Multilateral Governance of Nuclear Risks

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Risk, Hazards & Crisis in Public Policy
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Editorial for the Special issue of *RHCPP* on Multilateral Governance of Nuclear Risks

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Nuclear technology creates complex, international, intergenerational, and multi-level risks. While these risks add to the institutional complexity of the global system, they also contribute to the emergence of new forms and practices of risk governance Risk governance "includes the totality of actors, rules, conventions, processes, and mechanisms concerned with how relevant risk information is collected, analyzed and communicated and management decisions are taken" (Renn, 2008, p. 9). From the outset, the literature on risk governance explicitly acknowledged the "transboundary, international and ubiquitous" nature of risks (Renn, 2008, p. 43). Yet, in the subsequent decade, the multilaterality of risk governance has received little scholarly attention (see also Kuipers, van Grieken, & van Asselt, 2018).

This special issue will focus on the Multilateral Challenges of Nuclear Risks, whereby it addresses safety and security as well as safeguard issues associated with nuclear risks. In this editorial, we will first discuss what we mean by "nuclear risk" and "multilateral governance." We will wrap up by presenting the papers that deal with these multilateral aspects of nuclear risks.

Nuclear Risk and Its (Inter)national Governance

Nuclear risks emanate from nuclear technologies and both in practice and in the academic literature we discern three categories: safety, security, and safeguards risks. Nuclear safety is, according to the International Atomic Energy Agency (IAEA), "the protection of people and the environment against radiation risks, and the safety of facilities and activities that give rise to radiation risks" (IAEA et al., 2006, p. 5). Nuclear security relates to intentional malicious activities and to "[t]he prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities" (IAEA, 2007). Finally, nuclear safeguard relates to the proliferation of nuclear

doi: 10.1002/rhc3.12170

MPS | Journal: RHC3 | MSP No.: 12170 | Dispatch: May 03, 2019 | No. of Pages: 13 | CE: | PE: Lee Jieying

weapons and it aims to avoid the dispersal of proliferation-sensitive knowledge and to prevent the availability of nuclear material or technologies that could conceivably be used to manufacture nuclear weapons. Generally speaking, uranium enrichment facilities (as well as highly enriched uranium) and reprocessing plants for the recycling of nuclear waste which gives rise to the extraction of plutonium (as well as weapon-grade plutonium) are the technologies and materials that raise concern.[1] Each of the three nuclear risk categories brings its own set of governance challenges to the table.

Nuclear safety has given rise to a lot of governance considerations, mainly because of the fact that early in the deployment of nuclear reactors, it became painfully evident that safety concerns of nuclear risk are not going to be confined by national border. As the former Director General of the IAEA, Hans Blix, has eloquently put it: "A nuclear accident anywhere is an accident everywhere." While there is an increasing need for governing nuclear safety globally, this global governance has rather been institutionalized "by accident," and in response to nuclear accidents and disasters than proactively and "by design" of institutions (Taebi & Mayer, 2017, p. 20). Much of what is currently in place in the global nuclear safety regime was a response to the Chernobyl disaster (Findlay, 2011); also the Fukushima Daiichi accidents has again emphasized the supranational character of nuclear risk and the need for its global governance. An elaborate set of institutions, regulations, guidelines, and conventions aim at ensuring the safety of millions of tons of radioactive material and a vast number of nuclear facilities, focusing strongly on how nation states should govern nuclear safety within the confines of their national borders.

