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Local Populations Facing Long-Term Consequences of Nuclear Accidents: Lessons learned from Chernobyl and Fukushima

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This working paper is an output of the FGC research workshop “Understanding and Communicating Risks Post Fukushima”, held in Tokyo on 12–13 November 2015. The workshop brought together international experts to explore the specific challenges of understanding and discussing risks related to nuclear accidents, and identify appropriate and effective forms of risk communication.

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ABSTRACT

After a high scale nuclear accident, local populations face a high level of complexity, whereas their day-to-day life is seriously disrupted by the short and long term consequences of the event. Local populations have to perform numerous daily life decisions and trade-offs (including the choice to leave, stay or return in the contaminated zone) in order to cope with a whole range of unfamiliar issues associated with the long-term radioactive contamination.

The post-accident situation after the Chernobyl accident provides many example of the serious disruption of daily life experienced by the population living in the territories affected by long term radioactive contamination. Based on surveys performed in Ukraine (1990-1991) and Belarus (1992-1994) on the living conditions of the populations in the contaminated territories, the ETHOS project in Belarus (1996-2001) experimented an original approach of post-accident rehabilitation where a group of European experts have provided the population of a village a scientific, technical and organisational support, in order to enable them to achieve, at personal and community levels, concrete improvements of their living conditions, covering the many affected dimensions of their life quality. Grounding on the ETHOS results, the international CORE project (COoperation for REhabilitation of living conditions in the Chernobyl-affected areas of Belarus") was then initiated (2003-2009) at an interregional level involving the participation of the Belarus Government, the United Nations Development Programme (UNDP), the European Commission (EC) and a dozen European member states, together with European NGOs. The CORE project has experimented a new bottom-up scheme of post-accident rehabilitation governance aiming at supporting local public and private recovery initiatives in partnership with public, private or civil society organizations, at regional, national, and international levels.

The return of experience of the Chernobyl and Fukushima post-accident situations based on the results of the European "PREPARE" research brings many complementary insights on the complexity of nuclear post-accident situations involving long-term contamination, taking into account the specificity of the highly developed and interconnected social, economic, cultural and political context of Japan.

This project was carried out in order to evaluate how and to what extent local populations can access reliable information to protect themselves and participate to collective decisions, as foreseen in the terms of the UNECE (United Economic Commission for Europe) Aarhus Convention (1998) on public information and participation. The analysis of the societal mechanisms in post-accident contexts makes it possible to identify the interactions of the different response paths of individuals and families, professionals, local communities, public authorities and experts after an accident, the role of values in these social mechanisms, as well as the impact of public policies on the resilience and social cohesion of

local communities and on their capacity to build their own recovery strategies. It demonstrates the importance of the societal dimension of the response to post-accident situations.

In effect, the capacity of local actors to build their response to the crisis depends on their capacity to build new forms of cooperation among themselves and with other actors and relevant networks.

抄録

深刻な原発事故後、現地住民の生活は、同事故の短・長期的な影響を受け、非常に複雑な事態に陥っている。現地住民は、長期的な放射能汚染に関連したこれまで身近ではなかったさまざまな課題に対処するために、日常生活において非常に多くの決断と妥協（汚染地域を離れる、汚染地域に残る、汚染地域に戻るといった選択など）を強いられている。

チェルノブイリ事故後の状況から、長期的な放射能汚染の影響を受けた地域の住民が経験した深刻な日常生活を送るうえでの障害の事例が多数明らかになっている。ウクライナ（1990～1991年）とベラルーシ（1992～1994年）で行われた汚染地域の生活条件に関する調査に基づいて、ベラルーシで行われたETHOSプロジェクト（1996～2001年）では、独自の事故復旧アプローチを実験し、被災住民の生活の様々な側面を対象として、彼ら自身で各個人そしてコミュニティ全体の生活条件を具体的に改善することができるように、欧州の専門家グループが村の住民に科学的、技術的、組織的支援を提供した。ETHOSプロジェクトの成果を踏まえて、その後、国際CORE（COoperation for Rehabilitation）プロジェクト（2003～2009年）が地域間で発足し、ベラルーシ政府、国連開発計画、欧州委員会、多数の欧州諸国が欧州のNGOと共にこれに参加した。COREプロジェクトでは、地域、国、国際レベルの官民団体、市民社会団体が連携して、現地の官民による復興の取組を支援することを目指して、事故後の回復をボトムアップ式に管理する体制を試験的に導入した。

