For a World Free of Nuclear Weapons: Discussions Toward the Third Meeting of the States Parties to the TPNW

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Adoption of the Treaty on the Prohibition of Nuclear Weapons (TPNW)
(7 July 2017, United Nation Headquarters, New York. Photo by Kimiaki Kawai)

Introduction

The use of nuclear weapons has become a global concern from Europe to the Middle East, South Asia, and Northeast Asia. In the face of this situation, there has been a growing policy debate on how to reduce the risk of nuclear weapons use. The discussions were premised on the reliance on nuclear deterrence.

Against this backdrop, UN Secretary-General António Guterres warned in August 2022: "We have been extraordinarily lucky so far. But luck is not a strategy."[1] The "Building Bridge to Effective Nuclear Disarmament—Recommendations for the 2020 Review Process the NPT" of March 2018 by the Group of Eminent Persons for Substantive Advancement of Nuclear Disarmament also warned: "Although nuclear deterrence may arguably enhance stability in certain environments, it is a dangerous long-term basis for global security and therefore all states should seek a better long-term solution."[2]

An effort to address this problematic agenda is the Treaty on the Prohibition of Nuclear Weapons (TPNW). The TPNW is grounded in the scientific evidence of the humanitarian consequences and risks of using nuclear weapons in the event of a failure of nuclear deterrence. It also attempts to challenge arguments for national security based on a few unprovable assumptions supporting nuclear deterrence.

However, the debate between the position supporting the TPNW and one based on nuclear deterrence has not necessarily been engaged. As to the reasons for this, the working paper submitted by Austria to the Second Meeting of States Parties to the TPNW in November-December 2023 observes that there is "a fundamental disconnect between the arguments about security, humanitarian consequences and nuclear risks put forward by the nuclear-armed states and their allies and the arguments about the nuclear insecurity and the compelling scientific evidence on the humanitarian consequences and risks of nuclear weapons on which the TPNW is based."[3]

Based on this analysis, the Second Meeting of the States Parties to the TPNW decided to establish an intersessional consultative process between the second and third Meetings of States Parties, among States Parties and Signatories, with the involvement of the Scientific Advisory Group (SAG), the International Committee of the Red Cross (ICRC), the International Campaign to Abolish Nuclear Weapons (ICAN), and other stakeholders and experts, to consult and submit a

[1] António Guterres, Secretary-General's remarks to the Tenth Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, UN Headquarters, 1 August 2022.
[2] Group of Eminent Persons on the Substantive Advancement of Nuclear Disarmament, Building Bridges to Effective Nuclear Disarmament: Recommendations for the 2020 Review Process for the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), sponsored by Ministry of Foreign Affairs of Japan, March 2018.
[3] TPNW/MSP/2023/WP.9, p. 2, para. 4.

report to the third Meeting of States Parties containing a comprehensive set of arguments and recommendations. The themes of consultation are as follows: (1) to better promote and articulate the legitimate security concerns, threat, and risk perceptions enshrined in the treaty that result from the existence of nuclear weapons and the concept of nuclear deterrence, and (2) to challenge the security paradigm based on nuclear deterrence by highlighting and promoting new scientific evidence about the humanitarian consequences and risks of nuclear weapons and juxtaposing this with the risks and assumptions inherent in nuclear deterrence.[4]

Sharing the above awareness of the issues and political challenges, the RECNA published a policy paper to contribute to the above discussions. Policy Paper No. 20, entitled "For a World Free of Nuclear Weapons: Discussions Toward the Third Meeting of the States Parties to the TPNW", discusses (1) what challenges does the nuclear deterrence doctrine have within the traditional security framework? (Chapter 1), (2) what challenges the TPNW has in aiming from the prohibition of nuclear weapons to their elimination, and (3) what needs to be considered to transform into a world free of nuclear weapons.

While sharing an awareness of the issues involved in the TPNW approach based on the inhumanity of nuclear weapons, the authors are also fully conscious of the challenges faced by this approach. To engage constructively with states that depend on nuclear weapons in various forms (nuclear-weapon-dependent states), it is necessary to understand their threat perceptions in terms of national security yet still be mindful of the argument that to eliminate nuclear weapons even from a national security perspective cooperatively is an improving path. While encouraging a shift in national security values by nuclear-weapon-dependent states, it is also necessary to review the challenges of the TPNW objectively from the perspective of whether there are any blind spots in the current TPNW when the time begins to move toward the realization of a world free of nuclear weapons and to consider strengthening measures in preparation for that time.

Policy Paper No. 20 aims to encourage the discussion for eliminating nuclear weapons to step up to the next stage, taking as its clue the approach of the TPNW, which attempts to eliminate nuclear weapons by starting with their prohibition. It intends to go beyond the discussion on reducing the risk of the use of nuclear weapons based on nuclear deterrence. It is the common wish of the authors, who write from different standpoints, that this effort contributes to the discussions leading up to the Third Meeting of the States Parties to the TPNW, scheduled for March of the following year.

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[4] TPNW/MSP/2023/CRP.3/Rev.1, p. 3, V. Decision 5.

Contents

Executive Summary

Kimiaki Kawai

Policy Paper No. 20 comprises six papers in three chapters. Chapter 1 examines the challenges of nuclear deterrence doctrine within the traditional national security framework. Chapter 2 addresses the challenges ahead of the TPNW which aims from the prohibition of nuclear weapons to their elimination. Chapter 3 considers conditions necessary for a transition to a world free of nuclear weapons. The abstracts of each article are as follows.

Chapter 1: What challenges does the nuclear deterrence doctrine have within the traditional security framework?

First Paper

The Treaty on the Prohibition of Nuclear Weapons (TPNW) entered into force in January 2021, while its universalization has been a major challenge from the outset. The path to universalization of the TPNW is not easy; there is a significant discrepancy between the position to prohibit nuclear weapons as means of warfare and the position to oppose it. In light of this situation, the first paper entitled **"Still Lawful after All These Years?—Universalizing the TPNW through Examining Legal Questions related to the Nuclear Deterrence Policy" (Kimiaki Kawai)** points out that it remains crucial to discuss the legality of the use of nuclear weapons in terms of the regulation of methods of warfare in the customary law rules of International Humanitarian Law to universalize the prohibition of nuclear weapons as means of warfare.

The first paper delves into the legal questions that require further consideration regarding the use of nuclear weapons and the rules of *jus in bello* in terms of the regulation of methods of warfare and elucidates how the examination of these questions lead to the universalization of the TPNW. Providing a clue to this approach is the question posed by the International Court of Justice (ICJ) in its 1996 advisory opinion in which the ICJ asked whether the lawful use of nuclear weapons is feasible, which has been an unanswered question by the states with nuclear weapons. The ICJ observed that "none" of the states that advocated the legality of the use of nuclear weapons under certain circumstances, including the "'clean' use" of "smaller, low yield tactical nuclear weapons," indicated what precise circumstances would justify such a limited use were it feasible.

If the practicability of lawful use of nuclear weapons is difficult to find after examinations of individual situations, it should open the way for an argument that nuclear weapons should be universally prohibited as means of warfare. The first paper concludes that an approach that pursues the legal prohibition of nuclear weapons as means of warfare from the regulation of methods of warfare in the customary rules of IHL, which are binding on all states, is a viable way

to universalize the TPNW.

Second Paper

Scientific knowledge of humanitarian consequences of nuclear weapons use was the very foundation of the TPNW. At the same time, one must consider the reality that technological advances in nuclear weapons modernization programs have made nuclear strategy more complex and uncertain, and that the reliability of nuclear weapons systems is challenged by disruptive technologies such as cyber technology and artificial intelligence (AI). In light of this, the second paper entitled **"Nuclear Deterrence for National Security: What are the Issues?—Nuclear Weapon System and Its Risk Analysis: Role of Scientific Advisory Group (SAG)" (Tatsujiro Suzuki)** points out that the "risk of nuclear deterrence" should be carefully evaluated from a scientific and technological perspective.

The second paper identifies "risk analysis of nuclear deterrence" as a critical area in which the SAG should and can play an important role. Risk analysis of nuclear deterrence has typically focused on the humanitarian consequences of the use of nuclear weapons. This is an analysis of the risks following the use of nuclear weapons. At the same time, however, or even more so, risk analysis of nuclear deterrence must also focus on the risks before a nuclear weapon is used - risks that could lead to the use of a nuclear weapon, including unintentional use.

Nuclear deterrence is a political theory, but in practice it relies on highly sophisticated and complex technical systems. For a nuclear weapon to function as planned, many technical systems must work flawlessly, and the failure of any one of them could undermine the credibility of nuclear deterrence. Therefore, a risk assessment of nuclear deterrence necessarily involves assessing the risk of the complex technical systems that support the nuclear weapons system. In other words, the conclusion of the second paper is that scientific and technological assessment is essential to the risk assessment of nuclear deterrence, along with the social and political assessment of international relations, and that the SAG must address this unprecedentedly difficult task.

Chapter 2: What challenges does the TPNW have in aiming from the prohibition of nuclear weapons to their elimination?

Third Paper

The effectiveness of the TPNW is sometimes questioned because of the fact that the states with nuclear weapons are not parties to it. However, the TPNW has provisions to assist victims of the use or testing of nuclear weapons and to remedy the environment in areas contaminated by related activities (Articles 6 and 7), and states with nuclear victims, such as Kazakhstan and Kiribati, are parties. In addition, the Second Meeting of the Parties in 2023 decided (i) to take a decision on

voluntary reporting on Articles 6 and 7, and (ii) to intensively discuss the feasibility and guidelines for establishing an international trust fund for victim assistance and environmental remediation in the Informal Working Group on Articles 6 and 7, and submit recommendations to the Third Meeting of the Parties. Based on the above, the third paper entitled **"Discussions and Issus on Victim Assistance in the TPNW" (Toshinori Yamada)** points out that the TPNW can be fully effective in terms of promoting assistance to nuclear victims, and from this perspective, the implementation of Articles 6 and 7 is essential.

The third paper points out that while there is no disagreement that humanity is the basis of the need for victim assistance and environmental remediation, there are views expressed by civil society and some states that place Articles 6 and 7 in terms of human rights, which are closely related to but not exactly the same as humanity, and that the significance of victim assistance is understood as social inclusion. On the other hand, the Marshall Islands (a non-Party State), a State Party that is a victim of nuclear testing, raised the question of responsibility of the user and testing states and expressed reluctance to become a State Party and assume the burden of Article 6.

In light of these discussions at the Second Meeting of the States Parties, the third paper makes seven recommendations: (1) promoting understanding of the actual state of nuclear damage and the needs of victims, (2) promoting actual victim assistance and environmental remediation, (3) establishing the effective operation of the victim state assistance mechanism based on Article 7, (4) considering the implications of assistance and remediation on the universalization of the TPNW, (5) strengthening the SAG, (6) involving further the states that used or tested nuclear weapons, (7) placing nuclear victim assistance and environmental remediation as a long-term issues for humanity beyond the TPNW.