Nuclear security governance regime has even a weaker international focus than the safety regime. The IAEA's programs were, until recently, fairly limited (Ferguson & Reed, 2009). On the one hand this is surprising because nuclear security relates to the transboundary threat of nuclear or other radioactive material being used for criminal purposes (such as nuclear terrorism) (Boin, 2009). On the other hand, as national security is often at stake in nuclear security governance, any country's reluctance to renounce its sovereignty becomes more understandable. While certain nuclear activities such as enrichment, fuel fabrication, and reprocessing have already been organized internationally (e.g., IAEA, 2005; Rosner, Kollar, & Malone, 2015), nuclear security is according to a high official of the IAEA "almost exclusively governed by national law" (Tonhauser, 2013, p.174). It has been argued that nuclear security regimes could learn from the existing practices and mechanism of the nuclear safety regimes (Bunn, 2013). A first step is that the IAEA (2013) has started improving nuclear security by assisting states to establish a national nuclear security regime (which is lacking in most countries). The Nuclear Security Summits—a series of conferences held in Washington D.C., Seoul, and The Hague between 2011 and 2016—are another initiative (of then President Obama) to help reduce "the amount of dangerous nuclear material in the world, improving the security of all nuclear material and radioactive sources [and] improving international cooperation."[2] While these conferences put nuclear security on the policy agendas of nation states, not much has been reached in terms of international governance of security risks. In addition to difficulties associated with nationals security (as explained above) the transnational governance of nuclear security (even more than nuclear safety), runs into sentiments such as national prestige and pride (Taebi & Mayer, 2017).

In fact, the most effective international governance regime is in place for nuclear safeguard or non-proliferation, with the IAEA as a watchdog. Non-compliance with nuclear safeguard agreements could "subject the State to curtailment or suspension of assistance provided by the Agency, the recall of material and equipment, and/or the suspension of the privileges and rights of Agency membership" (Tonhauser, 2013, p. 183). In addition, non-compliance with the safeguard agreements could be reported to the General Assembly of the United Nations, which could in turn trigger Security Council resolutions. The difficulty, however, remains to establish what constitutes non-compliance, because clear definitions are lacking. In the past, every single case of non-compliance has posed its own unique challenges to the IAEA (Findlay, 2015).

Why Should It Be Dealt With in a Multilateral Way?

This special issue builds on the ongoing agreement in the literature that nuclear risks —be it safety, security or safeguard risks—should not be only dealt with at the national level (Bunn, 2013; Bunn & Heinonen, 2011; Findlay, 2011; Taebi & Mayer, 2017). The notion of multi-level governance that has gained importance in the process of European integration therefore applies here. This special issue focuses on the multilateral governance of nuclear risks. The notion *multilateral* emphasizes two key features. First, nuclear risks have an international transboundary character (both in terms of origin and consequences) and, second, such risks require *multi-level* governance because they are not simply issues between national governments and multinational/international bodies, but give rise to challenging and complex interactions between local, regional, national, and supranational governments, as well as well as non-governmental and corporate actors (van Asselt, Versluis, & Vos, 2013; Marks, 1993).

Introducing the Special Issue

Fiorentini (2019) discusses the multinational, and more specifically European governance of proliferation and safeguard risks. Building on novel theories about European Union governance, this paper analyzes the prospects under which proliferation risks can be dealt with through innovative forms of governance. In so doing, Fiorentini discusses the overarching traits of proliferation risks while focusing on the legitimacy of regional and global governance of non-proliferation regimes. The paper offers several remarks on the ways in which proliferation risks can be tackled legitimately and effectively.

Jenkins and Taebi (2019) discuss the multinational governance of nuclear risks in the context of energy justice discussions. This article investigates the viability of Energy Justice as a framework to assist the governance of multinational risks, emanating from nuclear waste. Positioned between local and universal justice, the authors advocate for the approach of multinational energy justice as a means of considering justice manifestations either between neighboring countries, or between geographically isolated countries that share common energy concerns or systems. The authors discuss

how to govern the risk of nuclear waste in a multinational fashion, by focusing on the justice issues multinational nuclear waste repositories give rise to.

Q2 Yuliya Lyamzina and Paul Slovic (2019) are presenting a clear case of multi-level governance with respect to risk communication regarding complex safety risks such as radiation risks after a nuclear disaster. They argue that known factors (e.g., trust, dread) that affect citizens' risk perception regarding radiation risks often pertain to planned exposure situations (such as the siting of a new plant or a waste repository, cf. Drottz-Sjöberg, 2010). Such factors also apply in post-accident exposure situation. Yet on top of those, other risk perception factors (e.g., volition, controllability) may be more prevalent for communities recovering from nuclear disaster. Authorities need to acknowledge specific risk perceptions in a given population and its various subgroups, in order to successfully incorporate such factors into their risk communication and public engagement strategies. Failure to do so can foster a skeptical or angry public reaction and hamper recovery both in terms of radiological risk reduction interventions
Q3 and in terms of a "return to normal life" for the communities involved. The authors discuss how these failures can be prevented.

