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Chornobyl Body Politics

Making Environmental Violence Visible

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Engaging Environmental Violence

The framework of environmental violence (EV) seeks to address the environmental and human health harms inflicted by the processes of production, especially climate change and pollution. This chapter brings a slow violence and critical knowledge production approach to strengthen the theoretical and methodological foundations in the EV framework. We emphasize the contingent, political processes of the production of scientific knowledge and how those processes change understandings of both violence and the environment. The 1986 Chornobyl disaster, our case study for this chapter, illustrates the mutually constructive processes of politics and knowledge production and how understanding that mutual dynamic reveals the ways in which the slow environmental harms of Chornobyl were made visible. We aim to accomplish this task by using examples from the social monitoring program of the Department of Social Expertise (DSE) in the Institute of Sociology in the National Academy of Sciences of Ukraine in its tracking of the embodied environmental effects among sufferers of the Chornobyl disaster. Using the DSE's data on Chornobyl sufferers, we demonstrate how focusing on the processes of knowledge production is a useful tool in assessing the harms of slow EV.

1.1 Introduction

How are environmental harms made visible? The other chapters in this collection offer many excellent examples of tracing sites and processes of EV. The contribution of this chapter is to discuss the ways in which the effects of EV are rendered either visible or invisible. The visibility of EV is not a foregone conclusion; the temporal and spatial elements of EV – such as long-term or delayed effects, sociomaterial relationalities, jurisdiction, and volumetrics – often obscure its harmful effects or make their obscuration easier. For this reason, we connect the processes of rendering visible the harms

of EV to the literature on slow violence. Our aim in this chapter is to draw together themes and threads of EV research to present a cohesive and flexible theoretical and methodological foundation – critical knowledge production – for continued work in this field by emphasizing how political processes and scientific knowledge production mutually construct each other. These processes of mutual construction are not as simple as political pressures to suppress scientific findings; these processes are much messier and less straightforward than that. Tracing the many ways that politics and science co-produce each other over long periods of time can show how the creation, presentation, and dissemination of different types of knowledge can hide or highlight environmental harms.

To put this foundation into practice, we will use examples from the 1986 Chornobyl disaster in northern Ukraine to explore ways in which the bodily, social, and environmental effects of the largest nuclear accident in history were made visible.[1] Hundreds of thousands of people were evacuated from what became the Chornobyl Nuclear Power Plant Zone of Exclusion (hereafter the Zone) that has, since 1997, covered approximately 2600 km^2 (1000 mi^2) of the Kyiv oblast (province) along the Ukrainian border with Belarus (Figure 1.1). Best estimates, using models based on soil testing done between 1986 and 1996, set the total amount of radioactivity released during the disaster at approximately 5300 peta-becquerels (PBq) (excluding noble gases) [1, 2].

The world's largest nuclear accident is notable for the role that knowledge politics – including questions such as: Who controls access to what knowledge? Who gets to know what when? Who controls the knowledge production processes? – played in the management of the crisis and its long, slow aftermath. Understanding the processes and practices of making EV harms visible involves analyzing the ways in which knowledge about the effects of the disaster was produced, how that knowledge was intended to evoke specific political responses, and how those political and knowledge-producing processes mutually constructed each other.

Adriana Petryna [3] makes some insightful connections between the scientific knowledge of nuclear radiation – or rather the lack thereof – and Soviet governance strategies. The historical and geopolitical contexts of the disaster in the mid-1980s, in the midst of Reagan's "evil empire" rhetoric, necessitated that Soviet officials maintained at least an image of control over the situation so that they could maintain control within the Soviet Union as a whole and avoid losing face to the world

[1] We use Chornobyl, the Ukrainian transliteration of *Чорнобиль*, instead of the more common, Russian-derived Chernobyl. Language, particularly the roles of Ukrainian and Russian, is a major source of political contention in Ukraine. As this chapter focuses primarily on investigating the effects of the Chornobyl disaster in Ukrainian contexts, I committed from the outset to using Ukrainian-language transliterations. This extends to other place names as well, such as Kyiv instead of Kiev and Odesa instead of Odessa. Titles or quoted texts using other spellings remain unchanged.

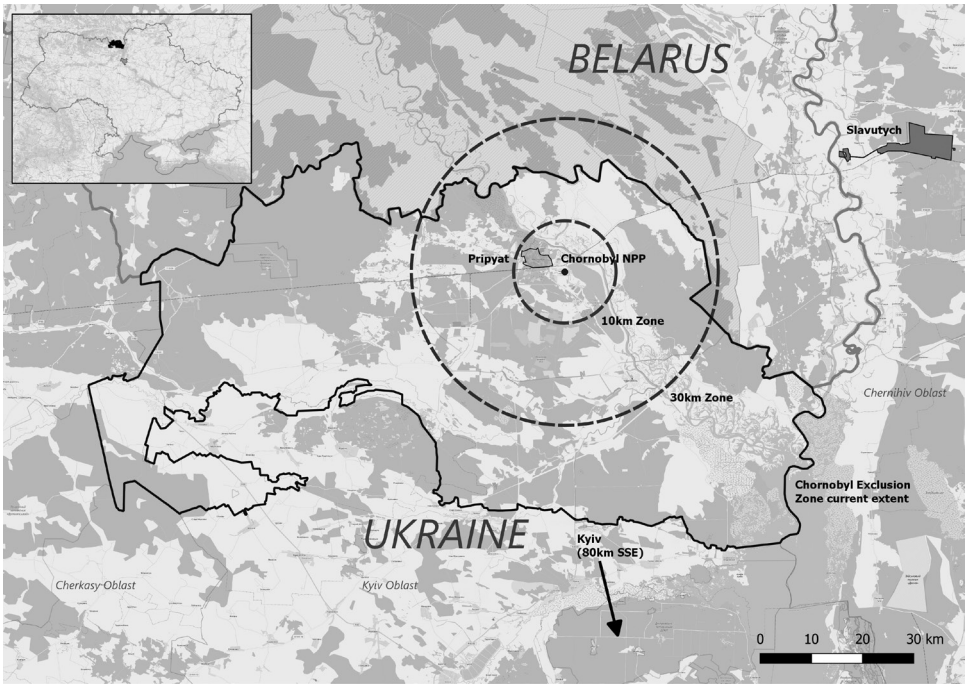

Figure 1.1 Map of the Chornobyl Exclusion Zones, including the cities of Pripyat and Slavutych. Inset shows the location of the current area of the Zone in Ukraine
Source: The author.