Forth Paper

Does the TPNW see a straight path toward the realization of a world without nuclear weapons? If the situation in international politics and international security were to become such that the nuclear-armed states and their allies could participate and a world without nuclear weapons could be realized, could the TPNW be the receiving body for such a situation? The fourth paper entitled "**Issues for the TPNW toward the Realization of a World free of Nuclear Weapons**" **(Michiru Nishida)** discusses what challenges the TPNW may face in "realizing" a nuclear weapons-free world and what challenges it may face in "maintaining" a nuclear weapons-free world once it is realized.

This paper analyzes challenges to the TPNW from both its substantive and institutional aspects. On the substantive aspect, it focuses on three issues: (1) the fact that the TPNW fully recognizes the right to the peaceful use of nuclear energy, (2) it does not prohibit the production of fissile materials for nuclear weapons, and (3) it does not contain a provision on the means of delivery of nuclear weapons. In terms of the institutional aspect, the paper focuses on three issues: (1) the

weakness of the verification framework for both nuclear-armed and non-nuclear-armed states, (2) the lack of an enforcement framework to deal with potential violations, and (3) the fact that the withdrawal provision remains standard.

Some may argue that it is unfair to demand a high level from the TPNW because it is not necessary to venture to deal with the above issues in the current situation where a path to a world without nuclear weapons is not yet clear, but this paper points out that if this is the case, it could be an admission that the TPNW is merely a political campaign document. It therefore argues that the TPNW should now start facing various issues and challenges squarely and start making efforts to address them through Meetings of States Parties and establishing working groups so that the TPNW will be a true receiving body when a nuclear-weapon-free world is to be realized.

Fifth Paper

"Logic (or illogic?) of Japan's Aversion to the TPNW and Charting a Path forward (Michiru Nishida) is the abstract of an article to be published in the forthcoming *Journal for Peace and Nuclear Disarmament*.

Chapter 3: What needs to be considered in order to transform to a world free of nuclear weapons?

Sixth Paper

Why have states possessing nuclear weapons and states under the nuclear umbrella been unable to move away from security policies that rely on nuclear weapons? Has there been sufficient discussion on this issue? Until now, discussions on nuclear deterrence and nuclear abolition have been limited to the fields of disarmament, nonproliferation, security, and the peace movement, and have not been holistic or cross-sectoral in nature. The real problem is the confrontation and division among nations, which we must overcome, and the lack of a vision of how this problem can be resolved and how solidarity and cooperation can be achieved. Based on this awareness of the problem, the sixth paper entitled **"Nuclear Deterrence from a Planetary Health Perspective: With the Economy for the Common Good as the Axis" (Kazuko Hikawa)** discusses the sustainability of nuclear deterrence policy based on the concept of an "Economy for the Common Good."

The sixth paper points out that states possessing nuclear weapons and states under the nuclear umbrella believe that security through nuclear deterrence to prevent the use of nuclear weapons is sustainable and are in a state of thoughtlessness about considering security that does not rely on nuclear weapons. Building on Christian Felber's argument on a "Common Good Economy," the sixth paper argues that a competition-based, profit-seeking world based on a market economy has created a world dependent on nuclear weapons, and that such a world cannot be sustainable.

As long as we are dependent on nuclear weapons, we will not be able to solve the problems we face, such as environmental destruction and fragmentation, and we will not be able to create a sustainable world. And to break away from a world dependent on nuclear weapons, we need to transform our social system which is a profit-seeking one based on competitive principles into a one which seeks for common good based on human values. This is not an easy task, but the conclusion of the sixth paper is that the practical model of the “Economy for the Common Good” may be a tool for transforming the social system.

I. Still Lawful after All These Years?—Universalizing the TPNW through Examining Legal Questions related to the Nuclear Deterrence Policy[1]

Kimiaki Kawai

1 Introduction

The Treaty on the Prohibition of Nuclear Weapons (TPNW), a landmark legal development, was adopted at the negotiating conference at the United Nations in July 2017 and entered into force in January 2021 with 50 states parties. As the first multilateral treaty to prohibit nuclear weapons as means of warfare, the TPNW is of significant importance. However, the principle of *pacta sunt servanda*, which holds that agreements must be upheld, also means that an agreement neither harms nor benefits third parties, non-parties to the TPNW are not bound by its provisions, and its universalization as a multilateral treaty has been a major challenge from the outset.[2]

The path to universalization of the TPNW is not easy; there is a significant discrepancy between the position to prohibit nuclear weapons as means of warfare and the position to oppose it.[3] Therefore, despite the ongoing efforts to promote the TPNW, it remains crucial to discuss the legality of the use of nuclear weapons in terms of the regulation of methods of warfare in the use of weapons to universalize the prohibition of nuclear weapons as means of warfare. This approach entails elucidating the meaning of the inhumanity of nuclear weapons from an international legal perspective, and the customary law rules of International Humanitarian Law (IHL) are powerful tools for this purpose.

The rationale underlying this approach is rooted in the fact that simply bringing the term "inhumanity" into the debate over the prohibition and elimination of nuclear weapons makes it difficult to engage with the discussions between the position promoting the TPNW and the position necessitating nuclear weapons for security reasons.[4] Therefore, through the examination of the use of nuclear weapons from the perspective of the regulation of methods of warfare in the customary law rules of IHL binding all states, this paper attempts to provide a clearer legal basis for the security concerns expressed by the TPNW[5] and a clearer legal explanation for the values

[1] The author would like to express sincerest gratitude to the many anonymous individuals who provided insightful and valuable comments in the writing of this article.

[2] Article 12 of the TPNW stipulates: "Each State Party shall encourage States not party to this Treaty to sign, ratify, accept, approve or accede to the Treaty, with the goal of universal adherence of all States to the Treaty."

[3] Akira Mayama, "How to Conduct Lawfare against Nuclear Weapons More Effectively in Japan: A View from the Law of Armed Conflict," *Osaka University International Public Policy Studies*, Vol. 26, No. 2 (2022), p. 125.

[4] For example, the United States says: "If we continue to focus on numerical reductions and the immediate abolition of nuclear weapons, without addressing the real underlying security concerns that led to their production in the first place, and to their retention, we will advance neither the cause of disarmament nor the cause of enhanced collective international security." United States, "Creating the Conditions for Nuclear Disarmament (CCND)," NPT/CONF.2020/PC.II/WP. 30, 18 April 2018, p. 1.

[5] Vienna Declaration of the 1st Meeting of States Parties of the Treaty on the Prohibition of Nuclear Weapons "Our

that the TPNW embodies.[6] In other words, this paper aims to clarify the meaning of inhumanity in terms of the customary law rule of IHL and incorporate the principles of IHL, which are frequently overlooked in the discourse on power politics, into the realm of security. In doing so, the question of whether the lawful use of nuclear weapons is feasible because of the nature of the weapons is an essential part of the legal argument surrounding nuclear deterrence policy,[7] and an in-depth legal analysis of this issue will support the universalization of the TPNW.

The second Meeting of States Parties to the TPNW decided to establish an intersessional consultative process between the second and third Meetings of States Parties, among States Parties and Signatories, with the involvement of the Scientific Advisory Group (SAG), the International Committee of the Red Cross (ICRC), the International Campaign to Abolish Nuclear Weapons (ICAN), and other stakeholders and experts, to consult and submit a report to the third Meeting of States Parties containing a comprehensive set of arguments and recommendations. One of the consultation themes involves "more appropriate and clear articulation of the legitimate security concerns, threats, and risk perceptions contained in the Convention arising from the existence of nuclear weapons and the concept of nuclear deterrence."[8] Therefore, this paper considers legal questions that require further examination regarding the use of nuclear weapons and the rules of *jus in bello* in terms of regulating methods of warfare, as well as how consideration of these questions can lead to the universalization of the TPNW.

2 Structure of the Contending Arguments

The twentieth century witnessed a significant transformation in international law. The first half observed that war was outlawed in *jus ad bellum*, an international law governing the use of force. The second half observed that *jus in bello,* once called the law of war, evolved to value "humanity" while reaffirming existing law, subsequently referred to as International Humanitarian Law (IHL).[9] This shift in focus in *jus in bello*, a set of rules for the protection of victims of armed conflict and the regulation of the means and methods of warfare in hostilities, emphasizes

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Commitment to a World Free of Nuclear Weapons" adopted in 2022 states: "That the catastrophic humanitarian consequences of nuclear weapons cannot be adequately addressed, transcend national borders, pose grave implications for human survival and well-being and are incompatible with respect for the right to life. They inflict destruction, death and displacement, as well as profound long-term damage to the environment, socioeconomic and sustainable development, the global economy, food security and the health of current and future generations, including with regard to the disproportionate impacts they have on women and girls." TPNW/MSP/2022/CRP.8, para. 3.

[6] "In these circumstances, the Treaty on the Prohibition of Nuclear Weapons is needed more than ever. We will move forward with its implementation, with the aim of further stigmatizing and de-legitimizing nuclear weapons and steadily building a robust global peremptory norm against them." *Ibid*., para. 8.

[7] While this paper is unable to address the questions relating to Article 2(4) of the UN Charter because of its limited space, it is also important to examine the question of the use of nuclear weapons in light of the provision which prohibits the "use of force." It is also necessary to examine the question of the threat of the use of nuclear weapons in light of the prohibition of "threat of force." These questions are addressed in my article "Buryoku Koshi ni kansuru Hou to Kakuheiki [Law on the Use of Force and Nuclear Weapons]," which will be included in Chapter 3, Section 2 of the publication to be published in autumn 2014 by Waseda University Press.

[8] TPNW/MSP/2023/CRP.3/Rev.1, p. 3, V. Decision 5.

[9] It is also referred to as the Law of Armed Conflict (LOAC).

humanity while retaining its nature of protecting military advantages for the parties to an armed conflict, intending to reduce the devastation caused by armed conflict.[10] This shift occurred against the backdrop of a growing awareness of human rights, as seen in the mainstreaming of international human rights in the post-World War II era.[11]

Today, it is a universal rule established and agreed upon among states that a state's right to choose the means and methods of warfare is not unlimited.[12] The legal assessment of the use of weapons as means of warfare is conducted in light of two "cardinal principles"[13] of IHL: the rule of distinction and the rule of prohibiting unnecessary suffering. These are regarded as "intransgressible principles of international customary law."[14] Under these two cardinal principles, a weapon that has "a nature" that violates at least one of these two principles is prohibited as means of warfare,[15] while weapons that do not violate at least either of the two principles are not immediately prohibited as means of warfare, but are only subject to the regulation of methods of warfare. This is the basic framework of IHL regarding the regulation of weapons.

However, the regulation of weapons under IHL is general and abstract, and does not specify which weapon is prohibited as means of warfare.[16] In international society, where no organization exists to interpret international law in a competent manner, different states have different views on what weapon is of a nature to violate at least one of the two cardinal principles of IHL. This is why there is a wide divergence of opinion as to whether nuclear weapons are legal.

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[10] Michael N. Schmitt, "Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance," *Virginia Journal of International Law*, Vol. 50, No. 4 (2010), p. 806.

