderly often see return as more desirable than younger generations do, with the latter tending to be more concerned about the risks posed by radiation. At the same time, protracted displacement inevitably diminishes the hopes of resuming a normal life in the original place of residence and many people — especially younger people with small children — have had to start rebuilding their lives elsewhere and have no plans to return. Consequently, the numbers of people returning to the parts of the evacuation zones that have reopened for residence remain low, and primarily comprise elderly residents. For example, large parts of Kawauchi village reopened for residence in April 2012 and the evacuation order was lifted for most of its remaining districts in October 2014, but still only 63% of its pre-disaster population had returned as of December 2015 (Cabinet Office Nuclear Disaster Victims Support Team 2016, 1), with 40% of the returnees being over the age of 65 (Sankei News 2016).



Kawauchi, Fukushima Prefecture – A returnee's house, June 2014

It is typically easier for younger, healthier generations with more social capital to establish a new life after displacement, and this is evident in the rapid aging of the population living in temporary housing complexes, and even in the newly constructed public housing for disaster-displaced people, known as disaster recovery housing. Statistics for Fukushima prefecture show that 38.7% of residents in prefabricated temporary housing were over the age of 65 in May 2015 (Fukushima Prefectural Government 2016b), whereas this number stood at 39.2% in subsidised disaster recovery housing as of January 2016 (Asahi Shimbun 2016a). Essentially, this reflects the negative social selection process commonly seen in displacement situations, in which “the weaker and more vulnerable members of the group, namely the sick, the disabled, single mothers with young children and older persons” (Help Age International and IDMC 2012, 34) tend to lag behind in the search for durable solutions. In this context, local authorities are struggling with the challenge of having to “build back better”. It is difficult to make progress in the recovery process that is tangible enough for their residents and at the same time cater to the needs of rapidly aging populations. In a survey conducted between December 2015 and February 2016, 50% of respondents in Fukushima expressed a feeling that recovery was not progressing, whereas this view was shared by only 18% of respondents from Miyagi and Iwate — the two prefectures worst affected by the tsunami (NHK 2016, 3).

Against this backdrop, discussions with both mandatory and voluntary evacuees revealed that many feel trapped in uncertainty: being unable to plan their future in a context where communities have become dispersed and divided, livelihoods have been disrupted, and the prospects for regaining normality continue to dwindle. This situation for Fukushima evacuees confirms the importance of the conditions mentioned in IASC framework for any settlement option to be considered sustainable.

At the same time, it equally underlines the need to address the less visible but influential social and psychological legacies of nuclear disasters, such as the disempowering effects of persistent uncertainties and the multi-layered social divisions that damage community ties.

The search for durable solutions must be approached as a longer-term resilience issue. There is a need to revisit existing policy, legal and institutional frameworks to provide targeted and timely support tailored to the changing realities of displaced populations. In the case of Fukushima, this firstly calls for realistic recovery plans and policy timeframes. Coherent and consistent recovery policies can only be formulated where there is close cooperation between all levels of governance that is backed by a genuine political commitment to engage with the affected population. Ensuring their participation requires not only sufficient resources and competent, transparent leadership, but also a strong and persistent commitment by all stakeholders, including public authorities and experts assisting the recovery planning. Recovering from a nuclear disaster also requires a careful and sensitive approach to addressing social divisions within the affected communities. In particular, this concerns the issues of evacuation zoning and compensation schemes. In addressing these and other issues, continued efforts are needed to involve IDPs in policy processes, accompanied by support measures that are tailored to their changing situations. This can help to increase certainty about their future options, allow them to take better, informed decisions and pave the way for fostering a sense of ownership in the recovery process among the displaced populations.

The case of Fukushima's nuclear evacuees also has broader implications for the durable solutions framework. The existing IASC framework does provide crucial guidance, but there is a need for greater appreciation of the long-lasting and divisive nature of nuclear disasters, which would enhance its relevance in these situations. Primarily, this calls for increased awareness of the sheer scale and importance of the comprehensive reforms to policy, legal and institutional systems that are required to address the protracted displacement resulting from such situations. Likewise, there is a need for greater acknowledgement that overcoming the destabilising and disempowering "uncertainty trap" experienced by displaced populations takes a long time. Finally, it should not be forgotten that addressing social and psychological consequences is as important as the reconstruction of physical infrastructure and environmental remediation.

Recovering livelihoods and restarting lives in displacement

The 3.11 disasters have had a tremendous impact on livelihoods. The disasters negatively impacted 25.9% of jobs in Fukushima prefecture alone (ILO 2015, 19). In a survey conducted in February 2016, 25% of respondents from Fukushima stated that they had lost their jobs, while 67% reported a decrease or loss of income in the years following the disaster (Asahi Shimbun 2016b). The nuclear accident has devastated the reputation of agricultural and fisheries products from the entire prefecture of Fukushima, and prices and sales are yet to recover. The number of tourists visiting the prefecture has also dropped, leading to significant losses in the tourism industry and related service industries. Many businesses and public enterprises were forced to close, and only a few reopened, either in other locations or in their original locations following adjustments to the evacuation zones. A public-private initiative was set up in August 2015 to survey some 8,000 business owners from the 12 municipalities that comprised the evacuation zones in 2011. According to the data gathered from 3,373 business owners as of February 2016, 20% have restarted operations in their original communities and 27% in the place to which they evacuated (Public-Private Joint Team for the Recovery of Fukushima's Sousou Region 2016, 3). Yet there is also worrying anecdotal evidence suggesting that the sustainability of businesses that have restarted operations may be questionable. Many had to

downsize in order to make restarting possible, while others are operating at a loss and are only surviving thanks to the compensation payments.

According to the 2014 Human Development Report, which focused on reducing vulnerability and building resilience, “investing in jobs and livelihoods can help communities and individuals recover from crises in the short term and increase resilience to the challenges of future crises” (UNDP 2014, 8). The more severe the impact of a disaster, however, the longer it takes for people to subsequently rebuild their lives, thus making them also more vulnerable to shocks along the way. This is particularly true for people who have been displaced and whose coping capacity has been substantially undermined. Livelihood strategies do not come about by themselves, but are shaped by the environmental, social, economic and political contexts in which people live. Thus, while access to livelihoods and employment are rightly used as the core criteria to determine the extent to which durable solutions have been achieved, in the longer term it is the ability of displaced people to achieve social integration that becomes an important indicator of their wellbeing in these environments. In fact, losing one’s livelihood does not simply represent an economic risk to one’s quality of life through loss of income. Especially in protracted situations, it often entails loss of social positioning and feelings of worth and dignity, and can thus negatively impact on social, physical and psychological well-being. Similarly, the process of livelihood recovery in the aftermath of disasters is significantly conditioned by structural factors such as institutional and policy responses that are essentially political in nature.

Several relief measures were introduced in response to the negative impacts of the March 2011 disaster on people’s livelihoods. For instance, emergency job creation schemes were set up in Fukushima prefecture, and the number of people employed under such schemes has more than doubled over the course of the four years after the disaster: starting from some 18,400 people employed in the first year and reaching nearly 38,600 people in the fourth year (Fukushima Prefectural Government 2012 and 2015a). Besides contributing to securing employment for disaster-affected people, such schemes have been found to be effective in supporting various types of relief activities carried out by local government authorities and civil society organisations in the aftermath of the disaster (Nagamatsu 2015 — FGC Working Paper No. 3). Likewise, the above-mentioned joint public–private team was set up to survey all of the business owners from the mandatory evacuation zones and design support schemes tailored to their situations, although this effort has been criticised for coming too late.

Several types of emergency temporary housing schemes were also set up to provide evacuees with a base from which to start the process of restoring their livelihoods and rebuilding their lives. These included prefabricated temporary housing complexes provided for mandatory evacuees around Fukushima prefecture, and rented apartments appropriated as temporary housing both inside and outside the prefecture. The number of people benefiting from such temporary housing schemes inside Fukushima prefecture peaked in March 2012 at 98,000, and was still at nearly 46,000 in February 2016 (Fukushima Prefectural Government 2016c). In the immediate aftermath of the disaster, rented flats appropriated as temporary housing were provided to any evacuees (with the rent paid by the authorities), which made evacuation a viable option for many of the evacuees from outside the officially designated evacuation zones. In Fukushima, the appropriated temporary housing was mostly reserved for mandatory evacuees, so many voluntary evacuees ended up in flats outside Fukushima.