欧州のPREPARE研究成果に基づき、チェルノブイリと福島同事故後の状況の経験を振り返ることによって、非常に開発が進み、社会、経済、文化、政治が絡み合っている日本の状況の特殊性を踏まえた、長期的な汚染が関与する原子力事故後の状況の複雑性に関する補足的な洞察が多数得られている。

本プロジェクトは、情報公開、市民参画に関する国際連合欧州経済委員会（UNECE）のオーフス条約（1998年）の条項で予見されているように、現地住民がどのように、そしてどの程度、信頼性の高い情報にアクセスし、自分自身を守り、集団的意思決定に参画することができるかを評価するために行われた。事故後の状況における社会的機序を分析することによって、事故後の個人、家族、有職者、地域社会、公的機関、専門家間の相互関係、こうした社会的機序における価値の役割、そして公的政策のコミュニティのレジリエンスや社会的絆に対する影響、復興戦術を立てる能力について明らかにすることができる。さらに、事故後の状況に対する対応の社会的側面の重要性を実証することができる。実際、現地関係者が危機に対応できるか否かは、現地関係者間、そして他の関係者および関連ネットワークとの間に新たな形態の協力体制を構築できるかにかかっている。

Introduction

After a high-scale nuclear accident, local populations face a high level of complexity, whereas their day-to-day life is seriously disrupted by the short and long-term consequences of the event. Local populations have to perform numerous daily life decisions and trade-offs (including the choice to leave, stay or return in the contaminated zone) in order to cope with a whole range of unfamiliar issues associated with the long-term radioactive contamination. Whereas upper levels of decisions are expected to bring support, information, expertise and means, many decisions and actions stay in the hands of local actors.

Discussion

The post-accident situation after the Chernobyl accident provides many examples of the serious disruption of daily life experienced by the population living in the territories affected by long-term radioactive contamination that was publicly acknowledged five years after the accident, only after the fall of the Soviet Union.

The surveys performed in Ukraine¹ (1990-1991) and Belarus² (1992-1994) on the living conditions of the populations in the contaminated territories, report the many affected dimensions of the daily life of the people living in the contaminated areas. They experience a break of the social bonds that is a consequence of the evacuation and relocation policies that, in addition, often tend to create inequitable situations among the local population and therefore affect the quality of the relations in the communities. Unlike natural catastrophes, the source of destabilisation, radioactive contamination, remains significantly present for a very long period (several generations at least for some radionuclides). The presence of invisible radioactive contamination in the daily life is at the origin of chronic internal and external radioactive exposure, thus creating risks and uncertainties regarding health and future. Local people experience anxiety and stress while the post-accident situation also impedes their way of life, jeopardizing rural activities such as agriculture and food production in rural areas. Their basic needs can hardly be fulfilled: feeding, housing, caring health, working, accessing education, leisure, connection to nature, social relations, and breaching their culture and history. The future of families and the relationships between generations are also damaged. The arising of complexity is also linked with the disruption of the usual political and social mechanisms of coordination that are shaken or impeded by the spreading of distrust and controversies, while the rational of expertise are disclosed and put into question.

Based on above-mentioned surveys, the ETHOS³ project in Belarus (1996-2001) experimented an original approach of rehabilitation of living conditions in a post-accident situation. Through the ETHOS project, a group of European ex-

perts provided the population of a village (Olmany village, Stolyn district and Brest region) with a scientific, technical and organisational support, in order to enable them to achieve, at personal and community levels, concrete improvements of their living conditions, covering the many affected dimensions of their quality of life. The project was then extended to the whole contaminated area of Stolyn district, while the European research team was extended to a larger group involving representatives of institutions of Belarus from several expertise areas (radiation protection, agronomy, education, culture, environment, etc).