[11] The International Conference on Human Rights, held in Tehran in April-May 1968 to commemorate the 20th anniversary of the Universal Declaration of Human Rights, affirmed that "even during the periods of armed conflict, humanitarian principles must prevail" (Resolution 23). UN Doc, XXIII Human Rights in Armed Conflicts, A/CONF.32/41, 12 May 1968, p. 18. Following the resolution, Resolution 2444, adopted unanimously by the UN General Assembly in December of the same year, invited the UN Secretary-General to study measures to "secure the better application of existing humanitarian international conventions and rules in all armed conflicts." UN Doc, Human Rights in Armed Conflicts, A/RES/2444 (XXIII), 19 December 1968. Jean Pictet, who is credited with initiating the term International Humanitarian Law, writes that "The Geneva texts have been drawn up solely for the benefit of the individual. … In Geneva an era has opened giving primacy to the individual and the principles of humanity. Jean Pictet, "The Principles of International Humanitarian Law," *International Review of the Red Cross*, No. 66 (ICRC, 1966), p. 458.

[12] Article 22 of the Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land. The Hague, 18 October 1907 (The Hague Regulations of 1907); Article 35(1) of the API.

[13] ICJ, *Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996*, p. 257, para.78.

[14] *Ibid.*, p. 257, paras.78-79.

[15] Article 35(2) and Article 51(4)(c) of the API. The commentary by the ICRC points out that Article 51(4)(c) also concerns the nature of means of warfare, noting that in most cases the indiscriminate nature of an attack does not depend on the nature of the weapon concerned but on the way in their use, however, "there are some weapons by their very nature have an indiscriminate effect." Yves Sandoz, Christophe Swinarski and Bruno Zimmermann (eds.), *Commentary on the Additional Protocols of 8 June 1977 to the Geneva Conventions of 12 August 1949* (ICRC, Martinu Nijhoff Publishers, 1987), p.623, para. 1965.

[16] *Ibid*., pp. 393-394 and 399, paras. 1390 and 1408.

Common sense makes it difficult to believe that the use of nuclear weapons, which are considered weapons of mass destruction, is consistent with the basic principles of IHL. The use of nuclear weapons would not only make death inevitable for many people but also bring terrible suffering to those who die, those who live, and even future generations.[17] The International Court of Justice (ICJ), in its 1996 advisory opinion on the legality of nuclear weapons, also held that the use or threat of use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of humanitarian law.[18]

If they are such weapons, they should first be universally prohibited as means of warfare. However, nuclear weapons are not understood to be prohibited under general international law.[19] The policy of nuclear deterrence established during the Cold War required the credible threat of the use of nuclear weapons to prevent the use of nuclear weapons held by other states against themselves, and states whose security premised on nuclear weapons resisted attempts to outlaw nuclear weapons as means of warfare.[20] The ICJ's 1996 advisory opinion states that "[t]here is in neither customary nor conventional international law any comprehensive and universal prohibition of the threat or use of nuclear weapons as such."[21] The opposition to the outlawing of nuclear weapons by states whose security is premised on nuclear weapons remains unchanged to this day.[22] The TPNW's position that nuclear weapons are unlawful as weapons and should be prohibited as means of warfare is rejected by the states whose security is premised on nuclear weapons as a difference of opinion.

3 The Significance of the 1996 ICJ Advisory Opinion Today

It is worth recalling the two points made by the ICJ in its 1996 advisory opinion. The ICJ observed that "none" of the states that advocated the legality of the use of nuclear weapons under certain circumstances, including the "'clean' use" of "smaller, low yield tactical nuclear weapons,"

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[17] "The atomic bombs wiped out two cities in a flash, killing thousands of people without discrimination. It was the 'hell' of the first nuclear war ever experienced, and the damage to body, life and heart of the victims has never ended. It doesn't allow them to live or die as humans." Japan Confederation of A- and H-Bomb Sufferers, "No More Hibakusha―Atomic Bomb Victims Demand," (1984).

[18] ICJ, *supra* note 13, p. 266, para. 105(2)E.

[19] Robert Kolb and Richard Hyde, *An Introduction to the International Law of Armed Conflicts* (Hart Publishing, 2008), p. 158, para. 5.

[20] This was particularly conspicuous in the debate over how to address the question of nuclear weapons at the 1974-77 Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law. There has been much debate as to whether or not API applies to the use of nuclear weapons. See Hisakazu Fujita, "Kakuheiki to Kokusaijindouhou: 1977 no Tsuikagiteisho no Tekiyo Mmondai [Nuclear Weapons and International Humanitarian Law Questions of Application of the 1977 Additional Protocol]," in Kaku ni Tachimukau Kokusaiho: Genten kara no Kenshou [International Law to Confront Nuclear Weapons: An Examination from the Origin] (Houritsubunkasha, 2011), pp. 77-113.

[21] ICJ, *supra* note 13, p. 266, para. 105(2)B. The decision was not unanimous, however, with 11 in favor and 3 opposed.

[22] US Department of State, Joint Press Statement from the Permanent Representatives to the United Nations of the United States, United Kingdom, and France Following the Adoption of a Treaty Banning Nuclear Weapons, New York City, July 7, 2017.

indicated what precise circumstances would justify such a limited use were it feasible.[23] The ICJ also observed that "none" of the states indicated that "such limited use would not tend to escalate into the all-out use of high yield nuclear weapons."[24] The significance of the ICJ's pointing out the absence of responses from states with nuclear weapons to these questions cannot be overstated, and they should still be held accountable.

However, in the approach of examining the legality of the use of nuclear weapons in light of the regulations on methods of warfare involved in the individual circumstances, it is not premised on the idea that nuclear weapons are unlawful as means of warfare or that *a priori* any use of nuclear weapons is unlawful. The preamble to the TPNW states that "[c]onsidering that any use of nuclear weapons would be contrary to the rules of international law applicable in armed conflict, in particular the principles and rules of international humanitarian law."[25] Therefore, the approach that assesses the legality of nuclear weapons use based on the regulations on methods of warfare may differ from the TPNW approach in its foundational principles.

Nonetheless, if, after examinations of individual circumstances, the practicability of lawful methods of warfare in the use of nuclear weapons is difficult to find, this should open the way to the argument that nuclear weapons must be universally prohibited as means of warfare. This would be beneficial for the universalization of the TPNW, which prohibits nuclear weapons as means of warfare. Therefore, this paper addresses legal questions that require further consideration regarding the use of nuclear weapons and the rules of *jus in bello*.

4 Use of Nuclear Weapons and *Jus in Bello*

(1) Rule of Distinction

As mentioned earlier, it is a universal rule agreed upon and established among states that states' right to choose the means and methods of warfare is not unlimited. The legal assessment of methods of warfare is made in light of the two cardinal principles of IHL, namely the rule of distinction and the rule of prohibiting unnecessary suffering, which are considered "intransgressible principles of international customary law."[26]

What criteria does the rule of distinction within the two cardinal principles of IHL provide in practice for the legal assessment of the use of weapons? First, it is the criterion involved in the selection of the target of the attack, whether the attack distinguishes a particular military target, which is relevant to Article 51(4)(a) of Additional Protocol I of 8 June 1977 to the Geneva Conventions of 12 August 1949 (API). Second, it is the criterion involved in the capability of the

[23] ICJ, *supra* note 13, p. 262, para. 94.
[24] *Ibid.*
[25] Preambular Paragraph 2 of the TPNW.
[26] ICJ, *supra* note 13, p. 257, paras.78-79.

weapon and whether the weapon is capable of distinguishing between specific military targets, which is relevant to Article 51(4)(b) of the API. Third, it is the criterion relating to whether the use of the weapon would have "uncontrolled effects."[27] This asks whether the effects of the use of the weapon can be limited to those required by the principles of IHL, which is relevant to Article 51(4)(c) of the API.

The first is the question of whether the attacker distinguishes between military and non-military targets in the use of the weapon. This involves intent, which is a subjective factor in the selection of the target of an attack; intentionally attacking a nonmilitary target is impermissible in light of the rule of distinction. This principle evaluates the use of nuclear weapons based on the "countervalue"[28] strategy as unlawful, which targets civilians and civilian objects for attack.

In security studies, the concept of "deterrence by punishment" has been introduced as a deterrent by nuclear weapons. [29] It is defined as making the other party think of the possibility of "unacceptable destruction" through one's "retaliation" for the other party's action and discouraging the other party from taking action.[30] This concept provides the basis for mutually assured destruction (MAD), [31] which is not permissible under international law if the unacceptable destruction inflicted on the opponent is meant to be caused by an attack on a city, as is the case with MAD.[32] This means that the rule of distinction imposes fundamental legal

[27] Stuart Casey-Maslen, "The use of nuclear weapons under rules governing the conduct of hostilities," in Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds.), *Nuclear Weapons under International Law* (Cambridge University Press, 2014), pp. 104-107.

[28] Theodor T Richard notes that it was Herman Kahn who popularized the term countervalue in the context of targeting; see Theodor T. Richard, "Nuclear Weapons Targeting: The Evolution of Law and U.S. Policy," *Military Law Review*, Vol. 224, Issue 4 (2016), p. 951, fn. 517. Kahn compiled the content of a 12-hour lecture he delivered at Princeton University in 1959 and published *On Thermonuclear War* in 1960. Kahn's in-depth analysis of nuclear strategy caused a sensation, and nuclear strategy, previously known only to a few experts, became generally understood. For more on this point, see John Wohlstetter, "Herman Kahn: Public Nuclear Strategy 50 Year Later: A Compendium of Highlights from Herman Kahn's Works on Nuclear Strategy," (Hudson Institute, 2010), p. 3. John Wallstetter explains that in military terminology, counterforce means "striking military targets" while countervalue means "striking at the civilian population." See also Wohlstetter, p. 8.

[29] Glenn H. Snyder, "Deterrence and Power," *The Journal of Conflict Resolution* Vol. 4, No. 2 (1960), p. 163.

[30] *Ibid*.

[31] Robert S. McNamara, Statement of Secretary of Defense Robert S. McNamara, in the House Committee on Armed Services, Hearings on Military Posture and H.R. 4016 before the Committee on the Armed Services, 89th Congress, 1st Session, 1965, pp.172-173.

[32] Scot D. Sagan and Allen S. Weiner, "The Rule of Law and the Role of Strategy in U.S. Nuclear Doctrine," *International Security*, Vol. 45, Issue 4 (2021), pp. 128-130.

restrictions[33] on the idea of "nuclear deterrence,"[34] which is born from the combination of deterrence and nuclear weapons that have devastating destructive power that is different from conventional weapons.[35]

A question to be raised here is: if the use of nuclear weapons is not legally permissible to attack civilians and civilian objects, why are nuclear weapons, which have devastating destructive power, necessary? Bernard Brodie, who examined the role of nuclear weapons in light of the use of atomic bombs on Hiroshima and Nagasaki, stated, "One does not shoot rabbits with elephant guns, especially if there are elephants available."[36] The anticipated role of nuclear weapons, classified as weapons of mass destruction, should have been mass destruction as compared to shooting elephants, and not small-scale destruction as compared to shooting rabbits. In this regard, Michael Walzer is right in saying that "[nuclear weapons] is designed to kill whole populations, and its deterrent value depends upon that fact (whether the killing is direct or indirect)."[37] His point is that the threat of nuclear weapons is effective against an opponent because of their inhumanity, such as being capable of killing whole populations, and there lies the usefulness of nuclear weapons.