outside the Soviet bloc. Presenting the situation at Chornobyl as under control was a monumentally hard task in and of itself, only compounded by the fact that, on the one hand, there were myriad unknowns – scientific, technical, political, institutional – while, on the other hand, the limited amount of knowns had to be kept secret in order to maintain control and save face. The Soviet response was hindered by knowledge gaps, and the bridging of said gaps was, in turn, hindered by Soviet policy in a self-defeating cycle. In other words, the knowledge-making and political processes regarding Chornobyl employed in the Soviet Union worked against each other and compounded the harmful effects of the violence of the disaster. Soviet officials and organs tried to render harms caused by the reactor's explosion *invisible to others* while at the same time having to produce and act on new knowledge regarding the effects of radiation via rendering those effects *visible to themselves*. Petryna [3] states that:

> The sciences, politics, and international cooperations that informed Soviet state responses to Chernobyl produced an image of control over unpredictable and largely unassessed circumstances of risk …. What was known or not known about the scale of the disaster was the result of policy choices, supported by a base of scientific knowledge that was

provisional at best …. The apparent arbitrariness of the situation prompted people to search for other resources and clues to render an uncertain and unknowable world knowable and inhabitable in some way. (p. 63)

After the Soviet Union admitted that there had been an accident at Chornobyl 19 days after it had occurred – no longer trying to render the disaster invisible to the rest of the world – researchers, officials, scientists, and sufferers were faced with having to address the effects of the disaster, despite the paucity of knowledge on the harms of radioactive contamination. Where people looked for experts, either scientific or political, to determine maximum exposure limits or even to outline possible symptoms, none were to be found, as there was no consensus regarding the treatment or the classification of radiation contamination in humans in either community. The lack of consensus among both scientists and officials muddied the processes of making the disaster's multiple forms of harm visible and compounded the violence done to the environment and to the people living and working in the Zone.

Olga Kuchinskaya [4] discusses the role that this invisibility played in the social and biological effects of the disaster. This includes the invisibility of the radioactive particles and waves but also how sufferers and their symptoms were rendered invisible by political actors who leveraged the unknowns regarding the effects of radiation to conceal or minimize those effects that could be accurately recorded. She emphasizes the role of government officials in how the radiation from Chornobyl was rendered visible, stating:

Because radiation is not directly perceptible to the unaided human senses and we do not encounter it as a tangible phenomenon, formal representations of what should be considered dangerous become doubly important in defining the scope of contamination and its risks. By formal representations I refer to standards, categories, and thresholds used in radiation protection. They help us interpret raw numbers by providing a context of what constitutes radiation risks. I also refer to visual maps that systematize quantitative data into graphic representations based on these definitions. These formal representations – including such things as acceptable thresholds of human exposure and acceptable levels of food contamination – are the language of legal and administrative decision making. They also set the general public expectations for what is dangerous. (p. 95)

This chapter similarly evaluates the mutually constructive processes of scientific knowledge production and political action, albeit from a slow violence perspective, where we take seriously the ways knowledge can produce unintended harms. We do this by examining the decades-long work of a network of researchers centered at the DSE. The DSE was an official site of knowledge production regarding the social harms of the Chornobyl disaster, and an analysis of its publications demonstrates the mutual construction of knowledge and policy in the processes of making the long-term harmful effects of EV visible. Gaining a better awareness of these processes and their relations allows us to create a better understanding

of how different types of knowledge can obscure, reveal, address, or cause more harm to people and environments.

The DSE has long been involved in the study of Chornobyl sufferers as a distinct social group via a methodology they term "social monitoring."[2] Their knowledge production efforts on the harmful effects of radioactive contamination were instrumental in making the slow violence of Chornobyl visible to Ukrainian state actors and the broader scientific community. In addition to their publications, the DSE provided reports to Ukrainian government ministries and elected officials, including regular presentations to the Ukrainian parliament, the Verkhovna Rada. Through their social monitoring program, the DSE systematically collected longitudinal data on Chornobyl sufferers from 1991 to 2011 with the explicit intention of making the problems sufferers faced visible both to the state and to the public. Radiation is invisible, requiring specific (primarily technoscientific) instruments to detect and measure it. The harms of radiation can also be invisible, especially to those not directly experiencing them and, in the same way, require specific (primarily political) instruments to detect and measure those harms. Making both radiation and its harms visible to others involves political and technoscientific processes. The politics of visibility invites questions – Visible to whom? To what ends? How to fill knowledge/visibility gaps? – that entail competing narratives of power regarding the mutually constructive processes of the production of knowledge and action.

This approach to EV research seeks to tackle the politics of visibility of environmental harms by exploring how a slow violence perspective affects investigations of knowledge production processes. Slow violence approaches to EV go beyond taking a long-term view of environmental harms by looking at how mutually constructed scientific and political processes alter the visibility of those harms, and the responses to those harms, over time.

The methodological framework of critical knowledge production [5] is a valuable tool for understanding the processes by which scientific knowledge is produced and why those processes and that knowledge matter in the EV framework and in

[2] "Sufferer" is commonly used in English narratives of the disaster as a translation of both потерпілий (Ukr.)/потерпевший (Rus.) and постраждалий (Ukr.)/пострадавший (Rus.). The first pair is derived from the verb "to suffer" and relates to going through an experience or being the victim of a crime caused by another's actions. This was also a legal term in the Soviet criminal code, carrying with it historical and institutional weight. The focus of this term is on one's relational subject position, as in "I am a victim/sufferer." The second pair is derived from the verb "to suffer hurt" and relates to being hurt, being injured, or suffering, whether the cause of pain is intentional or not. The focus of this term is on the present processes one is enduring, as in "I am suffering." Because both terms translate to "sufferer" and "victim" in English, the nuance of meaning is hard to capture in translation. To further complicate the matter, it is not always clear whether the authors of source material on Chornobyl are necessarily intending to highlight the nuance of meaning between the two words, as some treat the terms as interchangeable and others, writing in both languages, prefer one term in Ukrainian and one term in Russian. The term "Chornobyltsi," or people of Chornobyl, is also sometimes used to refer to Chornobyl sufferers.

the case of Chornobyl sufferers. Below, in a review of the literature, we discuss the concept of slow violence, why it matters to the framework of EV, and the political nature of the construction of knowledge. Following that, we introduce the DSE as a site of knowledge production on the human impacts of Chornobyl and an analysis of how its data on sufferers depict slow violence through the lens of critical knowledge production.

1.2 Slow Violence and the Environment

The term "slow violence" was popularized by Rob Nixon in his 2011 book, *Slow Violence and the Environmentalism of the Poor* [6], in which he draws attention to the importance of the overlooked experiences of vulnerable people around the world who suffer disproportionately from environmental mismanagement. According to Nixon, time plays a part in making this damage to groups of people and to ecosystems invisible. Nixon positions time as an actor, because it shapes how violence unfolds by separating direct cause from effect [7]. Nixon does not focus on direct and immediate harm inflicted by sudden events, but rather considers damage that emerges slowly over time resulting from, for instance, industrial dumping or the altering of landscapes. He emphasizes the importance of generating compelling images and stories of these untold, lived experiences resulting from decisions made elsewhere. He argues that it is through these images and stories that this otherwise invisible suffering becomes seeable.