Notes

1. For an overview of safety, security, and safeguard issues with nuclear fuel cycles, see Taebi and Kloosterman (2008, 2015).
2. Cited from the Nuclear Security Summit website: http://www.nss2014.com/en

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《公共政策之风险、危害和危机》（*RHCPP*）特刊社论：核风险多边治理

Behnam Taebi 和 Sanneke Kuipers

核科技引起的风险具有复杂性、国际性、代际性和多层性。当这些风险为全球系统增添制度复杂性时，还同时促进了风险治理出现新形势和实践。风险治理"包括行为者、规则、公约、过程和机制，这些都聚焦于相关风险信息的收集方式、分析方式、传播方式、以及管理决策的采纳方式"（Renn, 2008, p. 9）。研究风险治理的文献从一开始便明确认可了风险的跨边界性、国际性、和普遍性（Renn 2008, p. 43）。

然而在随后的十年里，风险治理的多边性（multilaterality ）却几乎没有受到学术关注（see also Kuipers, van Grieken, & van Asselt, 2018）。

本期特刊将聚焦于核风险带来的多边挑战，应对与核风险相关的核安全、核安保、以及核保障问题。笔者将在这篇社论中首先探讨"核风险"和"多边治理"意味着什么。笔者在文章结尾处介绍了研究核风险多边问题的文章。

核风险及其（国际）治理

核风险源于核科技，它存在于实践和学术文献中。笔者识别了三种核风险类型：核安全风险、核安保风险和核保障风险。按照国际原子能机构（IAEA）的定义，核安全指"保护人类和环境不受辐射危害，保障能产生辐射危险的设施安全和活动安全"（IAEA et al., 2006, p. 5）。核安保涉及蓄意危害性活动，对偷窃、破坏、未经许可、非法转移或其余危险活动（包括核材料及其他放射性物质或其相关设施）进行防范，探测和回应（IAEA, 2007）。最后，核保障涉及核武器扩散，旨在避免传播与核扩散相关的知识，并防止能用于大量制造核武器的核材料或核科技的可获得性。一般而言，铀浓缩设施（高浓度铀），和用于回收核废料，以提取钚和武器级钚的再处理工厂，就是引起担忧的科技。这三种核风险都各自带来了相应的治理挑战。

核安全引起了诸多关于治理的考量，这主要是因为在核反应堆部署前期，核风险安全顾虑明显不会受到国家边界的限制，这是十分痛苦的。正如前IAEA总干事Hans Blix的精彩叙述："任何地方发生的核事故都是全球性的"。尽管越来越需要从全球的角度去治理核安全，这种全球治理却在回应核事故和核灾害时被"意外地"制度化了，而不是"通过制度设计"来完成治理（Taebi & Mayer 2017, p. 20）。现有的全球核安全管理体制大多都曾用于应对切尔诺贝利事故（Findlay, 2011）；同时日本福岛第一核电站事故再次强调了核风险的超国家性和全球治理的必需性。旨在确保成百万吨放射性物质和大量核设施安全的精密制度、法规、准则和公约，都聚焦于各国应如何在各自国界内治理核安全。