Five years after the nuclear disaster in Fukushima, the restoration of livelihoods is evolving within the context of a transition from immediate response to a longer-term recovery process in which existing relief measures are being phased out. Most of the emergency job creation schemes were initially planned for 3 years, and then extended several times in recognition of the long-lasting effect of the disaster on the labour market, but most of these schemes were terminated in April 2016.

Likewise, the emergency temporary housing was initially provided for 2 years, and leases have since been extended several times for further 1-year periods. In June 2015 the government announced that all temporary housing schemes were to be terminated by March 2017. Mandatory evacuees who meet certain conditions have the option to apply for subsidised disaster recovery housing being built in various locations around Fukushima. In contrast, no housing schemes are in place for voluntary evacuees, although they can apply for a small moving support grant if they decide to move back to Fukushima prefecture and, if their income is below a certain threshold, for a limited period with a rent subsidy (Fukushima Prefectural Government, 2015b).

The phasing out of relief measures adds to the uncertainty experienced by the displaced populations. It also means that the situations from which evacuees embark on restoration of their livelihoods are growing increasingly diverse. In this uncertain and evolving context, many evacuees feel that they have to restart their lives while in limbo. For mandatory evacuees, the key question in the early stages after the disaster was when it would be possible to return home. As their displacement grew more protracted, however, the prospects for reclaiming normal lives after returning to their communities dwindled and attitudes toward return diversified. Similarly, many voluntary evacuees moved without setting a timeframe for return, and as the years have passed in uncertainty, many are now struggling to plan their future.

Displaced famers are facing a particular dilemma. Though many feel strongly attached to their land, they see little chance that this land will be able to provide them with viable livelihoods, having



Katsurao, Fukushima Prefecture – An evacuee cleaning up his home upon a brief visit

been designated as off-limits following the nuclear accident. For the elderly this often signifies a deeper loss of meaning for their lives. Unable to tender their plots of land, many of them not only feel useless because they cannot provide for themselves, but also because they are no longer able to participate in reciprocal exchanges within their families and communities.

Restoring livelihoods while adjusting to a different lifestyle in the place of evacuation is not a straightforward process. For former business owners, making the investments required to reopen in a new location is both risky and costly, and could lead to conflict with similar local businesses. Neither is finding other types of employment a straightforward solution, as the labour market in the disaster-affected prefectures — and especially Fukushima — has been characterized by a stark mismatch between the types of jobs available and the types of jobs that the evacuees are seeking. In the case of voluntary evacuees, mothers who evacuated with their children and became de facto single parents often encountered employers who were unwilling to hire them because they could not say how long they would stay, and because they would have to take time off work if their children fell ill as they had no informal support network in that location to assist with childcare.

While every case of displacement is unique and specific, difficult issues often arise related to the relationship between displaced people and their host communities due to differences in relief measures or compensation being provided. Restoration of livelihoods for the displaced persons should therefore be understood in relation to people's ability to rebuild their lives as full members of their new communities. For Fukushima's IDPs, this integration challenge is often compounded by a lack of understanding of, and empathy for, their situations on the part of their host communities. Discussions with mandatory evacuees revealed that it is not uncommon for them to be met with envy and resentment from local residents who think that they are competing for scarce jobs, when they could live off compensation. Faced with such reactions, some decide to conceal their evacuee status, which adds to the stress of their integration process. Voluntary evacuees often feel that their host communities regard them as having overreacted to the situation in Fukushima, as they do not understand that radioactive fallout from the nuclear accident also affected areas located outside the officially designated evacuation zones. Many voluntary evacuees also feel that they cannot easily share the difficulties they have encountered as evacuees with their relatives or friends back in Fukushima, because due to divergent views about radiation risks some of them regard evacuation as having been unnecessary, or because others were unable to evacuate even if they wanted to, for economic or other reasons.

The integration challenge also requires that the evacuees feel at ease with the process through which they make choices about how and where to restart their lives. Discussions with the evacuees — both from the mandatory evacuation zones and from outside these zones — revealed that many of them feel that instead of being provided sufficient time and an enabling environment to think through their options, they had to make important decisions under pressure. Mandatory evacuees feel pressured and powerless in the face of the top-down policies encouraging them to return home by lifting the evacuation orders and eventually terminating compensation. For the voluntary evacuees there is often pressure to return due to mounting economic and psychological stress from the prolonged evacuation that has led to split households, straining finances and relationships. In this context, many of the evacuee mothers feel they are faced with the difficult task of weighing risks. For example, some had to weigh the stress of separating their children from their fathers and friends against their concerns about remaining radiation, while others experienced a significant deterioration in their relationships with their husbands, and felt obliged to return in order to avoid divorce.

Livelihood restoration involves a dual challenge of re-establishing the means for making a living while integrating into a new environment. Fukushima's nuclear evacuees are facing this challenge

within the context of a response-to-recovery transition characterised by increasingly diversifying living conditions. Due to the uncertainty involved in this transition, emphasis must be placed on supporting holistic recovery by focusing on the development of the displaced people's livelihood strategies as well as their ability to integrate and adapt to a new environment. In the case of Fukushima, it is paramount that the shift from existing relief measures to longer-term recovery policies is informed by a thorough analysis of the evacuees' diverse conditions. Although a variety of resources have been channelled into surveys aiming to measure the return intentions of mandatory evacuees, no systematic assessment has been conducted on their capacity to sustain themselves without compensation. Likewise, there is a serious lack of data on conditions faced by voluntary evacuees and those whose compensation has been terminated following changes to the evacuation zones.

A holistic recovery also requires livelihood support programmes to facilitate community integration for displaced people. Providing employment counselling and support measures such as training courses and employer matching services is essential to ensure that displaced people remain active and to facilitate the process of restoring livelihoods — including transitional livelihoods. To provide meaningful livelihood support programmes that are tailored to the needs of the nuclear evacuees, however, the local authorities of the host communities require both human and financial resources. In addition, this emphasis on livelihood recovery should not lead to exclusion of vulnerable populations that may not be able to work, such as the elderly and mothers with young children, who need special support measures to facilitate their integration.

The tensions that exist within the displaced groups, and between the evacuees and their host communities, also underline the importance of fostering mutual understanding to overcome social divisions stemming from differences in compensation, relief measures and perceptions of radiation risks. First and foremost, this calls for meaningful investments aimed at relieving the pressures on the host communities' public and social services that have been caused by evacuees' inflows. It also requires allocating resources for setting up initiatives focusing on common interests, uniting different groups that make up displaced populations and host communities, such as parents' groups or clubs for the elderly.

From a more general perspective, the Fukushima case offers insights into what is needed to enable a smooth response-to-recovery transition in countries recovering from large-scale disasters. In this context, policymakers should formulate recovery plans while acknowledging that people need some degree of certainty about their situations in order to make longer-term plans for their futures. The transition also requires an adjustment of policies based on carefully considered criteria that allow for flexibility when applied to real-life situations. In essence, this means creating options for the displaced by enabling them to choose where to rebuild their lives without pushing them in a particular direction. While there may be short-term political gain in swiftly shifting from relief to recovery, redesigning policies without considering the actual needs of the displaced people risks creating serious problems of socio-economic marginalisation that would be far more difficult and costly to solve in the longer term.



3 Risk Communication and Nuclear Accidents

Tokyo – Discussion during the FGC workshop on risk communication, November 2015

The release of a large quantity of radioactive substances from the Fukushima Daiichi nuclear power plant has led to considerable effects on the environment and human well-being. Due to the long lifespan of some radioactive materials, environmental remediation is expected to take many decades. Initial assessments of WHO (2013) and UNSCEAR (2014) suggest that the direct physical health consequences of radiation will be limited. However, feelings of confusion, uncertainty and fear remain strong among the people affected by the accident, which is complicating and delaying the recovery process. As many countries continue to maintain and develop nuclear industries, the Fukushima nuclear accident highlights not only to Japan, but also to the international community, the need for risk communication policies and strategies appropriate and effective for the management of nuclear accidents.

Along with the progress made in decontamination and reconstruction of infrastructure, the evacuation orders for some areas have already been terminated (Fukushima Prefectural Government 2016a). The Government of Japan aims to discontinue evacuation orders by March 2017, except for those areas where currently no access is permitted and radiation levels are expected to remain above 20 millisieverts (mSv) per year (Nuclear Emergency Response Headquarters 2015). This has exacerbated the disparities between the desire of the Japanese government for residents to return and the position of many displaced families, who question the government's safety assurances and the future that awaits them.