Nixon's work has roots in the earlier work of Johan Galtung, who challenged the binary of war and peace to look at violence in various forms [8]. Galtung argued that if we are to understand the roots of violence, it is important to see beyond the immediacy of war to view violence, not only as direct, but indirect; not only as physical, but psychological; not only as intended, but unintentional; and not only as manifest, but latent. By offering this perspective, Galtung introduced a different way of understanding and examining violence. In his later work, Galtung went on to describe cultural violence [9] in which harm towards some groups of people is embedded in religion, language, art, empirical science, and other societal practices. These social norms and structures legitimize violence and harm and make it seem ordinary or unavoidable. Cultural violence relies on society's acceptance or ignorance to maintain its relatively widespread invisibility.

This seemingly invisible harm, however, is not invisible to the people whose lives it alters. In his work with people enduring the environmental damage of Louisiana's aptly named "Cancer Alley," Thom Davies [10, 11] has suggested that slow violence is a matter of perspective. For people who are dealing with degraded health caused by environmental conditions, the harm inflicted on their lives is very visible, palpable, tangible, and real. In order for researchers and other outsiders

to see this harm, it is necessary to take the approach of slow observation. This approach aims to see through the eyes and life experience of people suffering various forms of slowly unfolding harm in order to appreciate the changed conditions and prospects of their lives and livelihoods.

The label of "slow violence" might seem to set up as a binary opposite fast or immediate violence [12], but what an approach of slow violence does is to pay attention to forms of harm that might not be immediately obvious. As noted, with the idea of slow observation [10, 11], slow violence as an approach pays attention to multiple simultaneous ways of seeing, and it also signals other multiplicities. For example, policy-making processes tend to consider finite and linear aspects of decision-making. Our understanding of any decision- and policy-making process expands when we consider phenomena beyond the immediate focus. For example, Erin Fitz-Henry [13] studied the narrow linear view of policymakers in response to the Exxon Valdez oil spill and the focus on returning the measurable oil spill closer to previous "normal" conditions. She points out that this view completely overlooked other spatialities and temporalities of aquatic life at deeper levels of the ocean and in the context of migratory and reproduction cycles. The chosen variables of the standard clean-up response were not only extremely limited, but they also perpetuated forms of environmental harm and violence by not bringing them into the response process.

Another related form of multiplicity that a slow violence approach allows us to consider is found in the types of data and knowledge brought to bear in any context of unintended harm inflicted on groups of people and environments. That is, how can slow violence be measured and otherwise assessed? Taking into account that multiple perspectives, spatialities, and temporalities are all critical steps toward a better understanding of harm and violence, we also need to pay attention to what kinds of information or data are available, gatherable, and capable of contributing to an understanding of or a response to a situation. It is important to critique scientific practices and ways of knowing because even the very methods by which scientific assessments are made can obscure harm and violence or bring it to light. This point harkens back to Galtung's [9] concern with how practices that are considered standard or state of the art can actually embed structural forms of harm and violence. What is more, gaps in knowledge and data that are not collected can also contribute to "ignorance loops" [14] that perpetuate forms of harm, degradation, and violence, even while ticking the check boxes of "good science." Since slow violence comes into play across a wide range of human experience and environmental contexts, there is no single methodology or framework by which to study slow violence. Instead, there is ample room for researchers from a variety of disciplines to question how avoidable harm is generated, to apply different methodologies that make slow violence visible, and to expand awareness of slow violence in its many forms [15].

1.3 Politics of the Construction of Knowledge

Our point of entry in critiquing the scientific practices and ways of knowing about EV and the harms it causes is a research framework we call "critical knowledge production." We, along with Samuel Henkin [5], developed this framework as a way to place the processes and practices of scientific knowledge production in their political, historical, and geographical contexts. Context, as well as discourse, connection, and social and material relations, are central to tracing the ways in which scientific knowledge and political agendas and actions help produce each other.

Science, the systematic production of knowledge, is inherently and actively social. A central tenet of the field of Science and Technology Studies (or alternatively, Science, Technology, and Society) is that knowledge production does not happen in a vacuum. From research design to methodology to data collection to analysis, the processes and practices of "doing science" are shot through with contextual social and material relations – such as biases, norms, funding sources and amounts, discourses, power relations, previous experience, time constraints, available technology, and so on – that bear heavily on knowledge production, whether those doing the producing realize it or not. Recognizing these embedded contexts points to the messiness, complexity, heterogeneity, partialities, and contingencies that producers of knowledge must contend with, account for, embrace, ignore, suppress, or passively accept.

Critical knowledge production focuses on process rather than product. We developed this framework to analyze the constructive relationships among knowledge, political action, and discourse. In other words, this framework illuminates the politics of knowledge-making. For those interested in studying the effects of EV, critical knowledge production allows us to better understand the ways in which the sources, contexts, and harms of EV are obscured, made visible, perpetuated, interrupted, and addressed.

Making something visible is both a political action that requires the tools of knowledge production and an act of knowledge production that requires the tools of politics. The research methods, data collection instruments, and analytic tools used to create knowledge cannot, on their own, make that knowledge visible to others who are not personally involved in its creation. Making that knowledge be seen by others, especially in a format that is accessible and actionable, involves the political work of placing that knowledge in its relevant contexts and addressing sociomaterial realities for it to have an effect on the intended audience. Visibility is an emergent property, a result of the political and scientific work of having rendered a thing visible. When we are discussing making EV and harms visible, different, and less immediate forms of violence – indirect, psychological, unintentional, latent – require different tactics or methods to become visible.

Visibility also necessitates action in response. Once a harmful effect of EV is made visible, those seeing it must choose to ignore it, to work to resolve the causes and repair the damage, or to do something in between. Critical knowledge production extends its critique through these processes as well, asking questions such as: "What political actions did the researchers intend their audience to take?"; "What choices did the researchers make in their knowledge production processes to better appeal to their chosen audience?"; "How did the reaction of the intended audience impact subsequent processes of knowledge production?"; or "How did unintended audiences, reactions, and changing contexts alter later processes involving this knowledge?" The capacity of critical knowledge production to analyze mutually iterative constructions of knowledge and action over a longer time and broader space situates the framework as a productive research tool in investigating slow violence and harm.

Approaching investigations of slow violence from the framework of critical knowledge production allows us to show, in a granular way, how knowledge about, and the politics of, slow violence are constructed. Political actors, including researchers of the harms and other effects of violence, make decisions based on what is known and valued and what pieces and forms of knowledge can help advance the actors' agendas.