核安保治理体制所获得的国际关注甚至比核安全体制更少。IAEA在这方面的计划直到最近都还是相当有限（Ferguson & Reed, 2009）。一方面，这是出乎意料的，因为核安保涉及核物质或其他被用于犯罪目的（例如核恐怖主义）的放射性物质所造成的跨国界威胁（Boin, 2009）。另一方面，由于国防安全经常是核安保治理中的重要事务，因此任何一个国家就放弃核主权一事所表示的迟疑也更能被理解。尽管某些核活动，例如浓缩、燃料制备和再处理，已经在国际间有组织地安排进行（e.g., IAEA, 2005; Rosner, Kollar, and Malone, 2015），但核安保"基本只受国家法律管制"（Tonhauser, 2013, p. 174）。有言论称，核安保体制能从核安全体制的现有实践和机制中获取经验（Bunn, 2013）。第一步则是，IAEA在2013年开始通过协助各国建立国家核安保体制（大多数国家都缺乏该体制），进而提升核安保。核安保峰会——2011-2016年间在美国华盛顿特区、韩国首尔、和荷兰海牙所举办的一系列会议——则是另一项由当时奥巴马总统提出的倡议，以期帮助减少"全球危险核材料数量、提高一切核材料和放射性来源的安全、以及促进国际合作"。尽管这些会议将核安保置于各国政策议程之上，但就国际安保风险治理而言并没有取得太多进展。

事实上，针对核保障或不扩散而言最有效的国际治理体制已经就位，IAEA作为监管机构。（如果）不遵循核保障条约，则会"导致该国被IAEA缩短或取消协助、召回材料设备、和/或暂停IAEA成员资格所享有的一切特权"（Tonhauser 2013, p. 183）。此外，不遵循核保障条约会被上报到联合国大会，触发安委会采取一系列决

定。然而困难点依然是，如何判定不遵循的组成部分，因为对此还没有明确的定义。过去，每一次不遵循事件都给IAEA带来了独特的挑战。

为何应通过多边方式应对核风险？

本篇特刊的论调建立于文献中不断发展的一致观点——核风险，不论是核安全、核安保还是核保障风险，都不应只从国家层面上予以应对（Bunn, 2013; Bunn & Heinonen, 2011; Findlay, 2011; Taebi & Mayer 2017）。多层治理这一概念已在欧洲一体化进程中获得重要性，因此也适用于处理核风险。"多边"强调了两个特征。第一，核风险具有国际性和跨国界性（就起源和结果而言）。第二，这类风险需要"多层"治理，因为其并不仅仅是国家政府和跨国/国际机构之间的简单问题，而是地方、区域、国家和超国家政府，以及非政府行为者和企业行为者这一切复杂组合所面临的治理挑战（van Asselt, Versluis, and Vos 2013; Marks 1993 ）。

特刊文章介绍

作者Enrico Fiorentini探讨了关于核扩散和核保障风险的多国治理，尤其是欧洲治理。这篇文章基于有关欧盟治理的新奇理论，分析了核扩散风险能通过创新型治理得以解决的前景。为此，Fiorentini 探讨了核扩散风险的突出特征，同时聚焦于不扩散体制区域治理和全球治理的合法性。这篇文章针对核扩散风险能通过哪些方式从而得到合法有效的解决给出了几点建议。

作者Kirsten Jenkins 和 Behnam Taebi探讨了能源正义辩论背景下核风险的多国治理。这篇文章调查了能源正义的可行性，能源正义作为一项框架用于协助由核废料产生的多国风险治理。通过将观点置于地方正义和全球正义之间，作者提倡多国能源正义措施，将其作为一种考量邻国之间的正义表现，或者是地理上被隔离，但却享有共同能源顾虑或能源体系的国家之间的正义表现。通过聚焦于多国核废料储存库产生的能源正义问题，作者探讨了如何以多国形式治理核废料风险。

作者Yuliya Lyamzina 和 Paul Slovic提出了一项清晰案例，阐述了有关复杂安全风险（例如核灾害后的辐射风险）传播的多层治理。作者认为，影响公民对辐射风险感知的已知因素（例如信任和恐惧）通常与预计暴露情况有关（例如为新核工厂或核废料储存库选址cf. Drottz-Sjöberg, 2010）。这类因素同样适用于核事故后的暴露情况。然而除此之外，其他风险因素（例如自愿性和可控制性）可能更常见于还处于核灾害后恢复工作的社区。权威机构需认可既定群体及其子群体的特定风险感知，以期成功将这类因素融入风险传播和公共参与策略。如果无法成功完成此事，则会引起公众的质疑或愤怒反应，同时妨碍灾后恢复工作，即放射性风险降低干预和为受影响社区"恢复原样"。作者探讨了如何预防这方面工作的失败。