The assumption of the limited use of nuclear weapons, which is intended not to violate the rule of distinction,[38] seems to differ from the anticipated role of nuclear weapons as envisioned in nuclear deterrence, which is conceptualized based on the catastrophic and destructive power of

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[33] The United States declares its nuclear planning and targeting adhere to the laws of armed conflict. It also says that the United States has for decades rejected a deterrence strategy based on purposely threatening civilian populations, and will not intentionally target civilian populations. US Department of Defense, *Report on the Nuclear Employment Strategy of the United States – 2020 Specified in Section 491(a) of Title 10 U.S.C.* (2020), p. 6. Russia clarifies its position on the rule of distinction. The military doctrine of the former Soviet Union prohibited "to launch attacks against the civilian population or against individual civilians." See Instructions on the Application of the Rules of International Humanitarian Law by the Armed Forces of the USSR, Appendix to Order of the USSR Defence Minister No. 75, 1990 § 8(f), available at ICRC IHL Databases. The Russian Federation's Regulations on the Application of IHL (2001) states: "The civilian population as such and individual civilians enjoy protection which, in addition to other international humanitarian law rules, prohibits making them an object of attack." See Regulations on the Application of International Humanitarian Law by the Armed Forces of the Russian Federation, Moscow, 8 2001, § 54 and also § 7. China states: "In its military relations with other countries, the People's Republic of China observes the relevant treaties and agreements that it has concluded with them or acceded to or accepted." See Law of the People's Republic of China on National Defence, Article 67. Also see UN Doc, A/C.6/59/SR.5, 4 November 2004, p. 4, para. 22.

[34] Snyder, *supra* note 29, p. 163. Snyder defines deterrence as the power "to dissuade another party from doing something which one believes to be against one's own interests by the threat of applying some sanction."

[35] Chair's summary Humanitarian Impact of Nuclear Weapons, The Conference on the Humanitarian Impact of Nuclear Weapons in Oslo 4-5 March 2013.

[36] Bernard Brodie (ed.), *The Absolute Weapon: Atomic Power and World Order* (Harcourt, Brace and Company, 1946), p. 36.

[37] Michael Walzer, *Just and Unjust Wars: A Moral Argument with Historical Illustrations*, 5th ed., (Basic Books, 2015), pp. 280-281.

[38] For example, see Charles L. Glaser and Steve Fetter, "Should the United States Reject MAD? Damage Limitation and U.S. Nuclear Strategy toward China," *International Security*, Vol. 41, No. 1 (2016), pp. 49-98; Keir A Lieber and Daryl G. Press, "The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence," *International Security*, Vol. 41, No. 4 (2017), pp. 9-49.

nuclear weapons. The attempt to legalize the use of nuclear weapons by assuming their limited use may indicate the difficulty of reconciling the use of nuclear weapons with their catastrophic destructive power and the rule of distinction.

The second question concerns the capability of a weapon to distinguish between military and non-military objectives. Regarding this question, there is an argument that nuclear weapons can be directed at a military objective, as they can be used in a discriminate manner and "are not inherently indiscriminate."[39] This argument concerns the precision of the means of delivery of warheads that comprise nuclear weapons but not the nature of the power generated by the explosion of a nuclear warhead. Any weapon, regardless of its nature, can be used precisely in accordance with IHL. Therefore, this argument merely states that nuclear weapons, which are generally considered to have a nature that causes indiscriminate effects when used,[40] may still be used with precision. The nature of a weapon concerns its anticipated effects, which is a separate issue from how the weapon is used. It would be a leap of logic to argue that nuclear weapons are not inherently indiscriminate simply because the means of delivery is precise.

There is also an argument that nuclear weapons can be used without violating the rule of distinction in a scenario where there are no civilians.[41] Such an argument is also possible because any weapon can be used in areas with no civilian population. This argument, like the one concerning the precision of the means of delivery, only means that the use of nuclear weapons may be legalized in situations where their use is not anticipated to affect civilians, even if they are generally considered to be of a nature that would have indiscriminate effects.

Even if it is possible to use nuclear weapons in compliance with the rules of distinction and prohibiting excessive incidental harm, which will be discussed later, it is not permissible to inflict unnecessary suffering on combatants. Therefore, it cannot be concluded that nuclear weapons are lawful as means of warfare solely because it can be used without violating the rule of distinction. As explained earlier, this is because a weapon is prohibited as means of warfare if it violates at least one of the two cardinal principles of IHL, regarded as "intransgressible principles" of international customary law.

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[39] US, Letter dated 20 June 1995 from the Acting Legal Adviser to the Department of State, together with Written Statement of the Government of the United States of America, included in ICJ Written proceedings, Document No. 8700, pp. 1-48. Also see Charles J. Dunlap, Jr., "Taming Shiva: Applying International Law to Nuclear Operations," *Air Force Law Review*, Vol. 42 (1997), pp. 161-162.

[40] Although the consequences of the use of nuclear weapons can depend on a variety of factors, including the size and type of weapon used, whether it is a ground or underwater explosion, an air or high-altitude explosion, terrain and climate, Casey-Maslen points out "the effects can still be highly unpredictable even when such factors are known." Casey-Maslen, *supra* note 27, p. 106. This point relates to the question of controllability of the effects resulting from the use of nuclear weapons in light of Article 51(4)(c) of the API.

[41] UK, Letter dated 16 June 1995 from the Legal Adviser to the Foreign and Commonwealth Office of the United Kingdom of Great Britain and Northern Ireland, together with Written Comments of the United Kingdom, included in ICJ Written proceedings, Document No. 8802, p. 53.

The third question concerns the controllability of the effects of the use of nuclear weapons. This raises the question of whether the limited use of nuclear weapons without affecting the surrounding areas is feasible.[42] The ICJ pointed out that none of the states that advocated the legality of the use of nuclear weapons under certain circumstances, including the clean use of small, low-power tactical nuclear weapons, have indicated the circumstances that would justify such limited use should it be feasible, which is relevant here.[43]

The problem is that the uncontrollable effects are not confined to space. In its advisory opinion, the ICJ noted that the effects of radiation are not confined to the period during which hostilities occur, but can persist for a long time beyond their termination.[44] The ICJ used the phrase "their ability to cause damage to generations to come"[45] to refer to the temporal dimension of radiation effects, which is a "certain characteristic"[46] of nuclear weapons. In other words, the effects of radiation exposure resulting from the use of nuclear weapons cannot be controlled within the time frame anticipated for the scope of the application of IHL.

According to a comprehensive study of the customary law rules of IHL, an attack using means or methods of warfare "whose effects cannot be limited" as required by IHL "should be prohibited,"[47] and this rule applies to "weapons whose effects are uncontrollable in time and space."[48] As mentioned earlier, the API provides that "[indiscriminate attacks] which employ a method or means of combat those effects of which cannot be limited as required by this Protocol" are prohibited as indiscriminate attacks (Article 51(4)(c)). Alexander Breitegger, in his analysis of Article 51(4)(c), which concerns the effects of the use of weapons, writes that "this prohibition is meant to refer to weapons or tactics that, although by their design may generally be initially targeted at military objectives, then become uncontrollable in time and/or space."[49]

Shedding on the relationship between "those effects of which cannot be limited" as required" by the customary rules of IHL and the API and the uncontrollable effects in time of exposure to radiation resulting from the use of nuclear weapons would serve the purpose of the rule of distinction which intends to protect civilians. Radiation includes the effects of exposure to the initial radiation from the detonation of a nuclear weapon,[50] as well as the effects of exposure to

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[42] Although beyond the scope of this paper, this question involves the effects of the use of nuclear weapons on third states that are not parties to the conflict (effects on human health, the natural environment, and socioeconomic impacts) and on areas not belonging to either state such as the high seas.
[43] ICJ, *supra* note 13, p. 262, para. 94.
[44] *Ibid*., pp. 243-244, paras. 35-36.
[45] *Ibid*., p. 244, para. 36.
[46] *Ibid.*, pp. 243-244, para. 35.
[47] Jean-Marie Henckaerts and Louise Doswald-Beck, *Customary International Humanitarian Law* (Cambridge University Press, 2005), p. 43.
[48] *Ibid*.
[49] Alexander Breitegger, *Cluster Munitions and International Law: Disarmament With a Human Face?* (Routledge, 2012), p. 45.
[50] Epidemiological studies of the long-term effects of exposure to initial radiation from the use of nuclear weapons

radioactive materials produced by a nuclear detonation,[51] both of which need to be considered. In his oral statement at the 1996 ICJ advisory opinion hearing, Nagasaki's then Mayor Iccho Ito pointed out that "Indeed, the most fundamental difference between nuclear and conventional weapons is that the former release radioactive rays at the time of explosion" and that "[n]ot only directly exposed people, but also those how came into the hypocenter area after the bombing and those exposed to fallout carried by the wind suffered radiation-induced injuries…"[52]

The question here is that although epidemiological studies have shown the effects of exposure to radiation from the use of nuclear weapons on the human body,[53] the relationship between late effects such as cancer and those of initial radiation exposure remains largely unknown.[54] In addition, epidemiological studies are based only on the initial radiation dose from the point of nuclear detonation and do not take into account residual radiation, which is from radioactive materials produced by nuclear detonation. [55] Masao Tomonaga, professor emeritus at Nagasaki University and then director of the Atomic Bomb Disease Institute, writes that "[t]he effects of residual radiation on the human body are still ill-defined" and "it remains difficult to reproduce measurements scientifically." Tomonoga explains, "[T]his is the reason for some ambiguity in the total understanding of atomic-bombing effects."[56]

The implications of this explanation are important because they suggest that it is difficult to

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have been conducted on A-bomb survivors. See Atomic Bomb Disease Institute, Nagasaki University, *The Medical Effects of Nagasaki Atomic Bombing*, 10th ed., (2021).

[51] This is the problem of radioactive materials produced by nuclear explosions. Exposure to radiation is not only due to initial radiation (neutron and γ rays), which are emitted from the center of the detonation to the surrounding area by the chain reaction associated with the nuclear explosion, but also due to radioactive materials produced by the nuclear explosion. These radioactive materials include fission products produced by nuclear fission and induced activation materials (induced radioactivity) produced when neutron beams generated by nuclear fission collide with other materials. Masayoshi Naito, attorney for the Bikini Exposed Seafarers Lawsuit, explains that the question of the effects of radiation on the human body seen in the United States, Marshall Islands, Kazakhstan, and other parts of the world, which were brought before the meetings of states parties to the TPNW, were the about the effects of radioactive materials, and the question asked in the A-bomb Disease lawsuits and the Black Rain lawsuits in Japan are also about the effects of radioactive materials and environmental pollution. Interview with Masayoshi Naito, attorney at law (10 May 2024).