In the remainder of this chapter, we discuss the role of the DSE in making visible the effects and harms of the 1986 Chornobyl disaster on Ukrainian evacuees and residents of the Zone. For over two decades, the DSE was the primary entity researching the slow, long-term effects of the EV of Chornobyl. Applying the critical knowledge production framework to the knowledge production work of the DSE highlights not only the political nature of their research and the politics of addressing slow EV, but also how changing political, economic, and social contexts and research on Chornobyl sufferers co-produced each other.

1.4 The DSE and the Sufferer Population

The DSE [Ukrainian: *Відділ соціальної експертизи*] is one of eight departments of the Institute of Sociology of the National Academy of Sciences of Ukraine (NASU). As a public research department in the NASU, the DSE is funded by the Verkhovna Rada, the Ukrainian parliament. The DSE faculty often undertakes research projects requested by organs of the state, including the Verkhovna Rada and other government ministries. Analyzing the DSE's publications and scientific practices from a critical knowledge production framework can reveal important insights into the ways that their knowledge-making processes obscured, or made visible, the harms and violence of Chornobyl.

For the first half of the department's existence, until roughly 2007, the primary research objective of the DSE was concerned with its program of social monitoring of people affected by the 1986 Chornobyl disaster. While social monitoring remains a major function and methodology of the department today, the past decade has seen a diversification of the faculty's research efforts and an expansion in departmental publications on HIV/AIDS research and the impacts of market liberalization in Ukraine.

The work of the DSE faculty is largely structured around their definition of social/society. Of particular importance is the distinction between the two words in Ukrainian that mean society, *sotsium* [*соціум*] and *suspilstvo* [*суспільство*]. On this topic, Chepurko has stated that while authors often equate the two words, using them interchangeably, *соціум* is used more to describe society as a formation that determines the subjectivity of individuals in social structures, including the construction of communities and networks of cooperation, while *суспільство* emphasizes the systems of social organization, including "objective social laws" [16]. The program of social monitoring developed at the DSE is intended to navigate the distinctions between these two terms by taking seriously the agency of its research subjects and their interactions with social systems. Put another way, social monitoring is a method of analyzing biopolitical relations, regulations, and resistance.

Between 1995 and 2011, the DSE published a number of edited volumes of research related to its social monitoring program, including 13 volumes of *Chornobyl and Society* [17] [*Чорнобиль і соціум*; *ChiS* hereafter], and four other books: *Social Consequences of the Chornobyl Disaster* [18] [*Соціальні наслідки чорнобильської катастрофи*]; *Socioeconomic Consequences of Technogenic and Natural Disasters: Expert Evaluation* [19] [*Соціально-економічні наслідки техногенних та природних катастроф: експертне оцінювання*]; *Postchornobyl Society: 15 Years after the Accident* [20] [*Постчорнобильський соціум: 15 років по аварії*]; and *Social Consequences of Chornobyl: A Time for Rebirth* [21] [*Соціальні наслідки Чорнобиля: Час відродження*]. After this period, as mentioned above, the DSE's research and publication activities on Chornobyl sufferers fell off dramatically, in favor of the department's other focus areas. This transition came after governmental priorities and funding shifted away from studying the Chornobyl disaster and those suffering from its effects.

These publications were a conscious effort to make the harms of the Chornobyl disaster visible. The crux of the technocratic mode of (post-)Soviet governance is the space where treating classes or populations as the base unit of study and measurement and the calculation of state responsibility to those populations meet. This mode of governance is reflected in the research aims of the DSE and the methodology of their social monitoring program by collecting longitudinal data on the harms of Chornobyl among representative samples of the different categories

of sufferer populations. Who can be classified as a sufferer and the determination of which category an individual belongs to is yet another example of technoscientific knowledge and politics co-producing each other. In the case of the Chornobyl sufferer population in Ukraine, the Soviet and later Ukrainian governments explicitly outlined the criteria for membership of both the population itself, and the categories thereof. The relevant, and oft-amended, piece of legislation, "On the status and social protection of citizens that have suffered as a consequence of the Chornobyl disaster" ["Про статус і соціальний захист громадян, які постраждали внаслідок Чорнобильської катастрофи"] [22], enacted five years after the disaster, established four categories of sufferers. Though this law has been amended 65 separate times, including major amendments that redefined the criteria for category membership, this structure has remained intact to this day. This law indicates that liquidators, "citizens who directly participated in any work connected to the elimination of the disaster or its consequences in the exclusion zone" and sufferers, "citizens, including children, that have experienced the effect of radioactive exposure as a result of the Chornobyl disaster," are to be counted separately, though they are grouped together in categories for purposes of benefits ([22]: articles 9–10). From these general definitions, additional temporal, spatial, exposure, and medical conditions determined a person's membership of one of the four officially recognized categories of sufferers. Category 1 sufferers are recognized as experiencing the most harm as a result of the Chornobyl disaster and are entitled to the highest level of benefits in comparison to the other categories, with those in category 4 receiving the least amount of benefits. Series H [Серія Г] includes those who were never in the Zone, but have a proven Chornobyl-related health disability and Series D [Серія Д] includes children affected by the disaster. To be a recognized Chornobyl sufferer, a person must prove that they meet the requirements to belong to one of the categories; without that official recognition, a person cannot access the means of social protection the government has committed to provide. This situation has resulted in a contested liminal space of identity, where many feel as though their lives have been directly negatively affected by the Chornobyl disaster, but because they cannot produce the necessary documentation to prove as much, they are barred from accessing the entitlements of sufferers.

The social monitoring program was intended to understand the effects of the Chornobyl disaster on populations, with the expectation that this research would primarily inform the role and responsibility of the state to those classified as sufferers. The authors of these DSE volumes present their analyses of sufferer populations to an audience that understands that expectation. Each of these volumes contain, in the front matter, a short statement that explicitly identifies its audience and purpose. Though the exact wording varied slightly in the first two issues, the version of this statement in *ChiS* 3–13 reads,

Для фахівців, управлінців, широкого кола читачів, що цікавляться соціальними проблемами потерпілого населення та вирішення управлінських проблем його соціального захисту.

For experts, administrators, and the wide circle of readers who are interested in the social problems of the sufferer population and the solution of administrative problems of their social protection. ([17]: p. 2)

The purpose of social monitoring at the DSE was not just to keep tabs on the social well-being of Chornobyl sufferers, but also to establish and then execute a method of scientific knowledge production that could provide trustworthy and expert information – if not outright recommendations – to policymakers. From the perspective of the DSE, social monitoring is an explicit intervention into the co-constructive processes of politics and science. Knowing the DSE's perspective and their intended audience is relevant for understanding their processes of knowledge production. The DSE's research intentions were to make the social effects of Chornobyl visible and to improve the administration of social protections afforded to the Chornobyl sufferer population. The data they collected, as well as the forms and contents of their analyses, were meant to serve both of those ends.