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Gobernanza multilateral de riesgos nucleares

Behnam Taebi y Sanneke Kuipers

La tecnología nuclear crea riesgos complejos, internacionales, intergeneracionales y multinivel. Si bien estos riesgos se suman a la complejidad institucional del sistema global, también contribuyen a la aparición de nuevas formas y prácticas de gobernabilidad de riesgos. La gobernanza de riesgos incluye la totalidad de actores, normas, convenciones, procesos y mecanismos relacionados con la información relevante sobre riesgos. se recopila, analiza y comunica, y se toman decisiones de gestión" (Renn, 2008, p. 9). Desde el principio, la literatura sobre la gobernanza del riesgo reconoció explícitamente la naturaleza "transfronteriza, internacional y ubicua" de los riesgos (Renn 2008, p. 43). Sin embargo, en la década siguiente, la multilateralidad de la gobernanza del riesgo ha recibido poca atención académica (véase también Kuipers, van Grieken, & van Asselt, 2018).

Este número especial se centrará en los Desafíos Multilaterales de Riesgos Nucleares, por lo que aborda la protección y la seguridad, así como los problemas de salvaguardia asociados con los riesgos nucleares. En este editorial, primero discutiremos qué entendemos por "riesgo nuclear" y "gobernabilidad multilateral." Terminaremos presentando los documentos que tratan sobre estos aspectos multilaterales de los riesgos nucleares.

Riesgos nucleares y su gobernanza (inter)nacional

Los riesgos nucleares emanan de las tecnologías nucleares y tanto en la práctica como en la literatura académica, distinguimos tres categorías: seguridad, seguridad y riesgos de seguridad. La seguridad nuclear es, según el Organismo Internacional de Energía Atómica (OIEA), "la protección de las personas y el medio ambiente contra los riesgos de radiación, y la seguridad de las instalaciones y actividades que generan riesgos de radiación" (OIEA et al., 2006, p. 5). La seguridad nuclear se relaciona con actividades maliciosas intencionales y con "la prevención y detección de robos, sabotajes, accesos no autorizados, transferencias ilegales u otros actos maliciosos relacionados con materiales nucleares, otras sustancias radiactivas o sus instalaciones asociadas" (OIEA, 2007). Finalmente, la salvaguardia nuclear se relaciona con la proliferación de armas nucleares y su objetivo es evitar la dispersión del conocimiento sensible a la proliferación y prevenir la disponibilidad de material nuclear o tecnologías que posiblemente puedan usarse para fabricar armas nucleares. En general, las instalaciones de enriquecimiento de uranio (así como el uranio altamente enriquecido) y las plantas de reprocesamiento para el reciclaje de desechos nucleares que dan lugar a la extracción de plutonio (así como el plutonio apto para armas) son las tecnologías que más preocupan. Cada una de las tres categorías de riesgo nuclear trae su propio conjunto de desafíos de gobernabilidad a la mesa.

La seguridad nuclear ha dado lugar a muchas consideraciones de gobernabilidad, principalmente debido al hecho de que al principio del despliegue de los reactores nucleares, se hizo dolorosamente evidente que las preocupaciones de seguridad del riesgo nuclear no serían limitadas por las fronteras nacionales. Como el ex director general del OIEA, Hans Blix, lo ha dicho con elocuencia: "Un accidente nuclear en cualquier lugar es un accidente en cualquier parte." Si bien existe una creciente necesidad de gobernar la seguridad nuclear a nivel mundial, esta gobernanza global se ha institucionalizado más bien "por accidente," y en respuesta a accidentes y desastres nucleares que por "diseño" de las instituciones (Taebi y Mayer, 2017, p. 20). Gran parte de lo que actualmente existe en el régimen de seguridad nuclear global fue una respuesta al desastre de Chernobyl (Findlay, 2011); también los accidentes de Fukushima Daiichi han enfatizado nuevamente el carácter supranacional del riesgo nuclear y la necesidad de su gobierno global. Un conjunto elaborado de instituciones, reglamentos, directrices y convenciones tiene como objetivo garantizar la seguridad de millones de toneladas de material radiactivo y un gran número de instalaciones nucleares, se centra principalmente en cómo los estados nacionales deben gobernar la seguridad nuclear dentro de los límites de sus fronteras nacionales.