These problems are often connected to difficulties in communicating risks related to a nuclear accident. Risk communication is defined as "the exchange of information among interested parties about the nature, magnitude, significance, or control of a risk" (Covello 1992, 359). Risk communication is an essential tool and process for shaping a discussion among concerned stakeholders on risk and pragmatic problem-solving strategies. Poor risk communication can cause fragmented, inconsistent, controversial information; misinterpretation of messages; unnecessary exposure or increase of risks; and a breakdown of trust and credibility. Information about radiation is unfamiliar and highly technical for many members of the public, and it can be very challenging to translate complex and sometimes contested science into language that is understandable to non-experts and that they can apply in their daily lives. In the Fukushima case, these difficulties have been reinforced by the shortcomings of disaster-preparedness measures, as well as the problems in information provision and stakeholder communication before, during and immediately after the accident.

FGC research on risk communication explored how radiation risks are socially perceived and understood, including the specific challenges of discussing risks related to nuclear accidents, and considered what forms of information provision and communication can be effective. A review of the body of relevant literature was conducted to compile scientific knowledge, identifying the unique nature of risk perception related to radiation and the implications of this for risk communication. Fieldwork was then conducted and a research workshop organized, as described in Table 4.

Table 4: Main research activities on risk communication

Main Research Activities		Number of Informants
Fieldwork June-Sep. 2015	Interviews and focus groups discussions with displaced residents, returnees, residents in areas neighbouring evacuation zones, local government officials, civil society organisation representatives and social workers. Participants were from/have been supporting Date, Futaba, Iwaki, Kawauchi, Kōriyama, Namie, Naraha, Ōkuma, Tamura and Tomioka in Fukushima prefecture.	39
Research workshop Nov. 2015	Consultations with experts from Japan and other countries	20
		Total 59

Qualitative research was undertaken through the fieldwork, in the form of interviews and focus group discussions organized with support from local civil society organisations and other partners, to acquire in-depth understanding about the affected people’s concerns and information needs, and the most effective communication modalities. For one-to-one interviews, the interview duration was on average one hour per informant.

A research workshop entitled “Understanding and Communicating Risks Post Fukushima” was organized at UNU headquarters in Tokyo, to engage multidisciplinary expertise from relevant fields such as radiological science, environmental science and technology, sociology, political science, psychology, media studies and gender. The workshop combined theoretical discussion with perspectives and experiences from practitioners. It provided a broad range of insights into the complexities of understanding and effectively communicating the risks associated with nuclear accidents by drawing lessons from the Fukushima case and other cases such as the accidents at Chernobyl and Three Mile Island. A total of 15 papers from the workshop, including the findings from the FGC literature review on risk perception and risk communication, were published as part of the FGC Working Paper series and made available on the IAS and FGC websites. The workshop confirmed the importance of the timely sharing of candid and reliable information and of active public participation. It underlined that building an effective and appropriate information environment and promoting culturally-sensitive approaches should be prime concerns for successful risk communication. In addition to these activities, consultations with relevant researchers, practitioners and policymakers were also conducted on a regular basis through bilateral meetings and academic seminars and workshops.

Perception and Understanding of Radiation Risks

Radiation elicits an unusually high level of concern and fear among the general public, and the Fukushima nuclear disaster certainly provoked such feelings about radiation exposure and possible health consequences. Notable discrepancies have emerged in between the views of scientists, who mostly argue that the health risks from radiation released in the disaster will be limited, and high levels of concern held by the public. Furthermore, during the 5 years since the disaster, the range and complexity of issues related to anxiety over radiation have increased, due to both the unique nature of radiation science and the constant changes in the circumstances of the affected people. Tensions over radiation risks have arisen between and within affected communities and households, sometimes resulting in split families and even divorce. Such difficulties often stem from differences in how people perceive radiation risks. Therefore, understanding how risk perception is constructed and how people perceive the health risks introduced by a nuclear accident is critical to gain an understanding of risk communication in this unique context and inform the design of effective policies and approaches.

Risk perception is a complex phenomenon that integrates psychological and cognitive processes. Sjöberg et al (2004, 8), for instance, state that risk perception is “the subjective assessment of the probability of a specified type of accident happening and how concerned we are with the consequences.” Risk perception also extends beyond the intrapersonal domain to incorporate interpersonal interactions with the outside world. Chowdhury and Haque (2011, 1017) describe risk perception as “people’s beliefs, attitudes, judgments and feelings, as well as the broader social or cultural values and dispositions that people adopt, towards hazards and their benefits”. These definitions capture the fact that risk perception is more dynamic and variable than a simple calculation of risk. Prior studies have identified psychometric characteristics of risks, which in turn affect people’s risk perception, as well as their behavioural intentions and the actions they take toward the risks. Some of the key psychometric characteristics of risks and their influence on the level of concern are listed in Table 5.

Table 5: Selected psychometric characteristics of risks and their influences on risk perception

Characteristic	Scale (extremities)	Influence on the level of concern
Voluntariness	Voluntary – imposed	↘
Institutional control	Controllable – uncontrollable	↘
Catastrophe	Catastrophic – not catastrophic	↘
Fatality	Death – no death	↘
Benefit	Beneficial – no or inequitable benefit	↘
Familiarity	Familiar – not familiar	↘
Observability	Observable – unobservable	↘
Duration of effect onset	Immediate – delayed, long-term	Depends on the nature of the effect
Effect on descendants	Children are at high risk, intergenerational – children are not a high-risk group, non-intergenerational	↘
Cause	Technological, human-made – Natural	↘

Sources: Perko 2015 (FGC Working Paper No. 19); Renn 2004; Sandman 1993; Schmidt 2004; Sjöberg 2000; Slovic 1987; and Slovic and Weber 2002.

Individuals are likely to express concern towards risks that are imposed, uncontrollable, possibly catastrophic and fatal, non-beneficial, localized in a specific geographical area, unfamiliar, unobservable and intergenerational, regardless of the relative frequency of the event occurring. According to Schmidt (2004), a human-made, technical hazard generally triggers greater fear, compared with a natural hazard. One explanation for this tendency is that a human-made, technical hazard can connect to the perception of the capacity of responsible actors (e.g., the government authorities) for disaster prevention and management. The study of Slovic (1987) reveals that people tend to view a nuclear accident as more uncontrollable, dreadful, catastrophic, intergenerational and unfamiliar than other hazards such as automobile accidents. This provides a logical explanation for the general public's tendency to exhibit high concern about a nuclear accident despite its relatively low likelihood of occurrence, and to experience a deep sense of fear when an accident happens.

The psychometric paradigm also explains why people have different attitudes and reactions based on the source of a given risk. The general fear of radiation can be traced back through decades of reporting. But radiation risks are encountered through different channels, including voluntarily through occupational exposure and medical procedures such as radiation therapy and medical imaging using x-rays, in contrast to involuntary exposure, such as from nuclear energy and radioactive waste. People consider x-rays as posing less risk and being more beneficial, compared to the radiation risks



France – A view of a nuclear power plant, September 2011

associated with nuclear power (Slovic 1996). People are apprehensive about the nuclear industry due to the potential outcomes of a nuclear accident. The “unknown” nature of radiation risks related to a nuclear accident is a key factor behind the heightened level of fear among the general public.

During the emergency phase of the Fukushima nuclear disaster, there was only limited information about radiation available to non-experts. Since then, a lot of information has been distributed, seemingly with an assumption that if scientific facts were provided, this would result in laypersons perceiving radiation risks in the same way that the government and scientists did. Generally scientists understand risks by estimating the probability of a harmful event occurring and the potential severity of the consequences, based on relative frequency, the magnitude of a specific hazard, a causal mechanism, and the level of exposure and vulnerability. However, risks are perceived by the public through the lens of diverse individual factors and psychometric risk characteristics. Moreover, some distinct differences exist between policymakers, scientists and the public, including the levels of responsibility and authority, and actual exposure to risk. People become more cautious and take extra care to avoid any danger if there is a risk of direct negative consequences for themselves, as well as for their family, property and community. Particularly in the first few years after the nuclear accident, however, there was a mistaken belief that the discrepancies between the viewpoints of policymakers and scientists and that of the public were merely due to the insufficient knowledge of non-experts. This belief strengthened a dependency on traditional, top-down information distribution as the primary form of risk communication.