Beyond the individual level, the ETHOS approach dedicated particular attention to the various stakeholders involved in the governance of the post-accident situation, at local, regional, national and international levels. It took into account the diversity of concerned actors (residents, health professionals, teachers, private farmers, public farms, regional authorities, Chernobyl Committee, etc.) and action levels (local, regional, national and international levels) that impacted the local situation. The ETHOS research team facilitated the building of relationships among different actors at local but also at higher levels of action.

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

Grounding on the outcomes of ETHOS, the CORE international project was then initiated (2003-2009) at an interregional level involving the participation of the Belarus Government, UNDP, EC and a dozen European member states, together with European NGOs. The CORE project has experimented a new bottom-up scheme of post-accident rehabilitation governance aiming to support local public and private recovery initiatives in partnership with public, private or civil society organizations, at regional, national and international levels.

The PREPARE⁴ European research project analysed the return of experience of the Chernobyl and Fukushima post-accident situations. This project has successfully brought many complementary insights on the complexity of nuclear post-accident situations involving long-term contamination. A specificity of this work compared to previous works in this field grounding on post-Chernobyl experience is that it took into account the specificity of the highly developed and interconnected social, economic, cultural and political

context of Japan.

This project has been carried out in order to evaluate how and to what extent local populations can access reliable information to protect themselves and participate to collective decisions, as foreseen in the terms of the UNECE Aarhus Convention (1998) on public information and participation. The analysis of the societal mechanisms in the post-accident context has made it possible to identify the interactions of the several response paths between individuals and families, professionals, local communities, public authorities and experts after an accident, as well as the role of values in these social mechanisms, and the impact of public policies on social cohesion. It has demonstrated the importance of the societal dimension in the response to post-accident situations. In effect, the capacity of local actors to build their response to the crisis depends on their capacity to build new forms of cooperation among themselves and with other actors and relevant networks.

While the spreading of distrust impedes the building of a multilevel societal response, this research has investigated how local populations can re-create the conditions to access (and sometimes build by themselves) trustworthy and reliable information, understand the situation at individual and community levels and build a relevant post-accident response at personal and community levels.

This research has investigated how local actors can develop new patterns of social trust in order to cope with the complexity of their own situation in the post-accident context, taking advantage of the plurality of the available and multiple (often contradicting) institutional, foreign or independent sources of expertise in the post-accidental context. Values such as truth, honesty, justice, equity, freedom of choice (notably for evacuated people to return or to rebuild their life elsewhere), solidarity with affected people, dignity of people, are key factors of societal cohesion. It was observed that public policies can contribute to or, conversely, hinder the rebuilding of societal cohesion in post-accident contexts. Many examples demonstrate that breaches of societal values by the operators, the public authorities or the experts can seriously damage/hinder the ability of the local actors to build a meaningful societal response.

In the case of Chernobyl and Fukushima accidents, it was observed in many cases that public institutions and operators contribute already from the early phase of the accident to jeopardize social trust and their credibility for they tend to withdraw the information or they fail to acknowledge the reality of the radioactive release (intentionally or not). The citizen efforts to monitor radioactive releases and fallout are often disvalued. Even later on, in the post-accident phase, many shortcomings are reported of the lack of capacity to manage the situation in a transparent manner. In post-accident contexts, the efficiency of conventional public policies is impeded by the breaking of social bonds

and the arising of distrust in the population vis-à-vis the various kinds of political, professional and scientific authorities. Local actors and communities are often left without social recourse, creating thus isolation and despair among the victims. Moreover, in a system of expertise and information characterised by the diversity of expertise sources and institutional positions of experts, and the multiplicity of information channels including social media and mass media, people face many contradicting information and they have to build-up their own assessment of the situation. This process takes time.