Analyzing this body of work as a whole from a critical knowledge production perspective reveals the changes in the knowledge-making processes that the DSE employed; it marks the shifting political and social contexts in which their work was embedded; and it provides chronological pointers to related political events external to the DSE that, nevertheless, influenced the shape of its work. By connecting the content of these publications to, for example, parliamentary actions, presidential decrees, ministerial changes, and media coverage regarding the Chornobyl disaster and its sufferers, we can get a sense of the political responses to the data on sufferers that the DSE produced. As the DSE, acting as an official point of knowledge production on sufferers, presented its research on what is known, what matters, and what remains unknown to government bodies, the press, and other academics, we can trace the effects of their knowledge production efforts. The social monitoring program outlined what kinds of data on sufferers were collected and what was cultivated and what was disregarded. Changes in the laws regarding the long-term effects of the Chornobyl disaster, ministerial reorganizations and policy shifts, and adjustments to research funding allocations had their own effects on what knowledge about sufferers had value and was actionable. One result of this co-constructive relationship between knowledge production and political action was that the program of social monitoring of Chornobyl sufferers was shut down at the DSE after years of dwindling resources and funding for the work.

At the beginning of the *ChiS* project in 1992, the DSE received funding from the Ministry of Ukraine for the Protection of the Population from the Consequences of the Accident at the Chornobyl NPP [Міністерство України у справах захисту

населення від наслідків аварії на Чорнобильській АЕС, hereafter the Chornobyl Ministry].[3] By as early as 1995, however, in the introduction to *ChiS* 2, the volume's editors Sayenko and Pryvalov were already lamenting a shortfall of funds, stating that "it has been two and a half years since the sociological survey of 1992. Much has changed over these years. It is only thanks to the Chornobyl Ministry of Ukraine ([Vladislav Fedorovich] Torbin) that it was possible to conduct even a short sociological study – science funding is far too reduced" ([17]: p. 4). They had to settle for a sample size of 1200 respondents residing within the Zhytomyr oblast, which borders the Kyiv oblast and the Chornobyl Exclusion Zone to the west, instead of the large-scale survey they initially planned. Similar statements appear in a number of the *ChiS* volumes, including in number 5 (p. 7), where the editor bluntly states that there was insufficient funding to survey enough respondents to enable a full comparison of all groups of sufferers.

Funding cuts, state budget and political crises, and shifting public interest had resulted by 2011 in an almost complete reorientation of the DSE's research efforts from the social effects of the Chornobyl disaster to other research programs. As Chepurko explained in personal correspondence [16], the faculty of the DSE is proud of the work it has done, but after governmental priorities shifted away from the Chornobyl disaster and those suffering from its effects, there has been neither the will nor the funding to continue that work.

These examples highlight the reliance on personal connections within broader networks of collaboration and the politics of post-Soviet knowledge production. Even after three decades, despite incremental reforms, academics in the highest bodies of scientific research can only investigate those topics of which the government approves, from the micro level such as Torbin's individual ministerial backing of the project, to the macro, such as administrative and bureaucratic funding cuts to entire Institutes of the NASU. This research system is also reflected in the politics of visibility: When research funding and permissions are, at least in part, contingent on personal connections and cashing in favors, how much can truly be made visible from within that system? Who and what gets un- or under-studied?

The Chornobyl sufferers social monitoring program was a research methodology explicitly designed to make the invisible visible. The variables the DSE tracked

[3] This ministry was renamed the Ministry of Ukraine on the Question of Emergency Situations and in Matters of the Protection of the Population from the Consequences of the Chornobyl Disaster [Міністерство України з питань надзвичайних ситуацій і в справах захисту населення від наслідків Чорнобильської катастрофи] in 1996, following a decision by the Verkhovna Rada to establish a ministry for civil defense. The Chornobyl Ministry was expanded in scope and reformed in 2010 as the Ministry of Emergency Situations [Міністерство надзвичайних ситуацій України, MNS]. In 2012, as part of President Yanukovich's reorganization of Ukraine's government, the MNS was dissolved and the State Emergency Service [Державна служба України з надзвичайних ситуацій] was established in its place, moving the Service under the authority of the Ukrainian Ministry of Internal Affairs.

for decades, including hunger, feelings of helplessness, psychological health, the stress of not knowing exactly what effects radiation from Chornobyl has had on one's body, and other harms caused by the violence of Chornobyl, are not immediately obvious. The DSE's data, analyses, and knowledge-making practices over decades engaged in a limited form of slow observation. The political, academic, and scientific traditions from which the DSE developed their social monitoring methodology were technocratic and concerned with the state of *populations* rather than with individual experiences. This methodology categorically limits what kinds of data can be made visible by their research. While the longitudinal nature of social monitoring addresses, to some extent, the slowness of the violences of Chornobyl, or how Chornobyl's harmful effects are felt over time, its methodology cannot account for the granular multiplicities in perspective, identity, and space.

This analysis of the understanding of the methodology of the DSE in its social monitoring work with Chornobyl sufferers involves two related tracks. The first is in critiquing the ways social monitoring takes lived experience and specific circumstances and turns them into actionable knowledge. The second is reflexive, in seeing how the DSE incorporated the products of the actions taken in response to the knowledge they produced in their social monitoring practices.

1.5 Making Visible the Slow, Environmental Harms to Sufferers

The knowledge production processes the DSE engaged in reveal a systematic attempt to make visible the harms of the Chornobyl disaster over a period of decades by running a series of surveys. While the authors of the DSE's publications do not use the term "slow violence," they are nonetheless treating the disaster as an instance thereof and are interested in not only the physical and environmental harms caused by the disaster but also the less-immediately obvious social harms. In fact, of the 271 chapters in these 17 volumes, 109 are concerned with the social and psychological health of sufferers – their mental and emotional states, adjustments to resettlement, dealing with the social stigma of being a Chornobyl sufferer, feelings about the future, and even questions of faith. Other chapters focused on some of the less immediately obvious harms of EV, such as economic damage, differences in how age and gender groups experienced those harms, and attitudes to personal risk management. Table 1.1 shows the breakdown of how these chapters were coded in our analysis.

This table illustrates the kinds of data that the DSE valued, and that the DSE perceived its intended audience would value. At no point in these volumes are there personal stories or interviews; ethnography was never the point. The parameters of data that the DSE set in its social monitoring program shaped how forms of harm unfolded and were disregarded. The analyses of this data, recorded in these 271

Table 1.1 *Code counts by chapter in DSE publications.*

Category	Code	Count	Single Coded
Social and psychological health	PSYC	109	45
Social assistance and social protections	PROT	46	27
Agricultural, industrial, and economic effects of the disaster	ECON	44	18
Physical and material health	PHYS	43	8
Handling risk and extreme situations	RISK	38	8
Gender, family, and children's issues	FAMS	33	7
Mass media, culture, and mass consciousness	MASS	33	18
Methods of social expertise	EXPT	26	15
Comparative analysis	COMP	15	2
Social models and modeling	MODL	14	2

chapters, also shaped how those harms should be addressed by choosing which forms of harm were to be made visible.