Another issue that has been overlooked in the aftermath of the Fukushima nuclear disaster is the role of individual differences and socio-cultural factors in risk perception. Even within affected communities, there is a wide range of perceptions, some of which are highly polarised. Some people remain deeply concerned about the health effects of radiation and wish to reduce radiation exposure to the lowest possible levels, while others accept or agree with official assurances that risks from the radiation released by the accident are limited, and instead prioritise other issues. There is also a group of people who do not want to think about radiation due to the severe exhaustion caused by long, constant preoccupation and anxiety related to such issues. Broadly, compared to the elderly, the younger generations tend to express more concern about radiation, focusing on issues such as the possible duration of radiation exposure in their lifetimes, variations in individual vulnerability to radiation and the likelihood of health effects, especially on young children. Women, and particularly mothers with small children, tend to have stronger concerns about radiation than men, probably because of traditional gender roles (e.g., the role of housekeeping and child-raising versus the role of ensuring economic stability of a household). Based on a study conducted in 2013

in areas recognised as localised radiation hotspots soon after the disaster, Shimizu (2015 — FGC Working Paper No. 9) observed that the level of radiation concern had not changed since the accident for over two-thirds of the surveyed mothers with young children. The author notes that these women are under-represented in the policymaking process and in household surveys of affected people, and their voices are neglected or receive less attention in the male-dominated social structure. In this context and under the present government's policies for accelerating disaster recovery, those with strong concerns about radiation are at risk of been left out of the recovery process, with limited provision of the assistance that is necessary for decision making as well as livelihood reconstruction and stabilization.

The diversity in risk perception is also linked with the remaining uncertainty in radiation science and risk estimates. Based on the available scientific knowledge, the WHO (2013) has calculated the estimated change of lifetime risks for the development of cancers in Fukushima. The report suggests that, in comparison with baseline rates, the lifetime risk of certain cancers may, to some extent, increase in individuals exposed as infants in the most affected locations. An UNSCEAR report (2014) concluded that overall, negative health impacts directly attributable to radiation from the Fukushima nuclear accident would not be significant. This assessment remained unchanged in a subsequent report by UNSCEAR (2015). Nevertheless, there are continuing uncertainties and disagreements between experts, on issues such as the estimation of public radiation exposure, particularly in the first year after the disaster; the relationships between radiation doses received and health effects; lifetime doses and associated risks; and the latency period for the late onset of radiation health effects. The interpretation of the results of an ongoing series of thyroid screenings has been another topic of considerable debate between experts (Mainichi Shimbun 2016). This situation is exacerbating confusion among the public, and further polarising perceptions on the dividing line between "safe" and "unsafe" levels.

Key factors in individual risk perception also include perceived trust, confidence and reliance in public authorities, institutions and experts responsible for disaster management (Metlay 1999; Slovic 1993; Wachinger et al 2013). People tend to feel a higher hazard risk if they do not trust the responsible authorities (Siegrist and Cvetkovich 2000). Furthermore Perko (2015 — FGC Working Paper No. 19) suggests that while knowledge can increase people's attentiveness and understanding about risk messages, knowledge does not necessarily affect their perceptions of risks and the level of acceptance of the information; rather, trust is an important predictor of the acceptance. However, trust is an intangible and fragile social asset. The breakdown of public trust in the government, TEPCO and the scientific community, as well as the loss of a sense of security were one of the most significant and problematic outcomes of the disaster (Hobson 2015 — FGC Working Paper No. 4). Many participants in the field research stated that their everyday lives had suddenly been taken away by the nuclear power plant, which they had been told was safe, and believed to be so. Scepticism about information transparency still exists among the affected people. This clearly illustrates that trust erodes rapidly, but rebuilding it requires long-term, strenuous efforts.

FGC research has found that the multi-dimensional and context-sensitive characteristics of risk perception, and the inherently complex and emotional nature of the perception of radiation risks are powerful factors in the recognition of nuclear accidents as among the most notorious and feared hazards. Lessons from the Fukushima case confirm that risk management efforts through radiation risk communication are likely to fail unless the factors underlying people's perceptions of risk are sensitively considered. It is essential to identify socio-cultural factors that amplify or attenuate risks and risk perception, and accept diverse perspectives of radiation risks. Those people with high concerns over radiation should not be neglected and left unserved or underserved. It is vital to ensure that the diverse range of public voices are captured and addressed, by establishing an environment in which people can

freely express different views without fear of criticism. In addition, the situation in the aftermath of the Fukushima nuclear accident underscores that considering the limits of the existing scientific knowledge, in the context of a nuclear disaster, risks should be carefully defined through public engagement, based on a thorough assessment of public risk perception and concerns, and reflect the continuing debates and disagreements between experts. At the same time, greater attention should be paid to issues of trust, and strenuous efforts must be made to foster, or in cases like Fukushima, regain people's trust as soon as possible. Trust relies on individual judgements about the quality of risk-related public discourse, so well-reasoned, mutually-respected discussion is of the utmost importance.

Approaches for Risk Communication in Fukushima

Communicating about nuclear risks and emergencies is vital, although it is first and foremost important to build a "safety culture" in which safety and integrity are afforded the highest priority. Effective risk communication can help the public to be aware of and prepare for risks faced by people and society, take protective action in emergencies, prevent or lessen secondary effects, and recover from a hazardous event. It can also facilitate consensus-building among concerned actors and collaborative measures.



litate, Fukushima Prefecture – An information session held just before the evacuation order was issued, April 2011

There is still, however, a widespread misunderstanding that risk communication consists of nothing more than providing technical and statistical data and scientific perspectives. The IAEA (n.d.) notes that "questions of whether there is a risk or not, how serious it is, and what should be done to protect people's health and the environment are always associated with ethical, economic, and often even political considerations." Multi-dimensional dialogue, as an approach to risk communication, are necessary to facilitate joint risk monitoring and learning, mutual understanding, consensus building, recovery and resilience-building. When scientific uncertainties and decision-making with some degree of compromise are involved, stakeholder dialogues become critical, to enable individuals and communities to make informed choices. In contrast, one-way information provision is needed in some situations, for example, for urgent knowledge increase and behavioral change in a crisis, with a focus on delivering a simple, concise risk message to be rapidly transmitted and easily understood and acted upon. However, it does not reflect the complex nature of a nuclear disaster and the uncertainties in the assessment of risk and its impacts. It does not allow for decision-making institutions, society and community groups, and individuals to exchange information and opinions. Therefore, such one-way information provision is an incomplete form of risk communication, compared to more interactive dialogue.

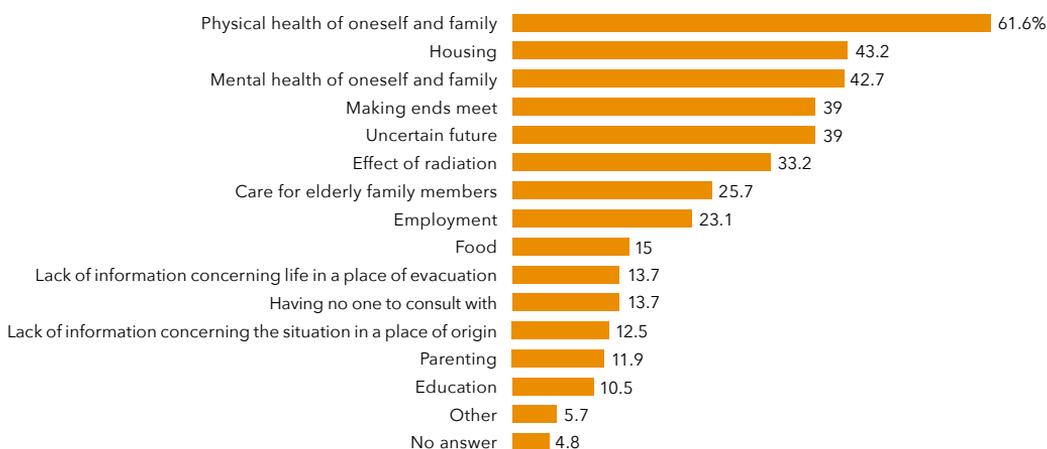
A multitude of actors have worked on information provision and communication since the Fukushima nuclear accident (see Table 6), in many cases as a response to the problems with the way official communication was handled during and after the accident, and the lack of information on radiation available to laypersons. Some data on the level of radioactive contamination, such as estimated external exposure doses in the initial stage after the disaster, current air dose rate, radionuclide levels in food and estimated internal exposure dose based on Whole Body Counting, are regularly updated and publicly available through various communication mediums.