The trustworthiness of information is resulting from the interactions between the different experts and information providers, which can facilitate or conversely hinder the capacity of people to assess the available pieces of information. In this, complexity of the information system is both a constraint and a resource, and trust is a mechanism for people to address the complexity of both the situation and the information system by progressively creating their own vision. The experts interacting with the population are confronted with questions that are not formulated as scientific questions but as concrete questions balancing various dimensions, including non-technical ethical, economic, social, human dimensions. It is important for experts to acknowledge the limits of their expertise and not substituting to the capacity of choice of people. Here, the experts have to acknowledge that they cannot answer to some questions of the people but can provide pieces of information, elements of assessment and elements of heuristics to help people make their own choices. The recognition by the experts of the autonomy of choice of local actors seems to be a key stake.

In a system of expertise and information characterised by the diversity of expertise sources and with various categories of experts, controversies are important elements for assessing the reliability of information and information sources. In this respect, one would speak of "productive controversies"⁵ as soon as the conditions are created for a genuine dialogue and mutual respect among interacting experts. However, the elements of controversy and the assessment of experts by other experts sometimes take the form of expression of disqualification (or even of contempt) of an expert by another. These "wild" controversies do not always allow people to characterise the elements and rationales of disagreement and to identify the very commonalities and differences between the disagreeing experts.

Conclusion and Policy Recommendations

Based on the lessons learned in the post-accident situations, it is possible to draw the structure of a relevant strategy of public authorities. Such strategy would in particular facilitate the unfolding of a meaningful societal response that is enabled by a shift in the post-accidental governance

in order to address the diversity of stakes and the complexity, while the post-accidental situation unfolds.

It is important to acknowledge that recovery processes are not only a matter of management, decisions, standards, resources, infrastructures and expertise, but also rely heavily on the capacity of local actors to build new networks, social resources, trust relations and governance schemes. Recovery is above all made by people, and their capacity to think and act together is as much important as their individual capacity of action. In the recovery process, the autonomy, resilience, capacity of action and freedom of choice of people and communities are key elements. The deployment of such a social process of recovery cannot be decreed, nor is it guaranteed by the mere reconstruction of favourable economic and material conditions. Various actors like public authorities, experts, NGOs, foreign institutions, can bring support or conversely hinder this social process of recovery. The post-accident policies should however focus on enabling and supporting local people and local communities to engage this long and costly effort of rebuilding a life that is worth to live.

Uncertainty is a general feature of complex emergency and existing exposure situation. While decisions are to be taken, the management of uncertainties entails for all actors (the public, experts, local and national decision-makers, professionals, and the media) assessing the reliability and trustworthiness of available information and therefore bridging multiple sources of information generated by a plurality of actors and institutions. In a context characterized by social distrust, creating the conditions for bridging

a plurality of information providers is a major challenge for improving the capacity of the local population to cope with the complexity of the emergency and post-emergency situations.

In this perspective, the implementation of provision of information to the public and public participation in decision-making processes as stated in the UNECE Aarhus Convention is, for instance, a major step in enabling civil society engagement in the decision-making along the successive phases of accident management and recovery. The Aarhus Convention is enforced in almost 50 countries of Europe and Central Asia.

The initial post-accidental phase is characterised by public policies focusing on health and radiation protection criteria, providing local affected populations with assistance and resources. Shifting from a focus on reducing risks to a larger perspective of restoring life (including risk management but not reduced to it), the second post-accident phase is dedicated to the framing of public policies for post-accident recovery (i.e. rebuilding of infrastructure, compensation, support to new activities, and development of a shared vision of the sustainable development of the territory) and entails societal participation in order to improve decision-making. A high level of devolution characterizes the third phase. It entails a transformation of the governance system in order to enable citizens and local communities to build their own protection and recovery strategies at personal and community levels, in order to rebuild economically viable, humanly dignified living conditions.