[52] Statement of the Mayor of Nagasaki to the International Court of Justice, Nuclear Weapons Advisory Opinion, Verbatim record 1995/27, Public sitting held on Tuesday 7 November 1995, p. 36.

[53] Nagasaki University, *supra* note 50.

[54] *The Medical Effects of Nagasaki Atomic Bombing* says that "the risk of death due to cancer tends to increase with increasing dose but that the risk of death due to causes other than cancer shows no such tendency." *Ibid*., p. 28. A particular difficulty in the studies of late effects is that it is difficult to distinguish leukemia and cancer, which occur independently of the initial radiation exposure associated with the use of nuclear weapons, from those caused by the use of nuclear weapons, so the relationship between radiation dose and disease can only be estimated epidemiologically in comparison with nonexposed individuals. The difficulty of explanation, however, does not mean that there are no late effects for which epidemiologic data do not adequately demonstrate a causal relationship. See Hisakazu Fujita, "Hiroshima/Nagasaki A-Bomb to Kokusaihou: Genbaku Hanketsu wo Tegakari ni [Hiroshima/Nagasaki and International Law: Atomic Bomb Ruling as a Clue]," in *Kaku ni Tachimukau Kokusaiho: Genten kara no Kenshou [International Law to Confront Nuclear Weapons: An Examination from the Origin]* (Houritsubunkasha, 2011), pp. 27-28.

[55] Radiation Effects Research Foundation, *Brief Description* (2016), p. 11.

[56] Masao Tomonaga, "The Atomic Bombings of Hiroshima and Nagasaki: A Summary of the Human Consequences, 1945-2018, and Lessons for Homo Sapiens to End the Nuclear Weapon Age," *Journal for Peace and Nuclear Disarmament*, Vol. 2, Issue 2 (2019), p. 504.

determine the extent of the effects of exposure to initial radiation and radioactive materials on civilians affected by the use of nuclear weapons. The temporally uncontrollable and difficult-to-determine effects of radiation exposure on the human body provide a basis for asserting the uniqueness of nuclear weapons as they are distinct from conventional weapons.[57] Considering the above effects of radiation exposure, it would be rational to assess nuclear weapons as means of warfare that has the potential to harm civilians indiscriminately.[58] A study by medical experts writes that "the resulting radiation exposure affects people's health "for the rest of their lives" and that "the effects will continue until 2045 (100 years after the bombings), when all the survivors are dead," concluding that nuclear weapons are weapons capable of indiscriminate "slaughter."[59]

Considering the uncontrollable effects of radiation exposure on the human body over time and the difficulty in determining the extent of such effects,[60] it has rationality to argue that Article 51(4)(c) of the API, which prohibits as indiscriminate attacks any attack using methods and means of combat that have effects exceeding the limits specified in the Protocol, effectively prohibits the use of nuclear weapons under the interpretation that the API is applicable to the use of nuclear weapons.[61] In addition, an attack using means or methods of warfare "whose effects cannot be limited" as required by IHL "should be prohibited," according to a comprehensive study of the customary law rules of IHL by the ICRC.[62] Since this argument is also related to the rule of prohibiting excessive collateral harm, this paper examines this question.

(2) Rule of Prohibiting Excessive Incidental Harm

As noted earlier, in its 1996 Advisory Opinion, the ICJ pointed out that of the states advocating the legality of the use of nuclear weapons under certain circumstances, including the "clean" use of smaller, low yield, tactical nuclear weapons, "none" indicated "what would be the precise circumstances justifying such use" should it be feasible.[63] This concerned the question of whether the damage limitation was feasible for the use of nuclear weapons.

As the rules of IHL relevant to this question, Articles 51(5)(b) and 57(2)(b) of the API require state parties to present "concrete and direct military advantage anticipated" in an attack that may

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[57] Fujita notes that atomic bomb diseases resulting from radiation effects by the use of nuclear weapons are the most unique characteristic of an atomic bombing. Fujita, *supra* note 54, p. 27.

[58] Henri Meyrowitz, "Le Statut des Armes Nucleaires en Droit International - 1e part," *German Yearbook of International Law*, Vol. 25 (1982), p. 248.

[59] Masao Tomonaga et al., "Research Study on Impacts of the Use of Nuclear Weapons in Various Aspects" Commissioned by the Ministry of Foreign Affairs of Japan in FY 2013," (2014), p. 36.

[60] Although beyond the scope of this paper, the study by Tomonaga et al. points out that the effects on human beings resulting from the use of the atomic bombs in Hiroshima and Nagasaki are not limited to health. They state that the "psychological damage and social discrimination suffered by survivors is profound and never goes away. Fears of genetic damage also have yet to be eliminated. A comprehensive knowledge concerning the effects on atomic bomb survivors remains elusive." Tomonaga et al., *ibid.*, pp. 36. This point leads to the even more difficult question of what constitutes nuclear harm and who are the victims.

[61] See *supra* note 20.

[62] See *supra* note 47.

[63] ICJ, *supra* note 13, p. 262, para. 94.

be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof. Unless otherwise presented, the attack is prohibited as "excessive" and "indiscriminate" in light of the principle of proportionality (API Article 51 (5)(b)), and if "committed willfully," they constitute "grave breaches" (API Article 85(3)(b)(c)) and "war crimes" (Article 85(5)).

The question here is what constitutes "military advantage." In the API, the words "a definite military advantage" (Article 52(2)) and "concrete and direct military advantage anticipated" (Article 57(2)) are used. According to the commentary of the ICRC, a military advantage can "only consist in ground gained and in annihilating or weakening the enemy armed forces"[64] but it is not legitimate to launch an attack "which only offers potential or indeterminate advantages."[65] Thus, military advantage cannot be based on mere hope or speculation but must be based on the information available at the time of the decision to attack, as the word "anticipated" suggests.[66]

It cannot be denied that the assessment of incidental harm, considering the principle of proportionality, may favor the attacker's interests as it is left to the attacker's subjective judgment. Therefore, if an attacker claims that incidental harm to civilians is not excessive, it is important for those affected to ask what concrete and direct military advantage is proportionate to such incidental harm. In other words, what constitutes the military advantage that legitimizes the devastating incidental harm that could be caused by the destructive power of nuclear weapons and the effects of radiation exposure should be questioned. The onus is for the attacker to explain it on the basis of available information.

Here again, the question lies in that, although epidemiological studies have provided knowledge on the effects on the human body of exposure to radiation from the use of nuclear weapons, the relationship between late effects such as cancer and the effects of exposure to initial radiation remains largely unknown. As this point was raised earlier in the API Article 51(4)(c) discussion, it also means that it is difficult to determine the extent of the effects of exposure to the initial radiation and radioactive materials on civilians affected by the use of nuclear weapons.

Not only through the experiences of Hiroshima and Nagasaki but also through the three international conferences on the humanitarian impact of nuclear weapons in 2013-14, scientific knowledge of the catastrophic humanitarian consequences of a nuclear detonation has accumulated, and the enormity of the damage has become public knowledge. The chair's summary of the March 2013 International Conference on the Humanitarian Impact of Nuclear

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[64] Sandoz, Swinarski and Zimmermann, *supra* note 15, p. 685, para. 2218.

[65] *Ibid*., p. 636, para. 2024. Michael Bothe, Karl Josef Partch, Waldemar A. Solf, *New Rules for Victims of Armed Conflicts Commentary on the Two 1977 Protocols Additional to the Geneva Conventions of 1949*, 2nd edn, reprint revised by Michael Bothe (Martinus Nijhoff Publishers, 2013), p. 367, para. 2.4.6; Gary D. Solis, *The Law of Armed Conflict*, 3rd edn (Cambridge University Press, 2022), p. 398, para. 13.1.

[66] William Boothby, *The Law of Targeting* (Oxford University Press, 2012), pp. 94-95.

Weapons in Oslo stated that it is "unlikely that any state or international body could address the immediate humanitarian emergency caused by a nuclear weapon detonation in an adequate manner and provide sufficient assistance to those affected" and "it might not be possible to establish such capacities, even if it were attempted."[67]

Moreover, the nature of devastation is such that it is impossible to determine how far the effects of such devastation would spread. This also means that it is difficult to determine whether the "concrete and direct military advantage" claimed by the attacker is proportionate to catastrophic incidental harm. Unless the "concrete and direct military advantage" is proportionate to the incidental harm presented, it should also be difficult for the attacker to claim that collateral harm to civilians is not excessive.

The views of military experts on applying the principle of proportionality are also important. General C. Robert Koehler, former commander of the U.S. Strategic Command, writes, "I was concerned that increasingly restrictive constraints and legal interpretations appropriate to conventional war may not be achievable (or desirable if carried to extremes) when applied to nuclear weapons and their unavoidable collateral effects."[68] Koehler strongly suggests that it is impractical to expect that collateral harm would not be excessive if nuclear weapons were used.[69]

The above discussion points out that there is reasonable doubt about the argument that the use of nuclear weapons under any normal circumstances can be consistent with the rules of IHL. It should not be overlooked that, unlike conventional weapons, radiation from the use of nuclear weapons has the potential to cause indiscriminate harm to civilians. The argument that nuclear weapons can be used in accordance with the rule of distinction in such a way that incidental harm is not excessive is hypothetical, and there is good reason to argue that the practicability of lawful methods of warfare in the use of nuclear weapons is difficult to find.

(3) Rule of Prohibiting Unnecessary Suffering

Of the two cardinal principles of IHL, the rule of prohibiting unnecessary suffering forbid the infliction of greater suffering on combatants than is unavoidable in achieving legitimate military objectives. The Hague Regulations of 1907 prohibits "[t]o employ arms, projectiles, or material calculated to cause unnecessary suffering" (Article 23(e)), just like the API prohibits "to employ

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[67] Chair's summary Humanitarian Impact of Nuclear Weapons, *supra* note 35.

[68] General C. Robert Kehler, "Commanding Nuclear Forces," in Charles L Glaser, Austin Long and Brian Radzinsky (eds.) *Managing U.S. Nuclear Operations in the 21st Century* (Brookings Institution Press, 2022), p. 150.

[69] Even if civilians are excluded from the attack, the question of whether the massive destruction that would result from the use of nuclear weapons can be legalized as incidental harm has long been recognized. Regarding the MSDM-242, Vice Admiral Frank McMullen witnessed that "we are not targeting people here, but we are indeed causing many, many fatalities." Testimony of Vice Admiral Frank McMullen, Vice Director Strategic Target Planning, JSTPS, Hearings in House Committee on Armed Services, Hearings on Military Posture and H.R. 1872 (US Government Printing Office, 1979), Book 1, Part 3, p. 20.

weapons, projectiles, and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering (Article 35(2)).