Table 6: Examples of information provision and communication activities after the Fukushima nuclear disaster

Actor	Activities
Government agencies	<ul style="list-style-type: none"> • Brochures, websites and public forums with invited experts providing information on radiation risks and the progress of disaster recovery • Tablet computers provided by municipal governments to residents to share up-to-date, locally-specific information • The “Decontamination Information Plaza” (Fukushima city) — a centre providing information on decontamination activities from experts • The “Support Centre for Radiation Risk Communication Counsellors” (Iwaki city) — a centre providing technical assistance to social workers and others engaged in community-based risk communication efforts. • The “life-support counselor programme”, conducting outreach and engagement activities for affected people and communities
Medical experts	Individual counselling to assist people in understanding and interpreting the results of personal radiation monitoring and medical exams, and provide advice on radiation protection as needed
Other experts	Public workshops and forums on radiation, decontamination and the issue of rebuilding livelihoods
Civil society organisations	Individual measurement of radiation doses and promote citizen scientists (efforts by members of the public to monitor, evaluate and protect themselves and communities from potential hazards)

Despite the various forms of information provision and communication being implemented, concerns about radiation persist, and many of the nearly 97,000 displaced people remain reluctant to return to their hometowns even after the termination of evacuation orders (Fukushima Prefectural Government 2016a, 2016d; see Figure 2). A survey of 225 evacuees conducted by the Asahi Shimbun newspaper and Fukushima University in January – February 2016 found that 17% wanted to return to their hometowns even if they had not been restored to their previous condition, and 41% wanted to return if their hometowns were fully restored; but that only 22% believed that their hometowns would be suitable for return within 5 years (Asahi Shimbun 2016c). A series of public opinion surveys conducted by Fukushima Minpo News and Fukushima Television found that the proportion of those being cautious about radiation in their daily lives had declined, but was still at 47% (Fukushima Minpo News 2016).

Figure 2: Concerns of affected people, June 2016



Source: Opinion Survey of Evacuees from Fukushima Prefecture, Fukushima Prefectural Government, 2016.

In addition, no structured evaluation of these practices has been performed. Hence, the coverage and effectiveness of these practices is unknown. However, FGC research found that the current radiation risk communication practices faced many challenges related to the availability, accessibility and quality of information, as well as the lack of inclusive, coordinated and comprehensive communication for sustainable disaster recovery.

People are not only concerned about long-term exposure to low-dose radiation from the release of radioactive substances in March 2011. Their concerns also relate to the safety of contaminated materials during their handling (e.g., the collection, storage, and transfer of radioactive waste produced over the course of decontamination operations at different locations). There is a notable delay in the decontamination process due to multiple issues involving the construction of the interim storage facility and a final disposal site, as well as radioactive waste management. Uncertainty about when and to where the massive and growing amount of radioactive waste will be moved for disposal is aggravating anxieties over radiation exposure. By February 2016, the total amount of radioactive waste from the decontamination procedure had exceeded 11 million cubic meters (10.7 million cubic meters for Fukushima prefecture). It is estimated that the final cumulative amount of waste for Fukushima prefecture alone will be double the current total (Asahi Shimbun 2016d). People also worry about the decommissioning of the damaged reactors in Fukushima, for example, because of the struggles with the management of rapidly increasing contaminated water and the removal of melted fuel debris. In parallel, the process of restarting nuclear plants in other parts of Japan has been prompting social debate and public protests.

In February 2014 a leak of radioactive water from the Fukushima Daiichi nuclear power plant was reported. In September 2015 torrential rains washed away bags filled with contaminated waste from various temporary storage sites in Fukushima and other prefectures affected by the disaster in September 2015. Neither incident caused serious environmental contamination, according to Tokyo Electric Power Company (TEPCO) (2014) and the Ministry of the Environment, Japan (2015). However, the incidents have heightened public anxiety over safety. Many people face difficulties in deciding whether or not to return, unless safety is assured. During FGC field research one of the informants said that the highest risk for him was that the decommissioning would take over 40 years. Since his residence is located no more than 10 kilometres from the nuclear power plant, he was concerned about secondary incidents during the process of decommissioning. Over 95% of respondents to the survey conducted by the Asahi Shimbun and Fukushima University said that Fukushima Daiichi nuclear plant was not safe or that there was a risk of further incidents (Asahi Shimbun 2016c). Although various data about the level of radioactive contamination are publicly available, in order to cope with the complex situation, people need accurate information that they can relate to their daily lives, such as radiation levels in their homes (including garden soil), schools, neighbouring areas, food, water and its sources, and on the streets that trucks use to transfer bags of contaminated materials.



Kawamata, Fukushima Prefecture – A monitoring post for measuring air dose rate of radiation, June 2014



Iitate, Fukushima Prefecture – A temporary storage site for contaminated soil removed by decontamination activities, June 2015

The establishment of an environment in which people are able to obtain information useful for their lives is another crucial foundation for risk communication. However, Shineha and Tanaka (2014) raised concerns about differences in access to information for those affected by the 3.11 disaster, between geographical areas (urban versus rural), economic status (wealthy versus poor) and age (young versus elderly). FGC research found that elderly-only households, the unemployed, and in particular those who have few opportunities for social interaction and/or need assistance to understand and utilize information that is provided, are especially

vulnerable to limited information access. It is concerning that the ongoing closing of temporary housing facilities for evacuees, where it tends to be easier to exchange information, will disrupt the social flow of information. Furthermore, many of the research participants who had evacuated to locations outside Fukushima prefecture at some point, and of those who remained in other prefectures, pointed out that local information was lacking outside the prefecture. Indeed, field research participants residing in Fukushima prefecture tend to seek information from local television programmes and newspapers, as well as from family, friends and other trusted community members. Moreover, Ito (2015 — FGC Working Paper No. 10) observes a decline in media attention focused on the disaster. The issue of information disparities is expected to worsen because of the increase in elderly-only households, the gaps between people who are able to restart their lives and those who are unable to for various reasons, the disruption of information networks, and the reduced media interest.

For people in Fukushima, scientific uncertainties, and disagreements between experts on issues such as radiation threshold models and the possible effects of long-term exposure to low-dose radiation, exacerbate the difficulties of dealing with risk. People now have access to an overwhelmingly large amount of relevant information and messages representing different perspectives, whose validity and reliability vary considerably. Some information is up-to-date and authoritative, while some is outdated, inaccurate, or biased and misleading. The current information environment requires people to have strong information literacy, including the capacity to locate and obtain necessary information, competently evaluate its quality, and effectively apply it. This abundant amount of information is of little help for many members of the public; rather, it increases their confusion and anxiety due to the contested opinions about safety in Fukushima.

Finally, attention for disaster recovery has been focused much more on environmental remediation than on the socio-psychological consequences of the Fukushima nuclear disaster. Field research participants underlined that addressing radiation issues should certainly be a core issue in the disaster recovery agenda, but that they are just one of many equally important topics. The affected people are not only facing challenges related to radiation, but also unemployment with declining occupational options; adjusting to an unfamiliar environment; disruption of family ties, social networks and community life; and uncertainty about the future (Mosneaga 2015). A public health nurse interviewed during the field research reported that due to the nuclear disaster some evacuated farmers had lost jobs to which they had devoted themselves for many years, and as a result had completely lost their

motivation and “given up” on the rest of their lives. A returnee in Kawauchi commented that people who returned to the village usually had a job in Kawauchi, or were elderly people who could drive a car and move independently. The statements of the interviewees showed how difficult it will be for the affected people to restart their lives under the long-term impacts of the nuclear disaster.

Furthermore, the prolonged displacement and associated changes in lifestyles have imposed various health burdens on the affected people. The elderly face particular difficulties, and evacuation itself is a risk factor for certain illnesses such as diabetes and hypertension (Satoh et al 2015). The number of deaths that are indirectly related to the 3.11 disaster (such as from the deterioration of health conditions because of evacuation, overwork, etc.) exceeds the number of deaths directly caused by the earthquake or tsunami in Fukushima (Fukushima Prefectural Government 2016a). A considerable problem is the incidence of post-traumatic stress disorder (PTSD) among the affected population (Tsujiuchi 2015 — FGC Working Paper No. 8). The affected people's current suffering is not only due to concerns over radiation but also due to the social impacts of the nuclear accident in relation to overall well-being and quality of life. Fukushima is now facing a critical period, with the transition from immediate response to long-term, sustainable disaster recovery. However, a number of participants in the field research said that their voices were not being heard, and that they felt powerless to influence decision-making in the disaster recovery process.

