Epilogue
"The path is built by walking"*: the co-expertise process as a technology of humility

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In the introduction of her seminal 2003 article entitled "Technologies of humility: citizen participation governing science" Sheila Jasanoff stated that it is time to seriously reassess existing models and approaches that structure the relationships between expertise and public policy. She also raises a series of overarching questions including the following two: *"Can we imagine new institutions, processes, and methods for restoring to the playing field of governance some of the normative questions that were sidelined in celebrating the benefits of technological progress? And are there structured means for deliberating and reflecting on technical matters, much as the expert analysis of risks has been cultivated for many decades?" (Jasanoff, 2007)* Acting as a synthesis, this Epilogue is an

* *The path is made by walking.* This quote is from the poem "Traveler, there is no path", by the Spanish poet Antonio Machado, published in 1917 in the collection of poems "Campos de Castilla".

Traveler, your footprints	By walking, the path is made
Are the path and nothing more	And when you look back
Traveler, there is no path	You'll see a road
The path is made by walking	Never to be trodden again

"This is the experience of many of us nowadays. There is no pre-existing path for us to follow, no recipe or best practice. We are in a discombobulating world filled with new opportunities and threats. So we need to become Wayfinders, Explorers who are unafraid to walk into the unknown and make new paths." (Sonja Blignaut – LinkedIn)

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attempt to partly answer these questions based on the experience acquired in the implementation of the co-expertise process after the Chornobyl and Fukushima nuclear accidents.

1. Historical perspective

The co-expertise process was built progressively in the context of the Chornobyl post-accident situation in the late 20th and early 21st centuries from an empirical trial and error approach. However, experts involved in the process were influenced by work carried out in the previous two decades on the development of risk assessment and risk management and its prolongation into risk perception and risk communication.

Despite advances in risk management during the 1990s, decision-making processes and regulatory approaches related to hazardous activities, continued to face growing opposition from stakeholders at local and national levels. This situation led researchers and experts in the field of risk assessment and risk management to carry out a detailed analysis of the underlying problems so that obstructions could be identified. It was found that whilst a technical approach to risk management is necessary, this in itself is not sufficient for making effective decisions on risk.

As a result of these investigations the new interdisciplinary perspective called risk governance emerged in the late nineties allowing a better understanding of the factors, criteria, processes and mechanisms by which decisions about complex situations with uncertain risks are taken, thereby contributing to social cohesion in technological societies. Thus, risk governance goes beyond traditional risk assessment and risk management analysis to include considerations of the legal, political, economic, societal and environmental contexts in which a given risk is evaluated and managed. Risk governance can be seen as an analytical framework aimed at integrating all previous theoretical and methodological developments relating to the understanding of risks: risk assessment and management, risk perception and risk communication.

But the innovation of risk governance lies partly in the importance given to the involvement and participation of stakeholders, and partly on the fundamental role of trust in the decision-making processes. Researchers who developed risk governance identified that the approach to risk that had prevailed until the nineties was often deadlocked because it did not sufficiently take into account the perception of risk and the aspirations of the public directly concerned. As Ortwin Renn, one of the leading contributors to risk governance, has pointed out, *"The concept of inclusive risk governance is based on a normative belief that the integration of knowledge and values can best be achieved by involving those actors in the decision-making process that are able to bring all the respective knowledge as well as the variability of values necessary to make effective, efficient, just and morally acceptable decisions in terms of risk."* (Renn, 2009).

In addition to the key role of inclusiveness, risk governance researchers have also identified that the perception of risk depends not only on the knowledge that a person has of the risk but also on the values that she/he shares with

the person(s) or institution(s) who talks about the risk. This has led to a distinction in the risk management process, between trust (based on morality information) and confidence (based on performance information). This distinction between trust and confidence theorized in the Trust, Confidence and Cooperation (TCC) model is powerful in furthering an understanding of how individuals perceive the risk, and cooperate (Earle et al., 2007). In particular, it provides an explanation of why dialogue, citizens' measurements of radiation, and participation in local projects with the support of professionals, are the way to restore trust after a nuclear accident. As underlined by Earle *"As long as the social system is stable, shared confidence in the system can supply the necessary foundation for daily life. When the system becomes unstable, however, confidence is lost, and trust is required to provide a transition to a new, stable state*".