The overwhelming majority of chapters in the *ChiS* series are analyses based on data collected via social monitoring. As mentioned above, the methodology of social monitoring employed by the DSE is designed to produce data on how a population – in this case, Chornobyl sufferers – sees itself in relation to other social processes. This was largely achieved with the use of self-evaluations: The DSE provided assessment forms annually to their respondents, asking questions about their sociopsychological and physiological state (how are they feeling), way of life (how are they living), cultural and economic situation (how are they participating in society), and the quality and conditions of their lived environments. In volume 3 of *ChiS* [17], Sayenko explained the purpose of social monitoring: "The tasks and functions of monitoring are not only the recording of facts and accumulating a data bank, a knowledge bank, but also the analysis of a situation, predicting the consequences of accepted and developed decisions, as well as suggestions for correcting and preventing adverse consequences" (p. 6). First, this research design understood the dynamics of change in the sociopsychological and sociocultural "orientations" and behaviors of sufferer populations and, second, when combined with demographic and economic data from other sources and studies, informed policy decisions regarding the management of a post-Chornobyl society. Understanding this design establishes a foundation for critiquing the DSE's social monitoring program. By knowing what kinds of data the DSE were most interested in, and that their data were intended to inform policy, we can gauge the efficacy of the program on its own terms and identify the limits of social monitoring with more clarity.

The overall picture of the state of Chornobyl sufferers that these chapters paint is one of frustration, uncertainty, and distrust. Frequently, the authors of these chapters indicate that many of the sufferers' issues are a direct result of the gap between word and deed, namely, the disconnect between the benefits guaranteed to sufferers and what the state was actually materially able to provide. A chapter titled "Social protection of sufferers of the ChNPP accident" in *ChiS 2*, for example, prefaces its survey findings with a short overview of the history of sufferers' social protections; it states that, although a number of laws had been passed guaranteeing sufferers certain rights and benefits, they have been falling far short of the promises. "Four years have passed [since the ChNPP sufferer laws were implemented], and although amendments have been made to these laws, during this time significant contradictions have accumulated between the proclaimed and legally enshrined benefits and compensations which should be provided to the different categories of citizens, and the real conditions of their implementation" ([17] [1995]: p. 60). Writing at the end of a decade of economic turmoil in Ukraine, the authors note that these laws were written when the country was still part of the Soviet Union and could rely on its immense budget to support the sufferers. Within six months of the passing of these social protection laws, the Soviet Union was gone and Russia declined to contribute any resources to the enforcement of these laws. Reflecting on this period 16 years later, one of the authors of this chapter, Chepurko, states:

> Changes in the socio-economic conditions of life, the drop in production, and the deepening of the socio-economic crisis in the 1990s led to a marked lowering in the quality of life for the population of Ukraine. The crisis covered all regions of the state, but most deeply the Chornobyl sufferers. In fact, over half of all Ukrainians fell below the poverty line. The suddenly impoverished country, its production ruined, was not able to ensure real and essential assistance for the majority of the poor and unprotected strata of the population (pensioners, invalids, the unemployed) and Chornobyl sufferers. ([19]: p. 158)

The situation for virtually all Ukrainians was so dire in the 1990s that across all the questions the DSE asked, among both groups of sufferers and the control group they surveyed, the only question that registered a majority response for "It got better" was faith in God; Table 1.2 is reproduced and translated.

The data presented in Table 1.2 are useful in that they show how the DSE tracked a variety of variables to assess the harms of the Chornobyl disaster. By including a control group, the DSE could demonstrate the contexts in which sufferers experienced the slow violence of Chornobyl. The results of this 1995 survey show that the social, economic, health, and other circumstances for Ukrainians were so poor that the added burden of dealing with the effects of Chornobyl did not make much difference in the daily lives of sufferers compared to the general population.

By 1999, however, Ukraine's economic decline had finally started to show signs of stopping, which resulted in a growing gap between the responses from sufferers and control groups to the DSE's surveys. In *ChiS 5* (1999), Sayenko provides an executive summary of the findings from that year's survey. Across the board,

Table 1.2 *"What happened with you in the last year? Which conditions of your life, like financial situation, health, income, and other matters got worse, got better, or didn't change?" ([15] [1995]: pp. 62–63).*

	Category 3 sufferers (n = 300)			Category 4 sufferers (n = 300)			Control group (non-sufferers, n = 300)		
	Worse	Better	Same	Worse	Better	Same	Worse	Better	Same
Financial situation	72	3	21	90	1	8	83	1	10
State of health	80	1	15	89	1	6	84	1	10
Psycho-nervous state	66	2	28	76	0	19	72	1	20
Generally how you feel	68	1	24	84	1	10	71	3	19
Income	74	6	16	91	2	5	86	2	10
Nutrition	72	2	22	79	2	16	61	1	34
Living conditions	22	9	67	31	5	62	20	7	70
Household management	10	10	76	21	11	65	10	11	72
Dacha	5	5	80	13	8	69	5	4	58
Business activity	10	5	68	14	7	57	9	2	47
Work conditions	38	4	51	52	5	38	36	7	41
Professional level	9	13	66	19	13	63	15	12	53
General cultural level	21	9	59	32	12	53	26	6	42
Achieving life plans	30	9	45	51	4	32	30	2	44
Relations with family	14	16	63	30	9	55	21	15	61
Relations with people	22	14	55	20	8	66	15	12	67
Leisure, vacation	57	9	29	62	0	32	43	4	35
[Health] treatment	79	2	15	86	2	12	75	2	20
Faith in God	6	47	38	10	47	36	5	50	34
Faith in science	27	9	50	34	8	47	23	10	41

Table 1.2. (*cont.*)

	Category 3 sufferers (n = 300)			Category 4 sufferers (n = 300)			Control group (non-sufferers, n = 300)		
	Worse	Better	Same	Worse	Better	Same	Worse	Better	Same
Faith in authority	69	2	20	77	2	12	71	2	13
Faith in family	9	35	47	10	34	52	8	38	44
Faith in one's self	16	27	41	17	27	46	7	28	43

respondents continued to report negative, deteriorating sociopsychological states; the highest rates of negative responses came from the resettled population. He writes in his summary: "The 'Chornobyl factor' still has a very negative impact on the social-psychological state of all categories of victims and, especially, on residents of places of resettlement …. The distance from the disaster is still too small to cure the social-psychological trauma. And already far enough to forget about material losses" (p. 9). In stark terms, the DSE's director reports that overwhelming majorities of groups of sufferers exhibit "distrust of the power structure and active discontent with the social policies of the government" and "distrust of authority" (p. 9); they were not provided with adequate information on how to conduct everyday life activities in a contaminated environment (p. 10); they felt that "people's wishes were not considered during resettlement" (p. 11); and they were in desperate need of material and medical assistance. For example, Sayenko states,