Lessons to be Learned

With each year, attention increasingly drifts away from Fukushima, but many of the deep-rooted problems remain and have become even more complex. The difficulties of the recovery process in Fukushima are providing valuable lessons both for Japan and for other countries operating or building nuclear facilities.

First, along with maximizing nuclear safety — including thorough consideration of, and sufficient resource allocation for, an extreme external event such as 3.11 — radiation risk communication must be carried out continuously, with engagement of citizens through open discussions regarding risks related to the nuclear industry. This must start from the pre-crisis period, and run throughout all stages of the disaster management cycle. A practical, comprehensive emergency plan should be developed with citizens in the areas where nuclear power plants are located, followed by similarly inclusive processes for risk monitoring and assessment. Individual radiation measurement should be promoted. For example, after the Fukushima nuclear disaster, the Safecast (2016) crowd-sourced radiation monitoring network developed rapidly, engaging local citizens to provide open-access, street-by-street radiation information. Similarly community-based self-support initiatives have also been effective in empowering local populations after the Chernobyl nuclear disaster, mitigating its long-term social and health impacts (Hériard-Dubreuil and Baudé 2015 — FGC Working Paper No. 17). However, it is critical for governments to make assistance available for the public to ensure accurate radiation measurements that produce credible data, which are competently interpreted for individual decision making. Practical options on how to avert or mitigate risks should be provided in the process of interpreting the data.

Second, emergency communication mechanisms should be established and utilized to ensure timely provision of situation-specific risk information. When the meltdown of nuclear reactors occurred at the Fukushima Daiichi nuclear power plant, there was a disruption of information flows and command mechanisms between TEPCO, the regulatory agencies and the Prime Minister's Office, as well as the central and local governments, which resulted in chaotic evacuations (Investigation Committee on the Accident at the Fukushima Nuclear Power Stations of Tokyo Electric Power Company 2012; Kushida 2014; National Diet of Japan, Fukushima Nuclear Accident Independent Investigation Commission 2012). A communication mechanism for emergencies should be established

by the concerned actors during a non-crisis period, and consistently used during any crises. Considering the complex nature and potential of widespread dispersion of radioactive substances, the involvement of actors at all levels, from local to international, is essential for the management of a nuclear accident. Maintaining consistency and transparency in the process of disaster management is critical to foster understanding and acceptance of the decisions made. Such transparent decision-making contributes to developing confidence and trust, and even lead to a higher degree of consensus and commitment to the proposed disaster management approaches.

Third, given the remaining uncertainties in the estimations of actual exposure to radiation and health effects, risks need to be defined in cooperation with citizens, taking into account their concerns and socio-cultural factors that affect their acceptance or tolerance of each specific risk. The limits of available scientific knowledge and points of scientific disagreement should be explicitly discussed in an understandable and credible manner. It is critical to carefully decide how messages are constructed, and when, how and by whom the messages are introduced and discussed. For discussions involving people with different views, there may be a need for trained personnel with the knowledge and skills to facilitate discussion effectively from a neutral standpoint. It is important to increase the number of skilled facilitators through collaboration with educational and/or vocational institutions. Intermediaries who are trusted by target communities and who have knowledge of related health risks and science can also play a valuable role by promoting the exchange of information and opinions between stakeholders, such as scientists, health professionals and local citizens (Miyazaki 2015 — FGC Working Paper No. 20). Such collaboration mechanisms are also beneficial for the efficiency of risk communication activities.

Lastly, if a nuclear accident occurs despite all possible precautions, radiation risk communication should be an integral part of the disaster-management dialogue, and a central element of the processes of policy development and implementation. Post-disaster radiation risk communication for a sustainable recovery requires considering the diverse concerns of affected people who are in the process of rebuilding their lives, and thus, genuine dialogue and the sharing of comprehensive information are needed. To facilitate a disaster-management dialogue, it is important to build a platform that enables a broad range of stakeholders — those who engage in disaster recovery issues and regularly engage with affected individuals and communities — to collaboratively address people's concerns in a balanced, coordinated way. These platforms should be used to foster a social support mechanism that identifies population groups with limited information opportunities and provides them with continuous support.

Fully reflecting these insights from the Fukushima case may require many countries to undertake rigorous reviews and drastic reforms, requiring an intensive commitment by industry and regulatory systems. These will not be easily or quickly accomplished. After the nuclear accidents at Three Mile Island and Chernobyl the forms and methods of effective risk communication were extensively discussed, yet the confusion and chaos observed during the Fukushima nuclear disaster demonstrated that many lessons had not been learned, and that deep and extensive improvements were still required. With the continued use of nuclear power and the growing risk of compound disasters occurring due to climate change, the frequency and magnitude of technological disasters can be expected to increase globally. It is critical that the lessons of Fukushima are learned, to avoid ineffective risk communication in future and ensure that all affected people are prepared and able to make informed decisions about risk related to nuclear accidents.



Conclusions

Aizuwakamatsu, Fukushima Prefecture – A road leading to a famous Ishibe Sakura tree, April 2014

FGC research and analysis has highlighted the complexity of the links between different socio-economic challenges related to the 3.11 disasters. These challenges are by no means unique to Fukushima or Japan; indeed, in recent years there has been growing recognition globally of the need to reduce disaster risks and improve responses to disasters, evident in the discussions leading to the adoption of the Sendai Framework on Disaster Risk Reduction (DRR) 2015–2030. While compound disasters — of which 3.11 is a prime example — have not been high on the global DRR agenda, this is now changing, with the Sendai Framework emphasizing the need to adopt a multi-hazard approach that can address these disasters. Nuclear emergency preparedness, however, remains a highly specialized field, although there has been some recent progress in opening up this area with the inclusion in the Sendai Framework of technological disasters. Overall, the multi-hazard approach, and the general trend in DRR towards managing risks rather than managing disasters, are highly relevant to 3.11, and reflecting them in policy has the potential to mitigate the impacts of similar disasters in future.

The research conducted by the FGC programme on post-3.11 Fukushima has explored the intertwined nature of challenges related to displacement, lost livelihoods and disrupted communities, all of which have become increasingly evident in the years after the disaster. Readjustments to the evacuation zones and related regulations have created disparities between evacuees in terms of compensation payments and relief measures. The heavy focus on environmental remediation activities, while paying less attention to the social and psychological impacts of the nuclear disaster, has escalated the diversification of perspectives about radiation risks among affected people and their perspectives on return as a potential durable solution to displacement. These wide differences in radiation risk perception, varying attitudes towards return and ongoing uncertainty about recovery prospects have deepened social divisions within the affected families and communities, and between evacuees and their host communities. Besides undermining recovery efforts in the affected communities and regions, this has also complicated efforts by individuals to find workable solutions to their situations, and reinforced people's lack of trust towards public authorities.

Five years have passed since the disaster, and the evacuees are finding themselves in increasingly diverse and rapidly changing situations. Given the persistent uncertainty and instability that characterised these years, many ended up resorting to living arrangements that fall somewhere between return, local integration and resettlement. In the context of policy reorientation that is taking place as the government is trying to shift gears from the immediate response to longer-term recovery, many are now facing the need to reconsider the viability of such makeshift arrangements. This also means that the challenge of livelihood recovery involves not only restoring or formulating an alternative strategy for making a living, but also navigating and integrating into a new environment. Such a challenge is also faced by those who opt to return to their community of origin, where the environment has inevitably changed in the years following the disaster.

FGC research has affirmed that many of the challenges faced by people in Fukushima are deeply connected to how radiation and related health impacts are understood and addressed. The unique nature of radiation and nuclear accidents complicates the perception of related risks. People were suddenly faced with unfamiliar and unobservable problems, and placed in the position of having to make decisions that could affect not only the rest of their lives, but in many cases also the future of their children — based on unfamiliar, incomplete and highly technical information. Concerns about radiation remain profound, despite a large amount of information on radiation being distributed in the years since the disaster. This is partly because some people have poor access to information and/or need assistance to understand and utilize it. Moreover, concerns over radiation risks vary considerably between individuals, with key issues including the potential onset of delayed effects from long-term exposure to low-dose radiation, contaminated soil and other debris from decontamination, and the decommissioning of the damaged nuclear reactors. Many people continue to question their safety due to the unsolved challenges in the environmental remediation procedures, the remaining scientific uncertainty in radiation risk and the persistent distrust in the government and TEPCO. Many are struggling to balance radiation concerns with other priorities, and this further diversifies how people perceive and respond to risk, and exacerbating tensions between them.