The ETHOS project and CORE programme taught us that cooperation with experts, personal experience of sharing views with other affected people and performing radiation measurement gradually change the perception of the risk, which in the first instance can be fuzzy and disturbing, even frightening, and which over time is transformed into real knowledge on which to base decisions and action in everyday life. By combining dialogue, measurements and projects, the co-expertise process is an effective mechanism to restore self-confidence among the affected people and trust in the experts cooperating with them. (see Box 1).

Box 1. The short story presented below provides an illustration of how self-confidence and trust are shaped by dialogues, measurements and projects — A 30-becquerel hot chocolate

I had just arrived in Olmany for a new week-long ETHOS mission in early autumn 1997. I was walking in the main street of the village with Nina my faithful Ukrainian interpreter and we met by chance Anna — a farmer, mother of four children and a dedicated member of the young mothers' working group who, for more than a year, had been working to improve the protection of her children and those of the village (Figure 1a). After a warm greeting, Anna invited me to her home to drink a hot chocolate. It was 2 p.m., it was hot, and I didn't feel like drinking a hot chocolate. I excused myself and offered to visit Anna one evening during the week. Seeing her deep disappointment, I dared to ask the reason for this unforeseen invitation. "But it's a 30-becquerel hot chocolate!" she replied, almost in a whisper. This completely unexpected answer filled me with so much joy and satisfaction that I immediately changed my mind and said to Anna "I finally accept your kind invitation! Let's go to your home now".

What a delight to learn that the milk her family drank no longer contained more than 2,000 becquerels per litre, as was the case three months earlier when we measured it together as part of the "milk project" (Schneider et al., 2026). On the way to her house, I remembered my visit in July, when I had to tell Anna that her children were the most contaminated in the village. I had just learned the news from the school nurse who had informed me of the results

of the last internal contamination measurements campaign of the school children. That day, I was not feeling at all at ease when I entered Anna's house to explain the situation to her. After a moment of despair, she asked me determinedly, "What can we do?" I explained to her, "We have to find the source of the contamination in the children's food. At school, they consume products from outside the contaminated areas. So we have to examine the products they consume at home." Anna then replied immediately, "It cannot be the milk because Kazoula (her cow), grazes in the same meadow as my neighbour's cow, who measured the milk last week and it was clean!" After exploring several possibilities, but without identifying a potential source of contamination, I was a bit lost. However, I had discovered in passing that Anna had adopted a very cautious attitude with regard the diet of her children, particularly for Aliocha and Maria, the youngest ones. Then, changing the subject to regain some composure, Anna started talking to me about her family, her father and grandfather, and casually mentioned, "I loved going with my grandfather in the evenings when he went to the riverbank to cut grass for his cow. He would tell me little stories..." Continuing the conversation, I then learned that it was a family tradition of giving the cow a supplement of fresh grass every evening, cut daily, at the edge of the marsh, to give a particular taste to the milk! She said that she had learned about this special place from her father, who had learned about it from his grandfather! So by chance, during a dialogue about family memories, we discovered the origin of Kazoula's highly contaminated milk, which was far above the average level of contamination of the herd that she was grazing with, in the summer.

Sitting at the kitchen table while sharing with Anna and Nina the 30 becquerel cocoa, Anna proudly explained to me how she managed the situation on her own. First by reducing the quantity of milk drunk by her children, and secondly in parallel, by reducing the contamination of Kazoula's milk by giving her access to Prussian blue salt lick (Figure 1b), which she obtained from the village's collective farm. Anna was using terms like "Becquerel" and "internal contamination," which had burst into her daily life after the disaster, and which for years, had seemed to her an incomprehensible jargon. She later confided that hearing these terms had made her cry.

(a) (b)

FIGURE 1. (a) Anna and her family; (b) Kazoula licking Prussian blue (Photos: J. Lochard)

As I was closing the blue gate at Anna's house to return to the ETHOS house with Nina, I reflected on my visit, and how, by sharing a hot chocolate she was offering me a truly wonderful gift in gratitude for our successful cooperation.