Whether the injury or suffering inflicted on the combatants is unnecessary depends on the necessity of selecting such weapons as means of warfare and the degree of injury or suffering caused by their use. In other words, the "equation/balancing act" between the "military aspect" and the "humanitarian aspect."[70] This approach allows for greater injury and suffering if the "military necessity"[71] is greater, and does not consider the magnitude of injury and suffering as an object of evaluation.[72] The idea is that only by comparing injury and suffering with military necessity can an assessment of the injury and suffering caused by the use of the weapon in question be made. However, it would be going too far to argue that the use of a weapon, regardless of how great the injury and suffering it causes, is not prohibited if it is necessary to achieve military necessity. Since it is difficult to conceive of the use of a weapon that is not related to military necessity, such an argument would negate the raison d'être of the rule of prohibiting unnecessary suffering.

Although there is a general agreement that whether the injury and suffering inflicted on the combatants in question is unnecessary is to be evaluated by balancing the military and humanitarian aspects, the specific question of how to balance the two is not easy.[73] Regarding the humanitarian aspect, the ICRC published a report on the SIrUS Project in 1997.[74] The report proposed four criteria for excessive injury or unnecessary suffering: (1) a specific disease, a specific abnormal physiological condition, a specific permanent disability, or a specific injury; (2) a battlefield mortality rate of 25% or more or a hospital mortality rate of 5% or more; (3) a third-degree wound as measured by the Red Cross classification; and (4) lack of a well-recognized and proven cure. Although this proposal is considered important because it recognizes the need for a rigorous review of weapons of unknown impact, it has not been widely accepted by experts.[75]

Simon O'Connor points out that when the question of proportionality between combatant suffering and military necessity arises in light of the rule of prohibiting unnecessary suffering, it

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[70] ICRC, Report, Conference of Government Experts on the Use of Certain Conventional Weapons, Lucerne, 1974, (1975), p. 9, para. 24.

[71] Sandoz, Swinarski and Zimmermann, *supra* note 15, p. 392, para. 1389.

[72] US, *supra* note 39, p. 2; US Army Judge Advocate General's Legal Center and School, International and Operational Law Department, *Law of Armed Conflict Deskbook 5th* ed.,(2015), p. 150, para. 2.

[73] ICRC, *supra* note 70, p. 9, para. 24; Sandoz, Swinarski and Zimmermann, *supra* note 15, p. 393, para. 1390.

[74] The SIrUS project, whose name derives from the phrase "Superfluous Injury or Unnecessary Suffering," was launched following an ICRC-sponsored symposium entitled "The medical profession and the effects of weapons" (Montreux, March 1996Robin M. Coupland and Peter Herby, "Review of the legality of weapons: A new approach — The SlrUS Project," *International Review of the Red Cross*, Vol. 81, No. 835 (September 1999), p. 583.

[75] Issabelle Daoust, "ICRC Expert Meeting on Legal Reviews of Weapons and the SIrUS Project Jongny sur Vevey, 29-31 January 2001," *International Review of the Red Cross*, Vol. 83, No. 842 (June 2001), pp. 541-542. See also Solis, *supra* note 65, p. 227.

is "important to assess the effects" of the use of the weapon in question.[76] The idea of relating the purpose of the use of the weapon—military advantage—to the effects of its use—injury and suffering—is a practical way to consider the balance between military and humanitarian aspects in a concrete manner. Comparing the effects of the use of a weapon with military advantage requires a close examination of what does and does not contribute to military advantage among the effects of the use of the weapon in question.

If it is difficult to explain how the effects of the use of weapons can be rationally related to military advantage, alternative weapons may need to be considered. Yoram Dinstein notes that the prohibition of undue injury and unnecessary suffering depends on distinguishing between avoidable and unavoidable injury and suffering, as well as the need to compare the weapon in question with other alternatives.[77] Christopher Greenwood also points out that the rule of prohibiting unnecessary suffering, in its essence, involves "a comparison between different weapons" in determining whether the injuries and suffering caused by a particular weapon are necessary.[78]

In light of the above arrangement, this paper considers how the effects of radiation on combatants from the use of nuclear weapons can be evaluated in light of the rule of prohibiting unnecessary suffering. The question here is whether such effects can be legalized by military advantage in cases where exposure to radiation from the initial radiation at the time of the detonation of a nuclear weapon and exposure to radioactive materials produced by a nuclear explosion would have health effects on the bodies of combatants in the medium-to-long-term after the end of the armed conflict. If it is difficult to explain the rational connection between the adverse health effects of exposure to radiation on combatants and military necessity, the question of choosing alternative means, as pointed out by Dinstein and Greenwood, must be considered.

As seen in the discussion of Article 51(4)(c) of the API and the rule of prohibiting excessive incidental harm, although there are findings from epidemiological studies on the effects of exposure to radiation resulting from the use of nuclear weapons on the human body, there are many unknowns regarding the relationship between late effects, such as cancer, and the effects of exposure to initial radiation. In addition, epidemiological studies are based only on the initial radiation dose from the point of detonation of nuclear weapons and do not take into account residual radiation, which is radiation from radioactive materials produced by nuclear explosions.

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[76] Simon O'Connor, "Nuclear weapons and the unnecessary suffering rule," in Gro Nystuen, Stuart Casey-Maslen and Annie Golden Bersagel (eds.), *Nuclear Weapons under International Law* (Cambridge University Press, 2014), p. 144.

[77] Yoram Dinstein, *The Conduct of Hostilities under the Law of International Armed Conflict* (Cambridge University Press, 2004), p. 60.

[78] Christopher Greenwood, "The law of weaponry at the start of the new millennium," in Leslie Green and Michael Schmitt (eds.), *International Law Studies*, Vol. 71: The Law of Armed Conflict: Into the Next Millennium (Newport, RI: US Naval War College, 1998), p. 197.

These arguments imply that it is difficult to determine the extent of radiation exposure of combatants. Simultaneously, it is difficult to determine whether the military advantage claimed by an attacker is proportionate to the suffering inflicted by the combatants. Moreover, unless the military advantage is presented as proportionate, it would also be difficult for an attacker to argue that the suffering of combatants is necessary.

In light of the above, there are good reasons to argue that the use of nuclear weapons is unnecessary unless the effects on combatants' bodies of exposure to radiation caused by the use of nuclear weapons can be explained by a military advantage. Therefore, when conducting a legal assessment of the use of nuclear weapons in light of the rule of prohibiting unnecessary suffering, it is necessary to ask states with nuclear weapons whether the effects of radiation exposure on the bodies of combatants are suffering necessary to achieve a military advantage.

5 Belligerent Reprisals

As explained, the use of nuclear weapons in violation of the relevant rules of IHL is unlawful. In particular, this paper pointed out that the use of nuclear weapons is unlawful under the rule of distinction when it is based on a countervalue strategy that targets civilian populations and objects.

However, in policy discussions on security, it is often argued that "retaliatory strikes" should be conducted when an opponent attacks one's own city. From the perspective of international law, such retaliatory strikes against the opponent city would violate the rule of distinction and, therefore, have to be legalized under the doctrine of "belligerent reprisals." A belligerent reprisal is a legal doctrine on *jus in bello* that precludes the unlawfulness of violations committed by the victim state in response to violations committed by the attacking state, on the basis that IHL is applicable to both parties to the conflict.

After all, as long as the rule of distinction prohibits attacks on cities, it is "absolutely"[79] impermissible under IHL to intentionally attack civilians or civilian objects with nuclear weapons without introducing the twisted argument that belligerent reprisals preclude the unlawfulness of such an attack. However, this is precisely because states with nuclear weapons see their utility in the catastrophic destructive power of nuclear weapons, as they have been strengthening their nuclear capabilities. Even if to do so means they must resort to the twisted argument, and so have their allies adopted security policies premised on nuclear capabilities. Thus, belligerent reprisals provide the ultimate legal basis for legalizing the use of nuclear weapons in a countervalue strategy by precluding the unlawfulness of attacks on civilians and civilian objects, which is prohibited by the rule of distinction.[80]

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[79] Rosalyn Higgins, Dissenting Opinion, *I.C.J. Reports 1996*, p. 363, para. 12.

[80] Mayama *supra* note 3, p. 130. See also The Netherlands, Letter dated 16 June 1995 from the Minister for Foreign Affairs of the Netherlands, together with Written Statement of the Government of the Netherlands, included in ICJ Written proceedings, Document No. 8690, p. 12, para. 29.

As the Geneva Conventions of 1949 and API specifically prohibit belligerent reprisals, it cannot be understood that belligerent reprisals are generally prohibited under IHL. For example, the API provides that "[r]eprisals against the persons and objects protected by this Part are prohibited" (Article 20). During peacetime, reprisals involving the use of force by a victim state are considered unlawful under Article 2(4) of the UN Charter.[81] However, belligerent reprisals are regarded as measures to ensure implementation to bring the violators of IHL back into compliance in a decentralized international society, unless otherwise provided for in an international treaty.

The provisions in API relating to the prohibition of belligerent reprisals provide that "[a]ttacks against the civilian population or civilians by way of reprisals are prohibited" (Article 51(6)) and clarify that "[c]ivilian objects shall not be the object of attack or reprisals (Article 52(1)). These provisions are possible grounds for rendering unlawful the use of nuclear weapons based on a countervalue strategy that targets civilian populations and civilian objects for attack.

However, there has been debate regarding whether the API applies to the use of nuclear weapons.[82] The United Kingdom (UK), France, and several NATO member states[83] made declarations denying the application of the API to the use of nuclear weapons. The UK then stated that the obligations of Articles 51 and 55 "are accepted on the basis that any adverse party against which the United Kingdom might be engaged will itself scrupulously observe those obligations."[84] France also stated that it will take the necessary measures to protect its civilians in accordance with international law in the event of "grave, manifest and deliberate" violations of the Geneva Conventions and the API by an enemy state.[85]

The United States is not bound by the prohibition of belligerent reprisals against civilians and civilian objects as a non-party to the API. In a letter to the Senate in January 1987, President Ronald Reagan stated that the API was "fundamentally and irreconcilably flawed" and decided not to ratify it.[86] One of the main reasons for this was the prohibition of targeting civilians through belligerent reprisals using nuclear weapons.[87] The concern was that if belligerent reprisals were denied, the United States would be legally prohibited from responding to an enemy attack on its

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[81] As reconfirmed in the Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, states have "a duty to refrain from acts of reprisal involving the use of force. UN General Assembly, Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, 24 October 1970, A/RES/2625(XXV).

[82] See *supra* note 20.

[83] They are Belgium, Canada, Germany, Italy, the Netherlands, and Spain. See William H. Boothby, *The Law of Targeting* (Oxford University Press, 2012), p. 79.

[84] ICRC, IHL Databases.

[85] ICRC, IHL Databases.

[86] Ronald W. Reagan, Address to the Nation on Strategic Arms Reduction and Nuclear Deterrence, 22 November 1982, on the National Archives, Ronal Reagan Presidential Library and Museum.

[87] Abraham D. Sofaer, "The Position of the United States on Current Law of War Agreements," *American Journal of International Law and Policy* (1987), p. 469.

city with nuclear weapons.[88] The doctrine of belligerent reprisals, which provides the ultimate basis in international law for a countervalue strategy in the use of nuclear weapons, was important to the United States.