What does sustainable recovery mean in such a context? Findings from FGC research suggest that to “build back better” after a compound disaster that resulted in large scale displacement, recovery policies must provide an enabling environment for the displaced people to pursue settlement options of their choice — be it return, local integration or resettlement.

Recovering from technological disasters also requires devoting sufficient attention to tackling social divisions and destabilising effects of protracted displacement alongside the necessary environmental remediation and reconstruction of physical infrastructure. Providing an enabling environment furthermore requires decision-makers to be committed to transparency, access to information, and extensive consultations with affected populations throughout policy formulation and implementation. Besides being indispensable for fostering ownership of recovery process, regular engagement with displaced populations and their host communities is essential for ensuring that existing policy, legal and institutional frameworks are adjusted to changing local realities. Finding the right balance between continuity and change in the process of re-adjusting existing frameworks is key to enabling displaced people to restore their livelihoods, restart their lives and plan their future irrespective of which solution they decide to pursue to their displacement. Evacuee situations, and especially their self-reliance capacity, have to be systematically assessed before terminating existing relief measures to avoid further socio-economic marginalisation. Building the capacity and resources of host communities is equally important to ensure that livelihood support and integration programmes are in place and are tailored to the needs of the displaced populations. Finally, mutual understanding must be fostered between evacuees and their host communities.

The Fukushima nuclear disaster also highlights the critical need for effective risk communication, as an integral part of preparedness for and recovery from technological disasters. While ensuring safety in decontamination and reactor decommissioning procedures, radiation risk messages should be developed in collaboration with affected people and with careful consideration of their concerns, emotions and socio-cultural context. It is essential that messages are communicated in such a way that they can be internalized by non-experts and used in their decision-making. Comprehensive and structured monitoring and approaches to the long-term consequences of disaster are critical. At the same time, it is equally important to provide continuous support for personal radiation monitoring and data interpretation in ways that are relevant to people’s daily lives. Currently a range of radiation risk communication activities is being carried out in the affected municipalities, but impartiality is essential if these are to be accepted by the communities. The “life-support counsellor” system, for instance, plays an important role, but

considering the diversity of the affected people's conditions and information needs, there is also a need to identify civil society organizations and experts that regularly engage with affected individuals, and create credible platforms to facilitate stakeholder communication and strengthen collaboration in the recovery process. Such platforms must be mainstreamed into the disaster recovery agenda.

The list of issues posed by and measures needed to address displacement and livelihood implications of the 3.11 disasters, and the Fukushima Daiichi nuclear disaster in particular, will continue to evolve in the coming years, and continuous monitoring and analysis will be needed to understand how to integrate that into ongoing recovery efforts. Already now, there are socio-economic developments that deserve further research and policy attention as they are profoundly shaping the recovery situation in the affected communities. This includes the demographic changes in the areas surrounding the damaged nuclear plant. In the context where return to the towns and villages reopened for residence after the nuclear disaster has been stagnant, some of these areas have been primarily populated by workers contracted for decontamination works in the nearby towns and villages and decommissioning activities at the damaged nuclear plant. While this brings some economic dynamism to some of the affected areas, it also promotes dependency on the so-called "recovery bubble" that is bound to end sooner or later. The overwhelming presence of primarily male workers coming from the outside also represents a source of concern for local residents and has already led to tensions in some areas. The dynamics characterising such socio-economic transformations have to be better examined to understand their effects on the longer-term recovery and reconstruction of the affected communities. On a more general level, more comparative research into different displacement situations resulting from technological disasters is needed to improve our understanding of the differences and commonalities in the processes framing the search for durable solutions, the recovery of livelihoods and the overall recovery of the affected communities. This would help to channel more policy attention toward technological hazards as triggers of displacement and to inform the process of preparedness for technological disasters in the context of the DRR agenda.

Considering risk communication, further work is needed to identify the coverage and effectiveness of current practices in Fukushima to identify those who have not been reached, and improve existing measures. In addition, considering the long and difficult process of disaster recovery and the instability of the environment of the affected people, continuous assessment should be carried out to build a clear picture of information needs. Further research is also needed to understand how people's risk perceptions relate to their information seeking and utilisation behaviours, in order to obtain insights for improving the information environment. Efforts are needed to understand how information disparities can be addressed by fostering a sustainable, supportive environment tailored to those with limited information literacy and those who are unable to think about radiation due to stress and exhaustion. More empirical studies are also needed on how existing knowledge on the complex mechanisms of risk perception and the principles of successful risk communication can be applied and integrated into actual practices. Although the experiences of past nuclear accidents have led to broad global recognition that dealing with radiological disasters requires interactive, continuous stakeholder dialogue, policies and mechanisms for applying this lesson remain poorly developed. Some general guidelines and tools exist, including the IAEA's materials on risk communication for nuclear accidents. However, the responsibility for utilizing these materials lies with the respective authorities in each case, and their effectiveness is unclear. Finally, it is of absolute importance to further investigate specifically how risk-communication actors with different interests can work collaboratively in practice, and how risk communication practices in the context of nuclear emergencies can be applied in risk communication related to other emergencies.

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Appendix 1: List Of Activities

23 July 2013: FGC High Level Advisory Committee Meeting #1 (UNU, Tokyo)

23 July 2013: Panel Session "Disseminating Information on Reconstruction Activities in Fukushima: From the Viewpoint of Local Resilience" at the International Forum for Sustainable Asia and the Pacific (ISAP 2013) (Yokohama-city, Kanagawa Prefecture)

31 August 2013: Video interview with Dr. Richard A. Meserve, Former Chairman of United States Nuclear Regulatory Commission (UNU, Tokyo)

2 September 2013: Video interview with Prof. Kiyoshi Kurokawa, Academic Fellow of National Graduate Institute for Policy Studies (Shonan-village, Kanagawa Prefecture)

11 September 2013: Lecture by Prof. Hiroyuki Yoshikawa, Director of the Japan Foundation for the United Nations University (UNU, Tokyo)

11 September 2013: FGC High Level Advisory Committee Meeting #2 (UNU, Tokyo)

11 September 2013: Video interview with Prof. Hiroyuki Yoshikawa, Director of the Japan Foundation for the United Nations University (UNU, Tokyo)

22 October 2013: FGC High Level Advisory Committee Meeting #3 (UNU, Tokyo)

18–21 November 2013: International expert consultations at the French Nuclear Safety Authority (ASN), the Institute for Radiological Protection and Nuclear Safety (IRSN), The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the Institute for Advanced Sustainability Studies (IASS-Potsdam) (Hauts-de-Seine, France; Berlin and Potsdam, Germany)

20 December 2013: FGC High Level Advisory Committee Meeting #4 (UNU, Tokyo)

20 December 2013: International seminar on "Methods of Evaluating the Radioactive Effects of the Fukushima Nuclear Accidents" at the United Nations University (UNU, Tokyo)

20 December 2013: Video interview with Dr. Jacques Repussard, Director-General of the IRSN (UNU, Tokyo) 2
February 2014: Site inspection of decontamination areas and temporary shelters in Fukushima (Fukushima-city, Date-city and Kawamata-town, Fukushima Prefecture)

3 February 2014: International symposium on "Information Sharing and Communication for Recovery in Fukushima – A Human Security Approach" (Fukushima-city)

24 February 2014: Video interview with Dr. Andre-Claude Lacoste, Former Chairman of the French Nuclear Safety Authority (French Nuclear Safety Authority, Paris)

24 February 2014: Interview with Dr. Michael Weightman, Former Head of the Office for Nuclear Regulation, UK (Paris)

24 April 2014: FGC High Level Advisory Committee Meeting #5 (UNU, Tokyo)

22–27 May 2014: International expert consultations with the UN Office for the Coordination of Humanitarian Affairs (OCHA), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the United Nations Office for Disaster Risk Reduction (UNISDR) and the Permanent Mission of Japan to the United Nations (New York)

29–30 May 2014: International expert consultations with the International Atomic Energy Agency (Vienna)

11 June 2014: Policy dialogue session with international advisors of the Nuclear Regulation Authority, Japan (UNU, Tokyo)

June and September: Field research on displacement and livelihood recovery challenges in the mandatory evacuation zones (Fukushima Prefecture).