Many years later, I realized that this episode perfectly illustrated how self-confidence and trust in others are gradually rebuilt when we work closely together in the co-expertise process.

2. About the technology of humility

As Jasanoff aptly points out, the technology of humility *"calls for different expert capabilities and different forms of engagement between experts, decision-makers, and the public"*. This approach goes beyond what was considered necessary in the classical governance structures.

A shift in perspective is needed. Jasanoff was already advocating more than 20 years ago for research to focus *"on what people value and why they attach importance to it*." She believes that this type of research is neglected in favour of "*the expansion of scientific knowledge and technological capabilities*." She thus called on research to focus on "*the analysis of aspects of the human condition that science cannot easily illuminate*" and she asked analysts and decision-makers to "*reconnect with the moral foundations of action in the face of inevitable scientific uncertainty*" (Jasanoff, 2007). It is interesting to note that the enormous research effort mobilized after Fukushima, while initially focusing primarily on scientific and technical dimensions, has recently shifted towards the social sciences and humanities in relation to the challenges of post-accident reconstruction in Japan (Murakami et al., 2025).

But this shift will only bear fruit if the experts and decision-makers who implement the results of this research trust the public. As the experience of the United Kingdom sheep farmers has demonstrated trust on both side is essential to engage in fruitful dialogues. After Chornobyl and Fukushima, much has been written about the loss of public trust in experts and politicians (Takahashi 2020). Many analysts and decision-makers have questioned how to regain this lost trust, but beyond acknowledging the loss and even quantifying it, little has changed in practice.

From this perspective, implementing the co-expertise process represents a learning opportunity. The experiences of Chornobyl and Fukushima demonstrated that the loss of trust is not permanent and that a combination of circumstances can foster a change in attitude. Among these circumstances, the trust shown to affected individuals by all those cooperating with them in the process is undoubtedly a key element. This point, which still requires further analysis, has been little studied. It is not enough to merely involve individuals on a formal basis; it is also essential to create an environment that encourages affected individuals to share their knowledge and expertise to solve the problems they face. The experience of the Sami people in Norway, or that of the residents of the village of Kawauchi, or the inhabitants of Kashiwa, Suetsugi and Yamakiya in

Japan, have clearly shown that the exchange of views in dialogue, the sharing of radiation measures, and the engagement in individual and community projects, strengthen self-esteem and that of others and are all favourable elements for the establishment of mutual trust between the affected people, the experts and the decision-makers. In a certain way, one can argue that the co-expertise process is nothing other than a learning process about living together in the presence of radioactivity within a community of stakeholders.

In conclusion, it is worth recalling that the root of the problem is linked to the unwanted presence of radioactivity in the environment, and that, among the first to become involved in managing the situation were radiation protection specialists. Subsequently, they were joined by a multitude of researchers, experts, decision-makers, and well-intentioned citizens. In this context, it is important to remember Lauriston Tylor's remarks in 1956 concerning radiation protection: *"Radiation protection is not only a matter for* ***science****. It is a problem of* ***philosophy,*** *and* ***morality****, and the utmost* ***wisdom!****"* (Taylor, 1957). Drawing on his long experience in serving the public interest, this visionary clarified 24 years later: *"Aside from our experienced scientists, trained in radiation protection, where do we look further for our supply of wisdom? Personally, I feel strongly that we must turn to the much larger group of citizens generally, most of whom have to be regarded as well-meaning and sincere, but rarely well-informed about the radiation problems that they have to deal with"* (Taylor, 1980). Recognizing that the wisdom necessary for specialists to serve the public interest is found among the citizens, also suggests to the specialists that they must rely on the testimonies and accounts of those who have lived through the ordeal of the accident. If after a nuclear accident, the recovery of self-esteem is crucial for affected people to regain dignity, then empathy is key for experts and decision makers to provide decent living conditions for these people (Lochard, 2021). In this regard the most important lesson from the Chornobyl and Fukushima experiences undoubtedly lies in the fact that experts who support the co-expertise process, beyond practicing their sciences with pride, sincerity, and transparency, must also cultivate empathy with humility and solicitude.

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