In contrast, Russia, China, the Democratic People's Republic of Korea, the Republic of Korea, and Japan are parties without reservation to Articles 51(6) and 52(1) of the API.[89] Therefore, they are prohibited from attacking civilians and objects by way of belligerent reprisals. It should not be overlooked that these states are obligated to prohibit attacks on civilians and civilian objects.[90]

The question of whether the API applies to the use of nuclear weapons is important because interpretation has a major impact on the security policy premised on nuclear weapons. In considering this question, it is crucial to know how these five states interpret the legal nature of the declarations made by the United Kingdom and France, which deny the application of the API to the use of nuclear weapons and impose restrictions on the prohibition of belligerent reprisals against civilians.

6 Conclusion

The universalization of the TPNW is not an easy task because there is a great schism between the position to prohibit nuclear weapons as means of warfare and the position to oppose it. Therefore, while promoting efforts for universalization, discussing the legality of nuclear weapons in terms of the regulation of methods of warfare under the customary rules of IHL remains important in guiding the discussion on the prohibition of nuclear weapons as means of warfare. A clue to this discussion is the question raised by the ICJ in its 1996 Advisory Opinion, which concerns whether the lawful use of nuclear weapons is feasible, which has remained unanswered by states with nuclear weapons. The arguments in this paper can be summarized as follows:

First, this paper pointed out that intentionally attacking civilians or civilian objects with nuclear weapons constitutes an indiscriminate attack and is absolutely impermissible under international law. In addition, considering the uncontrollable effects of radiation exposure on the human body over time and the difficulty in determining the extent of such effects, Article 51(4)(c) of the API, which prohibits indiscriminate attacks by employing a method and means of combat the effects of which cannot be limited as required by the Protocol, may effectively prohibit the use of nuclear weapons under the interpretation that the API is applicable to the use of nuclear weapons. Also, an attack using means or methods of warfare "whose effects cannot be limited" as required by IHL "should be prohibited," according to a comprehensive study of the customary law rules of IHL by the ICRC.

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[88] *Ibid*., p. 469.
[89] ICRC, IHL Databases.
[90] Kimiaki Kawai, "Japan's Reliance on US Extended Nuclear Deterrence: Legality of Use Matters Today," *Journal for Peace and Disarmament*, Vol. 5, Issue 1 (2022), pp. 171-175.

This argument was based on the fact that, although epidemiological studies have shown the effects of exposure to radiation from the use of nuclear weapons on the human body, the relationship between late effects such as cancer and the effects of exposure to initial radiation remains largely unknown; these epidemiological studies are based only on the initial radiation dose from the point of nuclear detonation and do not take into account residual radiation, which is from radioactive materials produced by nuclear detonation.

Second, this paper pointed out that the argument that nuclear weapons can be lawfully used is limited to cases in which no excessive incidental harm to civilians is anticipated from their use. It also pointed out that if the attacker claims that the incidental harm to civilians caused by exposure to radiation resulting from the use of nuclear weapons is not excessive, then the affected by incidental harm must ask what concrete and direct military advantage would be proportionate to such incidental harm.

As explained in the question concerning Article 51(4)(c) of the API, it is difficult to determine the extent of the effects of exposure to initial radiation and radioactive materials on civilians affected by the use of nuclear weapons. This fact also means that it is difficult to determine whether the "concrete and direct military advantage" claimed by the attacker is proportionate to catastrophic incidental harm. Unless the "concrete and direct military advantage" is proportionate to the incidental harm presented, it should also be difficult for the attacker to claim that collateral harm to civilians is not excessive.

Third, this paper raised the argument that nuclear weapons can be used in accordance with the rule of distinction in such a way that incidental harm is not excessive is hypothetical. There is good reason to argue that the practicability of lawful methods of warfare in the use of nuclear weapons is difficult to find. Therefore, this paper pointed out that there is reasonable doubt about the argument that the use of nuclear weapons under any normal circumstances can be consistent with the rules of IHL.

Fourth, this paper pointed out that when conducting a legal assessment of the use of nuclear weapons in light of the rule of prohibiting unnecessary suffering, it is necessary to ask states with nuclear weapons whether the effects of radiation exposure on the bodies of combatants are suffering, which is necessary to achieve a military advantage.

As seen in the discussion of Article 51(4)(c) of the API and the rule of prohibiting excessive incidental harm, it is difficult to determine the extent of the effects of radiation exposure on combatants by initial radiation and residual radiation resulting from the use of nuclear weapons. It is then difficult to determine whether the military advantage claimed by an attacker is proportionate to the suffering inflicted by the combatants. Moreover, unless the military advantage is presented as proportionate, it would also be difficult for an attacker to argue that the

suffering of combatants is necessary.

Fifth, this paper pointed out that Russia, China, the Democratic People's Republic of Korea, the Republic of Korea, and Japan are parties without reservation to Articles 51(6) and 52(1) of API. All of these states are prohibited from attacking civilians and civilian objects by way of belligerent reprisals. It should not be overlooked that these states are obligated to prohibit attacks on civilians and civilian objects.

Therefore, the question of the applicability of API to the use of nuclear weapons remains important. In considering this question, it is critical to know what the interpretations of these five states are regarding the legal nature of the declarations made by the United Kingdom and France, which deny the application of API to the use of nuclear weapons and impose restrictions on the prohibition of belligerent reprisals against civilians.

As discussed above, the approach of examining the legality of the use of nuclear weapons in terms of the regulations on methods of warfare in the customary law rules of IHL may differ from the TPNW approach, which holds that any use of nuclear weapons is unlawful. However, if, after examinations of individual circumstances, the practicability of lawful use is difficult to find, this should open the way for the argument that nuclear weapons should be universally prohibited as means of warfare. Therefore, an approach that pursues the legal prohibition of nuclear weapons as means of warfare from the regulation of methods of warfare in the customary rules of IHL, which are binding on all states, is a viable way to universalize the TPNW. The arguments raised in this paper encourage the states with nuclear weapons to be accountable for the legal questions that have been left unanswered.

II. Nuclear Weapon System and Its Risk Analysis —Role of Scientific Advisory Group (SAG)

Tatsujiro Suzuki

1 Introduction

At the first meeting of the States Parties of the Treaty on the Prohibition of Nuclear Weapons (TPNW), Member States decided to "institutionalize scientific and technical advice for the effective implementation of TPNW" and thus to establish the Scientific Advisory Group (SAG). This is a historic decision in the nuclear disarmament arena, as other nuclear disarmament treaties, such as NPT or CTBT, do not have such an advisory group. What specific roles can or should SAG play for TPNW? Would scientific advice be necessary for a highly political and societal issue like nuclear disarmament? Scientific knowledge of the humanitarian consequences of nuclear weapons use was indeed the very basic foundation of TPNW. Besides, it is now well-recognized that technological advancements in nuclear modernization programs and conventional weapon systems make nuclear strategies much more complex and uncertain. Furthermore, disruptive technologies, such as cyber and Artificial Intelligence (AI), challenge the reliability of nuclear weapon systems. This is where the "risk of nuclear deterrence" should be assessed carefully.

In this section, the paper first describes the generic issue associated with scientific advice and policy-making and draws experiences of Scientific Advisory institutions in other international issues. Then, the paper will discuss "risk analysis of nuclear deterrence" as a major area in which SAG should and can play a critical role for the TPNW. The paper will then look at key technological components of "nuclear deterrence" whose risk needs to be assessed. In short, risk assessment of "nuclear deterrence" means that we now need such an assessment BEFORE nuclear weapons are used, while we typically assess the risk of nuclear weapons AFTER their usage. Finally, the paper concludes by suggesting specific roles that SAG can and should play for the TPNW and nuclear disarmament as a whole.

2 Why Science Matters or Not

"*Science without policy is science, but policy without science is gambling.*"[1]

- David Grey, Oxford University's School of Geography and the Environment, Former Director of the International Institute for Systems Analysis

[1] Quoted in Susan A. Hughes, "What role does science play in economics, technology, and climate policy?", Harvard Kennedy School, March 30, 2022. https://www.hks.harvard.edu/faculty-research/policy-topics/science-technology-data/what-role-does-science-play-economics.

This famous quote describes the essence of the relationship between science and policy. As this statement suggests, science matters for policy making. In today's world, we witness tremendous opportunities generated by advances in science and technology. At the same time, we face major issues that cannot be solved without an adequate understanding of science and technology. Or at least, policy-making for solving such complex issues as climate change, pandemic, etc., requires the contribution of scientific/technological knowledge. Without such contributions from science, policy-making could negatively impact our society. Or, at worst, such a policy without adequate scientific knowledge could lead to catastrophic consequences in the modern world.

However, the relationship between science and policy is not straightforward. In reality, many issues need answers to "*questions which can be asked of science and yet which cannot be answered by science*," i.e., so-called "trans-scientific" issues that were originally proposed by Dr. Alvin Weinberg in 1972[2]. Weinberg cited several examples of "trans-scientific" issues, which include the biological effects of low-level radiation and the probability of extremely improbable events. Then, what are the responsibilities of scientists in trans-scientific debate? Weinberg suggested the following;

"Though the scientists cannot provide definite answers to trans-scientific questions any more than can the lawyer, the politician or a member of the lay public, he does have one crucially important role: to make clear where science ends, and trans-science begins."[3]

This is exactly the role scientific advisors should play. Abraham Lincoln established the National Academy of Science (NAS) in the United States in 1863 as a scientific advisory organization. Lincoln, witnessing the two ironclad warships battle to a draw because "cannonballs just bounced off the sides of these ships" during the Civil War, is said to have proclaimed that he wanted scientists on his side.[4] Interestingly, NAS was created to respond to security issues for which scientific advice was thought to be needed.

NAS did establish a Committee on International Security and Arms Control (CISAC) in 1980 in the division of Policy and Global Affairs. CISAC comprises distinguished members from the science, policy, and military fields. International security issues are typically considered non-technical, but a policy issue requires technical expertise to resolve. Still, scientists alone cannot solve the issues as international security issues are also "trans-science" issues. Scientists play critical roles but need to work with experts from non-scientific fields. In short, science matters, but science alone cannot solve the issues.

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[2] Alvin M. Weinberg, "Science and Trans-Science", Minerva, Volume 10, pp. 209-222, April 1972. https://link.springer.com/article/10.1007/BF01682418#preview.
[3] Weinberg, *ibid*., p.220.
[4] Susan Hughes, *ibid*.

3 Role of Scientific Advisory Organizations in International Policy Discussion

There are scientific/technical organizations in the nuclear disarmament and non-proliferation field. The best examples are the International Atomic Energy Agency (IAEA) and the Comprehensive Test Ban Treaty Organization (CTBTO). Both organizations provide important technical information/assessment and act as organizations for "verification" of nuclear activities. Still, they don't have any specific role as a "scientific and technical advisory" organization. Organization for Prohibition of Chemical Weapon (OPCW), while it is not for nuclear weapons and has a verification function, is itself a decision-making body.