23 July 2014: Panel Session “Stakeholder Communication for Informed Decisions: Lessons from and for the Displaced Communities of Fukushima”, co-organized with the Institute for Global Environmental Strategies (IGES) at the International Forum for Sustainable Asia and the Pacific (ISAP 2014) (Yokohama-city)

23 July 2014: FGC High-Level Advisory Committee Meeting #6 (Yokohama-city)

21–24 October 2014: International expert consultations with representatives from UNEP/OCHA Joint Environment Unit (JEU), the Internal Displacement Monitoring Centre (IDMC), the International Federation of Red Cross and Red Crescent Societies (IFRC), the International Organisation for Migration (IOM), the Office of the High Commissioner of Human Rights (OHCHR), UNDP, UNISDR, the World Bank and the World Economic Forum (Geneva).

15 October 2014: Public seminar “Communicating Health Risks from Nuclear Accidents,” featuring a lecture by Prof. Gerry Thomas of Imperial College London, co-organized with the British Embassy Tokyo (UNU, Tokyo)

15 October 2014: Video interview with Prof. Gerry Thomas, Imperial College London (UNU, Tokyo)

11 November 2014: Public seminar “Monitoring Impacts and Communicating Health Risks after Fukushima”, co-organized with the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (UNU, Tokyo)

28 November 2014: Public forum “Disasters, Mental Well-being and Disability: Promoting Resilience for All” (UNU, Tokyo)

28 November 2014: FGC High Level Advisory Committee Meeting #7 (UNU, Tokyo)

2 December 2014: Policy dialogue session with representatives from the Nuclear Disaster Victims Support Team, Cabinet Office, Japan. Included a presentation by FGC researcher Ana Mosneaga on “The Displacement Situation in Fukushima: Preliminary Findings” (in Japanese) (Tokyo).

5 February 2015: Policy dialogue session with representatives from the Nuclear Disaster Victims Support Team, Cabinet Office, Japan. Included a presentation by FGC researcher Ana Mosneaga on “The Employment situation in Fukushima after the Nuclear Accident” (in Japanese) (Tokyo).

16 March 2015: Panel session “Risk Reduction and the Transition from Response to Recovery: Lessons from Japan’s Triple Disasters,” a side event at the Third UN World Conference on Disaster Risk Reduction (Sendai-city, Miyagi Prefecture)

17 March 2015: Presentation by Ana Mosneaga “Between return and relocation: addressing the displacement situation created by the nuclear accident” (in Japanese) at the “WCDRR in Fukushima”, a side event of Third UN World Conference on Disaster Risk Reduction (Fukushima-city).

21 April 2015: FGC High-Level Advisory Committee Meeting #8 (UNU, Tokyo)

June–July 2015: Field research on the displacement situation and livelihood recovery challenges faced by evacuees from outside the mandatory evacuation zones (Fukushima, Yamagata and Tokyo Prefectures)

June–September 2015: Field research on the current concerns, information needs and preferred communication modalities of people affected by the Fukushima nuclear disaster (Fukushima and Tokyo Prefectures)

24 September 2015: Presentation by FGC researcher Ana Mosneaga on "Tackling Prolonged Displacement: Lessons on Durable Solutions from Fukushima" at the Session "Migration and Human Security", at the 9th Pan-European Conference on International Relations (Giardini-Naxos, Italy)

30 September 2015: Presentation by FGC researcher Ana Mosneaga on "Disasters, displacement and livelihoods: the case of Fukushima's nuclear evacuees" at a Joint Seminar organised by Maastricht School of Governance and the UNU Maastricht Economic and Social Research Institute on Innovation and Technology (UNU-MERIT) (Maastricht, The Netherlands)

12–14 October 2015: International expert consultations with representatives from IDMC, IFRC, IOM and OHCHR (Geneva).

12–13 November 2015: Research workshop "Understanding and Communicating Risks Post-Fukushima" (UNU, Tokyo)

13 November 2015: Public seminar "Understanding and Communicating Risks Post-Fukushima" (UNU, Tokyo)

16 November 2015: Presentation by FGC researcher Ana Mosneaga on "The Situation of Fukushima's Nuclear Evacuees Seen from an International Perspective" (in Japanese) at the Japan Platform Symposium "Fukushima Emergency Appeal: What's happening? What can we do?" (Tokyo)

8 December 2015: Poster presentation by FGC researcher Akiko Sato on "Current Information Needs and Preferred Communication Channels in Municipalities Affected by the Fukushima Nuclear Accident" at the Society for Risk Analysis (SRA) 2015 Annual Meeting (Arlington, USA)

9 December 2015: Presentation by FGC researcher Akiko Sato on "Complex Dimensions of Radiation Risk Communication in the Aftermath of the Fukushima Daiichi Nuclear Accident" in a session on "Trust, Credibility and Risk Communication" at the SRA 2015 Annual Meeting (Arlington, USA)

15–17 December 2015: International expert consultations with representatives from UNEP/OCHA JEU and IFRC.

13 January 2016: Contribution by FGC researcher Ana Mosneaga to an inauguration meeting of "Fukushima Working Group" organised by Doctors of the World (MDM) Japan (Tokyo)

27–29 January 2016: Poster Presentation by FGC Project Manager Nicholas Turner on "Social Dimensions of Technological Disasters" at the UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction (Geneva)

28 January 2016: Presentation by FGC researcher Ana Mosneaga on "Towards an Age-Sensitive Approach to Durable Solutions" at the 1st Conference of the UNU Migration Network, "International Migration and Current Challenges: Transforming the Debate on Human Mobility", at the UNU Institute on Globalization, Culture and Mobility (UNU-GCM; Barcelona, Spain)

16 February 2016: Public symposium "Human and Social Impacts of the Fukushima Daiichi Nuclear Disaster: What has been Learned and What Remains to be Learned?" (Fukushima-city)

16 February 2016: FGC High-Level Advisory Committee Meeting #9 (Fukushima-city)

9 March 2016: Contribution by FGC researcher Akiko Sato to a risk communication workshop organised by the Ministry of Education Culture Sports Science and Technology, Japan (MEXT), the Japan Science and Technology Agency (JST), and the Society of Risk Analysis Japan (including a further review meeting on 12 April) (Tokyo).

15 March 2016: Policy dialogue session with representatives of the Public-Private Joint Team for the Recovery of Fukushima's Sousei Region. Included a presentation by FGC researcher Ana Mosneaga on "Fukushima's Mandatory Evacuees and their Livelihood Restoration: Up until Now and from Now on" (in Japanese) (Fukushima-city).

Appendix 2: Outputs

Policy Briefs

Mosneaga, Ana. 2015. "Tackling Prolonged Displacement - Lessons on Durable Solutions from Fukushima". UNU-IAS Policy Brief No. 1, 2015. Available at: http://collections.unu.edu/eserv/UNU:2755/UNUIAS_Policy_Brief_No_1_2015.pdf

Mosneaga, Ana. 2015. "Restoring Livelihoods after Disasters: The Case of Fukushima's Nuclear Evacuees" UNU-IAS Policy Brief No. 2, 2015. Available at: <http://i.unu.edu/media/ias.unu.edu-en/news/10502/UNU-IAS-Policy-Brief-No.-2-2015.pdf>

Sato, Akiko. 2016. "Nuclear Disasters and Risk Communication: Learning from Fukushima". UNU-IAS Policy Brief No. 5, 2016. Available at: http://i.unu.edu/media/fgc.unu.edu-en/page/920/UNUIAS_PB5.pdf

FGC Working Paper Series

Hobson, Christopher. 2014. "Rethinking Human Security after the March 2011 Tohoku Earthquake, Tsunami and Nuclear Accident". FGC Working Paper Series No. 1, March 2014. Available at: http://collections.unu.edu/eserv/UNU:2759/FGC_WP_01_March_2014.pdf

Tatsuki, Shigeo. 2015. "The Experiences of People with Functional Needs in Times of Disasters: Results from the 2013 Sendai Grass-roots Assessment Workshop". FGC Working Paper Series No. 2, February 2015. Available at: http://collections.unu.edu/eserv/UNU:2756/FGC_WP_02_February_2015.pdf

Nagamatsu, Shingo. 2015. "Did Cash for Work Programs Promote Recovery from the March 2011 Disasters?" FGC Working Paper Series No. 3, February 2015. Available at: http://collections.unu.edu/eserv/UNU:2757/FGC_WP_03_February_2015.pdf
Hobson, Christopher. 2015. "Rebuilding Trust after Fukushima". FGC Working Paper Series No. 4, March 2015. Available at: http://collections.unu.edu/eserv/UNU:2758/FGC_WP_04_March_2015.pdf

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