> Among inhabitants of zone 2,[4] the main necessities are: 1) "financial support" and "individual treatment [of disease]" – 80–82%; 2) "treatment of children" – 46%; 3) "job retraining," "a workplace," and "relocation" – 34–38%.
>
> "Among inhabitants of zone 3 the main needs are:[5] 1) "individual treatment" – 63%; 2) "financial assistance" and "treatment of children" – 53–54%; 3) "a workplace" – 44%; 4) "help with unemployment" – 34%.
>
> Among the resettled the main needs are:[6] 1) "a workplace" and "individual treatment" – 84%; 2) "financial assistance" – 79%; 3) "treatment of children" – 78%; 4) "help with unemployment" – 71%. (p. 12)

These responses show a devastating breakdown in the relationship between the state and the sufferers. Promised benefits were slashed in practice, though left in

[4] Zone 2 is the area of the Exclusion Zone where evacuation was mandatory. Respondents to the 1999 survey in this zone lived in the Narodytskyy region of the Zhytomyr oblast ([15] [1999]: p. 8).

[5] Zone 3 is the area of the Exclusion Zone where evacuation was encouraged, although voluntary. Respondents to the 1999 survey in this zone lived in the Ovrutskyy region of the Zhytomyr oblast ([15] [1999]: p. 8).

[6] Respondents to the 1999 survey in this group had been resettled from the Exclusion Zone to the Barishivskyy and Zgurovskyy regions of the Kyiv oblast ([15] [1999]: p. 8).

the wording of the law, and the sufferers dependent on those benefits suffered even further. As the DSE turned over its reports to the Chornobyl Ministry and made proposals to the Verkhovna Rada, the law – with its reparative and restorative spirit – remained the same. To again quote Chepurko reflecting on the work done by the DSE, the poor economic situation and decimated state and local budgets "necessarily led to leaving only those types of social assistance that were directly tied to the preservation of sufferers' health (treatments, rehabilitation in the summer, clean products, children's nutrition, etc.). All other kinds of assistance were subject to cancellation. But, despite our proposals in this direction, which have been expressed for many years, a new concept of the law on the social protection of Chornobyltsi has not been developed" ([21]: p. 159). By their own admission, despite presenting compelling data that the social protection obligations to sufferers were not being met, the DSE's social monitoring program was unable to produce the desired political result. Social monitoring did make visible some of the slow social harms of the Chornobyl disaster, but those knowledge-making processes – tailor-made for their audience as they were – not only failed in their objective to alleviate those harms but also, in that failure, compounded the harmful effects of the disaster. The sufferers continued to live with the slow harms of Chornobyl with the super-added burden of knowing that even a respected academic department speaking directly to the Verkhovna Rada and heads of ministries was insufficient to relieve that suffering. In this case, the limits of the social monitoring methodology, the inherited technocratic mode of governance in Ukraine, and the contexts within which both operated and produced each other, in fact, served to legitimize the violence and harm caused by the disaster, or at least to legitimize state inaction in addressing those harms.

The inability of the Ukrainian state to fully administer the social protection benefits that were owed has further compounded the harm done to Chornobyl sufferers. Ceasing funding for continued social monitoring of sufferers also works to obscure those harms, making it even harder for those experiencing the slow EV of Chornobyl to achieve the redress that was promised. The survey responses collected by the DSE also highlight other factors that compounded those harms. For example, in Sayenko's summary in *ChiS 5*, he records: "Half of the respondents were not informed of the special measures of living in contaminated territories. The other half were divided thus: 25–40% of the residents of zones 2 and 3 know that it is necessary to put potassium fertilizer in the soil, but only 15% actually do this" ([15] [1999]: p. 10). This finding points back to those base questions about the process of making something visible: If knowledge exists, but it is not shared with those that can make use of it, why do they not know it? Who is responsible for making that knowledge visible to them? What obstacles to visibility exist, and what factors perpetuate those obstacles? Beyond simple visibility, even if something is known, what educational processes are required

for people to understand why taking action based on that now-visible knowledge is valuable, beneficial, or necessary?

Slow EV does not just entail a gradual unfolding of harms, but also includes the acceleration and deceleration of compensatory and reconciliatory action as a function of the fluctuations of the visibility of that violence. It takes consistent, dedicated work to render the harms of slow violence visible, and when the spotlight moves away from those harms – whether that is in the form of declining social consciousness, funding cuts, or other crises and violence that emerge and are deemed by various political actors to take precedence – they are much easier to ignore or dismiss; the violence is compounded.

In evaluating the DSE's processes of knowledge production and their goal of making the many kinds of harm caused by the Chornobyl disaster visible, we can draw a few conclusions about their knowledge production practices. The first is that the methodology of the social monitoring program was shaped and limited by both the academic and scientific traditions within which the faculty of the DSE operated, and the political decisions regarding which data were to be collected. The DSE's focus on population data is symptomatic of this dynamic, as the concept of social monitoring emerged from the technocratic mode of Soviet knowledge production and the results of the program were primarily targeted at the decision-making bodies of the Ukrainian state. The second is that visibility cannot force desired political outcomes. Simply presenting survey responses and data analyses to the Verkhovna Rada and publishing results did not force the creation of new social protection laws for sufferers or even guarantee that existing legally defined benefit obligations were being met. While visibility does require political action in response, there is always a possibility that that response is to ignore the harms of violence, or to act to reduce the visibility of those harms. The third is that the processes of knowledge production are social – there is no such thing as "pure science." The faculty of the DSE, the 138 authors of these 271 chapters, are real people with their own internal lives, preferences, cares, worries, and ways of doing things, even if they are engaging in structured systems and processes. Their sympathies and frustrations are laid out on the pages of these academic–scientific volumes, as is the sense that these researchers did not lose sight of the fact that their survey respondents were real people with very real problems. These conclusions are not unique to the work of the DSE. Broadly, they demonstrate how a critical knowledge production approach to assessments of slow EV is useful to understanding how ways of knowing and political action co-construct each other, and how a critique of those co-constructed processes can inform researchers on slow and EV as to the ways by which scientific assessments can either obscure and exacerbate harms or make them visible and motivate action.