El régimen de gobernanza de la seguridad nuclear tiene incluso un enfoque internacional más débil que el régimen de seguridad. Los programas del OIEA fueron, hasta hace poco, bastante limitados (Ferguson y Reed, 2009). Por un lado, esto es sorprendente porque la seguridad nuclear se relaciona con la amenaza transfronteriza de la utilización de materiales nucleares u otros materiales radiactivos con fines delictivos (como el terrorismo nuclear) (Boin, 2009). Por otro lado, como la seguridad nacional está a menudo en juego en la gobernanza de la seguridad nuclear, la renuencia de cualquier país a renunciar a su soberanía se vuelve más comprensible. Si bien ciertas actividades nucleares como el enriquecimiento, la fabricación de combustible y el reprocesamiento ya se han organizado internacionalmente (por ejemplo, OIEA, 2005; Rosner, Kollar, y Malone, 2015), la seguridad nuclear está "casi exclusivamente regida por la ley nacional" (Tonhauser, 2013, p. 174). Se ha argumentado que los regímenes de seguridad nuclear podrían aprender de las prácticas y mecanismos existentes de los regímenes de seguridad nuclear (Bunn 2013). Un primer paso es que el OIEA (2013) ha comenzado a mejorar la seguridad nuclear ayudando a los estados a establecer un régimen nacional de seguridad nuclear (que falta en la mayoría de los países). Las Cumbres de Seguridad Nuclear, una serie de conferencias celebradas en Washington DC, Seúl y La Haya entre 2011 y 2016, son otra iniciativa (del entonces Presidente Obama) para ayudar a reducir "la cantidad de material nuclear peligroso en el mundo, mejorando la seguridad de todos los materiales nucleares y fuentes radiactivas [y] mejorar la cooperación internacional". Si bien estas conferencias pusieron la seguridad nuclear en las agendas políticas de los estados nacionales, no se ha alcanzado mucho en términos de gobernanza internacional de los riesgos de seguridad.

De hecho, el régimen de gobernanza internacional más efectivo está en vigor para la salvaguardia o la no proliferación nuclear, con el OIEA como un perro guardián. El incumplimiento de los acuerdos de salvaguardia nuclear podría "someter al Estado a

una restricción o suspensión de la asistencia prestada por el Organismo, el retiro de materiales y equipos y / o la suspensión de los privilegios y derechos de la membresía del Organismo" (Tonhauser, 2013, p. 183). Además, el incumplimiento de los acuerdos de salvaguardia podría informarse a la Asamblea General de las Naciones Unidas para activar las resoluciones del Consejo de Seguridad. Sin embargo, la dificultad sigue siendo establecer qué constituye incumplimiento, porque faltan definiciones claras. En el pasado, cada caso único de incumplimiento ha planteado sus propios desafíos únicos para el OIEA (Findlay, 2015).

¿Por qué debería ser tratado de forma multilateral?

Este número especial se basa en el acuerdo actual en la literatura de que los riesgos nucleares, ya sean de seguridad o de salvaguarda, no deben tratarse solo a nivel nacional (Bunn, 2013; Bunn y Heinonen, 2011; Findlay, 2011; Taebi y Mayer, 2017). La noción de gobernanza multinivel que ha ganado importancia en el proceso de integración europea, por lo tanto, se aplica aquí. Este número especial se centra en la gobernanza multilateral de los riesgos nucleares. La noción multilateral enfatiza dos características clave. Primero, los riesgos nucleares tienen un carácter transfronterizo internacional (tanto en términos de origen como de consecuencias) y, segundo, tales riesgos requieren una gobernanza multinivel porque no son simplemente problemas entre los gobiernos nacionales y organismos multi-nacionales / internacionales, sino que rigen los desafíos para combinaciones complejas de gobiernos locales, regionales, nacionales y supranacionales, así como de actores no gubernamentales y corporativos (van Asselt, Versluis y Vos 2013; Marks 1993).