Notes

¹ Hériard-Dubreuil G., « Un premier bilan des effets psychiques et sociaux de l'accident de Tchernobyl », *Radioprotection*, 1994, Vol. 29, n°3, pp 363-376

² Girard P., Hériard-Dubreuil G., « Les conséquences socio-économiques de l'accident de Tchernobyl en Biélorussie. Un aperçu de la situation dans le district de Tchetchersk », *Radioprotection*, 1996

Girard P., Hériard-Dubreuil G., Stress in accident and post-accident management at Chernobyl, *J. Radiol. Prot.* 1996 Vol. 16, n°3, pp. 167-180

³ Hériard-Dubreuil G. et al. « Chernobyl post-accident management : the ETHOS project », *Health Physics*, Octobre 1999, Vol. 77, n°4, pp.361-372

⁴ This project has received funding from the European Union's Horizon 2020 research and innovation programme [Euratom research and training programme 2014-2018].

⁵ See Callon, M., Lascoumes, P., & Barthe, Y. (2009). *Acting in an uncertain world: An essay on technical democracy* (G. Burchell, Trans.).

Gilles Hériard-Dubreuil is a mathematician by education and social scientist. From 1982 to 1990, he was researcher and consultant for public and private organisations in the field of risk governance, crisis management and environmental planning. Since 1991, he is director of the independent research group MUTADIS based in Paris, France. Since 1990, he was involved in the assessment of the consequences of the Chernobyl accident. He studied the living conditions of the population in the territories contaminated by the Chernobyl accident in Ukraine (1991-1992) and Belarus (1993-1995). From 1996 to 2001 he was scientific coordinator of the ETHOS project in Belarus aiming at the rehabilitation of the living conditions of the population in the context of long-term post-accident radioactive contamination. The ETHOS project has developed a rehabilitation process centred on the methodological and scientific support of the efforts and projects of the local populations to rehabilitate their own living conditions at personal and community levels. The methodology of the ETHOS project was developed during 3 years in the village of Olmany, in the Stolyn district (Brest Region, Belarus), and then transferred to other contaminated areas of this district. Gilles Hériard-Dubreuil was then involved in the executive instances of the international CORE project (cooperation for rehabilitation in the contaminated areas of Belarus), from 2003 to 2008, that implemented on a larger scale the ETHOS methodology in four contaminated districts of Belarus (Braguin, Tchetchersk, Slagorod and Stolyn). He participated to several European and French research and implementation programmes on emergency preparedness and response since 2005, notably in the context of the development of the French national policy on nuclear post-accident management. He also currently involved as supervisor of a pilot project on the sustainable development of the islands of Martinique and Guadeloupe (French Caribbean) in the context of the large scale long-term chemical contamination (chlordecone) resulting from past agricultural practices.

Gilles Hériard-Dubreuil has also developed a research on the governance of radioactive waste management and coordinated several European research programme in this field, notably the COWAM (Community Waste Management) programme from 2000 to 2009. He is the author of numerous reference publications in the field of risk governance. He has developed several research projects regarding long-term governance, notably in the field of post-accident management. He has also coordinated several surveys on public engagement and participation in the context of nuclear activities such as the 2012 PIPNA study (Public Information and Participation in the context of Nuclear Activities) commissioned by the European Commission. Since 2008, he is a member of the advisory committee of the ANCCLI (French federation of local commission of information attached to nuclear facilities). He is member of the NERIS management board since its creation. He is also co-founder and secretary of Nuclear Transparency Watch since 2013.

A list of reference publication of Gilles Hériard Dubreuil regarding notably post-accident management can be found at the following address: <http://www.mutadis.org/publications/gestion-des-risques/>

Stéphane Baudé is an engineer and social scientist by education (Ecole Polytechnique, Institute for Political Studies of Paris). Since 2004, he is a collaborator of MUTADIS. Stéphane Baudé has been involved in several European research projects in the fields of governance of activities entailing risks for people and the environment (TRUSTNET IN ACTION, COWAM 2 and COWAM IN PRACTICE European research projects). He has been involved in various initiatives in the post-accident field at national (PAREX project - participatory assessment of post-Chernobyl experience of Belarus), European (EURANOS, NERIS-TP and PREPARE research projects) and international levels (CORE programme for rehabilitation of living conditions of Chernobyl-affected territories of Belarus). He is also involved in the management of long term contamination in the French Caribbean as a result of agriculture activities.