1.6 Conclusion

The DSE was but one of many official and unofficial points of knowledge production on the human and environmental impacts of the Chornobyl disaster. However, their social monitoring program and regular access to Ukrainian governmental bodies does situate them in a unique position for discussing how the harms of Chornobyl were made visible. The size, notoriety, historical context, and still-unresolved questions (especially regarding the long-term effects of ionizing radiation) arising from the Chornobyl disaster have attracted many other groups and individuals who have engaged in different knowledge-making processes than that of the DSE. International organizations, such as the United Nations, the International Atomic Energy Agency (IAEA), Greenpeace, and charities such as Chernobyl Children International, all have produced regular official reports on various aspects of the effects and harms of the disaster, from the environmental to the human to the regulation of the nuclear industry. Personal narratives of survivors and liquidators, such as those recounted in the works of Nobel laureate Svetlana Alexievich [23], former Chornobyl liquidator Sergiy Mirnyi [24], or anthropologist Adriana Petryna [3], illustrate a human cost of the disaster that is not often captured in those reports, and sometimes directly contradicts their findings.

Each of these knowledge production efforts should be read critically and as mutually creating a new context for understanding the harms of the Chornobyl disaster. For example, the gulfs between official reports on the effects of the Chornobyl disaster and collections of people's experiences with the effects are large and stark. In the preface to *The Politics of Invisibility* [4], Olga Kuchinskaya explains how her attempts at bridging those gaps became the basis of that book:

> I had taken it as indisputable that Chernobyl had devastating consequences and that Belarus, the country in which I grew up, was most affected by it. The UNSCEAR reports confronted me with the fact that what I considered *obvious* from my perspective was interpreted as *nonexistent* from a different—expert and institutionally powerful—position; their judgment was buttressed by claims to objectivity. (p. ix)

Kuchinskaya's lived experience, and her friends' and family's experiences and narratives of the disaster and its effects, did not match the official findings supported by the United Nations and other groups such as the IAEA and World Health Organization. The specific report she cites, UNSCEAR's *Sources and Effects of Ionizing Radiation* [25], takes a conservative approach to attributing specific health consequences to Chornobyl, excluding from any accounts those effects that cannot *solely* be attributed to radiation from Chornobyl and only counting radiation sickness and cancer as health consequences.

For people like Kuchinskaya, the language of this report is understandably insufficient for an explanation or investigation and, as she states: "Connections

between UNSCEAR and the international nuclear industry became apparent rather quickly; it was not surprising that nuclear industry experts might be motivated to downplay the perceived consequences of a nuclear accident" ([4]: p. viii).

The global nuclear industry certainly took, and continues to take, the Chornobyl disaster seriously. Most prominently, once the causes of the disaster became clear, the IAEA crafted new safety regulations for nuclear power plant operation and the storage and disposal of nuclear waste [24] and worked with the Nuclear Energy Agency (NEA) to produce a comprehensive report on how Chornobyl changed international law [25]. However, Kuchinskaya's point is salient – it is in the political interests of the nuclear industry to minimize the harm of the disaster, to check radiophobia tendencies, and to continue to promote the operation and opening of new nuclear plants. Similarly, one can argue that it is in the interests of the Ukrainian government to minimize the effects of Chornobyl. At the time of the disaster, the liquidation efforts were borne by the Soviet Union as a whole. After 1991, the significant costs of maintaining the Zone, operating the remaining three functional reactors at ChNPP, and caring for the sufferer populations fell solely on the Ukrainian state. Even before that, however, the Soviet government was also motivated to minimize the official counts of individuals suffering from the effects of Chornobyl. For example, there is still disagreement between different camps regarding the death toll of the accident, as evidenced by Imanaka's [28] comparison of the claims of estimated cancer deaths: Greenpeace counts 93 000, the WHO 9000, and the Chernobyl Forum, established in 2005, puts the number at 3940 (p. 18). Each of these three organizations worked to make the effects of Chornobyl visible but, as a result of different methods of knowledge production and different political agendas, they each resulted in wildly different conclusions.

Making the harms of slow and EV visible is a crucial step in assessing those harms. Understanding the ways of knowing and knowledge production processes that go into making harms visible will also reveal the political decisions and actions that shape and are shaped by those processes. A critical knowledge production framework, therefore, is also a tool for analyzing the power structures around the emergent property of visibility of the harms of violence. It can illuminate how the politics of knowledge production can compound and exacerbate harms. It can also serve as a foundation for engaging in direct political action targeted at addressing, reducing, eliminating, and compensating for those harms.

As we have been writing this chapter, the genocidal war of imperialist aggression that Russia is waging on Ukraine entered its eighth year. When the full-scale invasion of Ukraine began on February 24, 2022, one of the first areas Russia captured was the Chornobyl Exclusion Zone. The mass mobilization of troops and armored units through the sparsely populated Zone kicked up clouds of radioactive dust, reintroducing harmful particles into the air, injuring many, and in their capture of the plant, the Russian

army prevented Chornobyl plant workers from leaving the facility for almost a month, forcing them to work to keep the reactor cooling systems running. The Russian occupation of the Zone led immediately to concerns of large-scale contamination events. After Ukrainian forces retook the plant and the Zone on April 3, they discovered that the occupying troops had destroyed 698 computers, 344 vehicles, and 1500 dosimeters in addition to causing significant structural damage to many buildings [29] which will undoubtedly hinder Ukrainian officials' efforts to monitor and maintain the radioactive safety of the Zone. Time will tell the full scale and scope of the environmental damage perpetrated by the Russian army. When this war concludes, a whole host of actors – the Ukrainian government and the governments of other states, the IAEA and other nuclear safety bodies, scientists and researchers from many disciplines, the International Criminal Court, financial institutions, environmental activists and human rights groups – will all have a part to play in the future of the management of the Zone, the mitigation of the continued environmental harms of the Chornobyl disaster, and the reparations owed to those who continue to suffer from the effects of the radiation from Chornobyl. This war highlights, among many other issues, how the smoldering harms of EV can be reignited and exacerbated much more quickly than they can be mitigated.

Critical knowledge production contains within it the opportunity, if not the tendency, for social justice–based research and scholarly activism. From this approach, investigations of knowledge production explicitly challenge or interrogate the politics of expertise, encourage exploration of nonhegemonic narratives and ontologies, and, in prying open knowledge gaps, create opportunities to disrupt Western academic norms, assumptions, and methods. If we incorporate this framework into our research efforts, not only will we find a greater "potential to foster deeper and richer explanations of the interactions of people and things in various places and spaces" ([5]: p. 261), but we will do so responsibly and ethically. As for the future of the slow EV of Chornobyl, there are no easy solutions or quick fixes, but the new harms resulting from the war, made visible by the preponderance of coverage from news outlets, soldiers' mobile phone videos shared on social media, and official statements, will necessitate new actions. In our role as knowledge producers concerned with the effects of slow EV we should continue our work to make these harms visible and to forge productive political relationships to minimize the effects of those harms, and to work toward equitable outcomes for sufferers.

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