Presentando el número especial

Enrico Fiorentini analiza la gobernanza multinacional, y más específicamente la gobernanza europea de la proliferación y los riesgos de salvaguardia. Sobre la base de nuevas teorías sobre la gobernanza de la Unión Europea, este documento analiza las perspectivas bajo las cuales los riesgos de proliferación pueden abordarse a través de formas innovadoras de gobernanza. Al hacerlo, Fiorentini analiza los rasgos generales de los riesgos de proliferación y se centra en la legitimidad de la gobernanza regional y global de los regímenes de no proliferación. El documento ofrece varias observaciones sobre las formas en que los riesgos de proliferación pueden abordarse de manera legítima y efectiva.

Kirsten Jenkins y Behnam Taebi discuten la gobernanza multinacional de los riesgos nucleares en el contexto de las discusiones sobre justicia energética. Este artículo investiga la viabilidad de la Justicia de la Energía como un marco para ayudar a la gestión de los riesgos multinacionales, derivados de los desechos nucleares. Situados entre la justicia local y la justicia universal, los autores abogan por el enfoque de la justicia energética multinacional como un medio para

considerar las manifestaciones de justicia, ya sea entre países vecinos o entre países aislados geográficamente que comparten preocupaciones o sistemas de energía comunes. Los autores discuten cómo gobernar el riesgo de desperdicio nuclear de una manera multinacional, enfocándose en los asuntos de justicia que generan los depósitos de desperdicios nucleares multinacionales.

Yuliya Lyamzina & Paul Slovic are presenting a clear case of multi-level governance with respect to risk communication regarding complex safety risks such as radiation risks after a nuclear disaster. They argue that known factors (e.g., trust, dread) that affect citizens' risk perception regarding radiation risks often pertain to planned exposure situations (such as the siting of a new plant or a waste repository, cf. Drottz-Sjöberg, 2010). Such factors also apply in post-accident exposure situation. Yet on top of those, other risk perception factors (e.g., volition, controllability) may be more prevalent for communities recovering from nuclear disaster. Authorities need to acknowledge specific risk perceptions in a given population and its various subgroups, in order to successfully incorporate such factors into their risk communication and public engagement strategies. Failure to do so can foster a skeptical or angry public reaction and hamper recovery both in terms of radiological risk reduction interventions and in terms of a 'return to normal life' for the communities involved. The authors discuss how these failures can be prevented.

Yuliya Lyamzina y Paul Slovic están presentando un caso claro de gobernanza multinivel con respecto a la comunicación de riesgos con respecto a los riesgos complejos de seguridad, como los riesgos de radiación después de un desastre nuclear. Argumentan que los factores conocidos (por ejemplo, confianza, temor) que afectan la percepción de riesgo de los ciudadanos con respecto a los riesgos de radiación a menudo pertenecen a situaciones de exposición planificadas (como la ubicación de una nueva planta o un depósito de residuos, véase Drottz-Sjöberg, 2010). Tales factores también se aplican en situaciones de exposición post-accidente. Sin embargo, además de eso, otros factores de percepción de riesgo (por ejemplo, volición, capacidad de control) pueden ser más frecuentes en las comunidades que se recuperan de un desastre nuclear. Las autoridades deben reconocer las percepciones de riesgo específicas en una población determinada y sus diversos subgrupos, a fin de incorporar con éxito dichos factores en sus estrategias de comunicación de riesgo y compromiso público. No hacerlo puede fomentar una reacción pública escéptica o enojada y obstaculizar la recuperación tanto en términos de intervenciones de reducción de riesgo radiológico como en términos de un "retorno a la vida normal" para las comunidades involucradas. Los autores discuten cómo se pueden prevenir estas fallas.

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