There are international organizations under the UN that are set up by interested parties and are specifically designed to provide scientific and technical advice. Here are some good examples to follow.

(1) Intergovernmental Panel on Climate Change (IPCC)

IPCC was established by the United Nations Environmental Program (UNEP) and the World Meteorological Organization (WMO) in 1988, endorsed by the UN General Assembly Resolution 43/53 of December 6, 1988[5]. Its main mission was to prepare a comprehensive review and recommendations concerning the state of knowledge of the science of climate change and potential response strategies. It was also asked to provide elements for inclusion in a possible future international convention on climate change. It was crucial in formulating the UN Framework Convention on Climate Change (UNFCC) adopted in 1992. The IPCC publishes the so-called Synthesis Report, which includes "Summary for Policymakers". Since 1988, the IPCC has published six Synthesis Reports, which have been the scientific basis for policy discussion at the UNFCC. It is widely acknowledged that the IPCC's role in the climate change policy debate has been critically important.

(2) Intergovernmental Science-Policy Platform on Biological Diversity and Ecosystem Service (IPBES)[6]

IPBES is an independent intergovernmental body established by 94 individual governments on April 21, 2012, that wanted to strengthen the science-policy interface for biodiversity, ecosystem, and sustainable development. While it is not a UN organization, UNEP provides secretariat services to IPBES, responding to requests from IPBES with authorization from the UNEP Governing Council in 2013. IPBES's main governing body is the "Plenary," which consists of the representatives of IPBES member states. "Multidisciplinary Expert Panel" (MEP) is a group of experts (five experts from each of the five UN regions) who provide scientific and technical

[5] UN General Assembly Resolution 43/53, "Protection of global climate for present and future generations of mankind," 6 December 1988. https://www.ipcc.ch/site/assets/uploads/2019/02/UNGA43-53.pdf.
[6] Website of IPBES. https://www.ipbes.net/.

advice to the Plenary. IPBES also aims to promote effective stakeholder engagement and establish an "Open-Ended Network of IPBES Stakeholders." Any individuals or organizations who can benefit from or contribute to implementing IPBES programs are encouraged to apply.

(3) Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)

SBSTTA was specifically established in 1995 by Article 25 of the Convention on Biological Diversity. Article 25 specifies the mission of SBSTTA as follows: a) Provide scientific and technical assessments of biological diversity, b) Prepare scientific and technical assessments of the effects of types of measures taken in accordance with the provisions of this Convention, c) Identify innovative, efficient and state-of-the-art technologies and know-how relating to the conservation and sustainable use of biological diversity and advice on the ways and means of promoting development and/or transferring technologies, d) Provide advice on scientific programs and international cooperation in research and development, e) Respond to scientific, technical, technological and methodological questions.[7]

These missions could be good references for TPNW SAG to follow. SBSTTA has met 23 times to date and produced a total of 240 recommendations to the Conference of the Parties, some of which have been endorsed by the COP.[8]

(4) International Union for Conservation of Nature (IUCN)

The IUCN was established in 1948 and is now the world's largest network for conserving the global environment. It is a unique organization with more than 1,400 members in more than 160 countries, including government and civil society organizations. Over 16,000 scientists and experts worldwide volunteer their expertise as members of the IUCN Commission. IUNC Commissions to the following: a) Analyze issues and prepare assessments, reports, action plans, criteria, and methodology; b) Undertake research and other scientific and technical work; c) Undertake tasks assigned to them within the integrated program of IUCN; d) Provide advice on any matter within their fields of competence, e) Broaden knowledge and competence on matters relation to the mandates, f) Work with Members and components of IUCN with necessary expertise, and g) Undertake such other responsibilities as may be assigned to them by the World Congress and the Council.[9]

This is an interesting model where experts of both government and civil society work together to provide analysis and advice to the decision-making body.

As noted above, there are various ways to form a scientific/technical advisory group, but the

[7] "Convention on Biological Diversity," https://www.cbd.int/doc/legal/cbd-en.pdf.
[8] Website of SBSTTA, https://www.cbd.int/sbstta.
[9] IUCN Website, https://www.iucn.org/our-union/expert-commissions.

common factor is the importance of objective and independent advice to the decision-making body based on scientific and technical analysis. That is what we need in the field of nuclear disarmament and non-proliferation.

4 Risk Assessment of Nuclear Deterrence

The second Meeting of the States of the TPNW adopted the decision to "establish an inter-sessional consultative process" with the "involvement of the Scientific Advisory Group" to submit the report to the third Meeting of the States Parties containing recommendations on the following two issues;

1) To better promote and articulate the legitimate security concerns, threats and risk perceptions enshrined in the Treaty that result from the existence of nuclear weapons and the concept of nuclear deterrence
2) To *challenge the security paradigm based on nuclear deterrence* by highlighting and promoting new scientific evidence about the humanitarian consequences and risks of nuclear weapons and juxtaposing this with the risks and assumptions that are inherent in nuclear deterrence.[10] (emphasis added by the author)

The more challenging task is 2), in particular, to "challenge the security paradigm based on nuclear deterrence" by promoting "new scientific evidence about humanitarian consequences and risks of nuclear weapons…that are inherent in nuclear deterrence". In the past, risk assessment of nuclear weapons tends to focus on AFTER the use of nuclear weapons. To assess the risk of "nuclear deterrence," the new task is to assess the risk of nuclear weapons use BEFORE it is used.

In a typical engineering risk assessment, the risk is measured by "probability (likelihood)" times "consequences." Unfortunately, the risk assessment of nuclear weapon use cannot be measured as easily as general engineering risk. It is because: 1) reliable probability (likelihood) cannot be obtained as nuclear weapon use is such a rare event, and there is no empirical record of such events (in fact, there were only two events of nuclear weapons use during the war, i.e., Hiroshima and Nagasaki). 2) catastrophic consequences of nuclear weapons use can also go beyond normal event analysis. The use of nuclear weapons is a typical "low probability, high consequence" event and is beyond typical risk assessment methodology. This is called "existential risk assessment," and its risk cannot be assigned a fixed numerical value and should be considered in relative terms.[11]

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[10] Second Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons (TPNW), "Decisions to be taken by the second Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons," 30 November 2023. TPNW/MSP/CRP.3/Rev.1. https://docs-library.unoda.org/Treaty_on_the_Prohibition_of_Nuclear_Weapons_-SecondMeeting_of_States_Parties_(2023)/TPNW.MSP_.2023.CRP_.3.Rev_.1_draft_decisions.pdf.

[11] John Borrie, Tim Caughley and Wilfred Wan edit, "Understanding Nuclear Weapon Risks," UNIDIR Report, 30 March 2017. https://unidir.org/publication/understanding-nuclear-weapon-risks/.

The risk of nuclear deterrence is also difficult to measure. As Fitzpatrick and Barnett argue, nuclear deterrence is inherently risky due to imperfect systems and human failings.[12] Fitzpatrick and Barnett point out several pitfalls of nuclear deterrence: 1) command control systems for nuclear deterrence are exceedingly complex, with numerous moving parts and tight coupling, and with little time for decision-making; 2) nuclear doctrine is designed to send clear signals to adversaries, yet can be ambiguous, abandoned, or outdated in a crisis, mistrust and miscommunication; 3) smaller nuclear powers have less secure control over nuclear weapons.[13] Most recently, the US National Academy of Sciences (NAS) published a report on risk analysis of nuclear war. In the report, they concluded regarding the risk of nuclear deterrence as follows; "Due to the potentially catastrophic consequences of nuclear weapons' use, the U.S. government must recognize and prioritize the need to develop specific assessments of the risks of nuclear weapons use while implementing an integrated deterrence strategy."[14]

Among those pitfalls, we need to focus on technological factors that SAG can contribute to in risk assessment. Let's consider the technological components of nuclear deterrence first and move to individual risk assessments.

5 Technological components of nuclear deterrence

As noted above, current nuclear weapon systems are highly complicated, depending on numerous technological systems that need to work perfectly to make sure that nuclear weapons will function as planned. US Department of Defense, in its report "21st Century Nuclear Deterrence and Missile Defense," listed the following technology systems as "components of nuclear deterrence."[15] The failure of any of them may be under the credibility of nuclear deterrence.

- Command and Control

This is probably the most important technological system for nuclear weapons. It is also called the NC3 (Nuclear Command, Control and Communication) system. The NC3 system must detect the attack by the enemies and warn the national command authority of the attack so that the national commander can order the launch of nuclear weapons in time in response to the attack. The US Global Operation Center (GOC) is called the "nerve center" for the US Strategic Command (StratCom). The GOC can be isolated with an emergency power supply system and protected against electromagnetic pulse attacks. The Commander's order must be communicated

[12] Mark Fitzpatrick and Marc Barnett, "Risk and Nuclear Deterrence", Chapter 2 of Borrie, Caughley and Wilfred edit., *ibid*, 2017.
[13] Fitzpatrick and Barnett, *ibid*.
[14] Committee on International Security and Arms Control, National Academy of Sciences (NAS), "Risk Analysis Methods for Nuclear War and Nuclear Terrorism," 2023. https://nap.nationalacademies.org/catalog/27393/risk-analysis-methods-for-nuclear-war-and-nuclear-terrorism-phase.
[15] US Department of Defense, "21st Century Nuclear Deterrence and Missile Defense." https://dod.defense.gov/News/Special-Reports/21st-Century-Nuclear-Deterrence-and-Missile-Defense/.

accurately and promptly to the operators of the nuclear launch system.

- Space and Cyber

US Space Command-operated Defense Support Program (DSP) satellites are called a “key part” of the early warning system. DSP satellites use an infrared sensor to detect heat from missiles and booster plumes to detect incoming missiles. Technological developments in censor design include above-the-horizon capability for full hemispheric coverage and improved resolution. It is reported that the Space Based Infrared System will replace DSP in the future.

- Bombers and DCA (Dual-Capable Aircraft)

Flexibility is the key characteristic of bombers capable of carrying nuclear weapons. For example, the B-52 STRATOFORTRESS is a long-range, heavy bomber capable of flying at high subsonic speeds at altitudes up to 50,000 feet (~15 167 meters) and can carry both nuclear and precision-guided conventional weapons with worldwide precision navigation capability. B-2 SPIRIT can also carry both conventional and nuclear weapons, and its “low-observable” (or “stealth”) characteristics make B-2 unique and most sophisticated bomber.

- Ballistic Missile Defense System

The Missile Defense System is designed to counter ballistic missiles of all ranges- short, medium, intermediate, and long. The Missile Defense System is, thus, designed as an integrated “layered” structure. It comprises 1) networked sensors, 2) ground- and sea-based interceptor missiles, and 3) a command, control, battle management, and communication network.

- Ballistic Missile Submarines (SSBN)

SSBNs assure the second-strike capability, which is an essential part of nuclear deterrence. SSBNs are also specifically designed to provide extended deterrent patrols. Ohio-class SSBNs can carry up to 20 submarine-launched ballistic missiles with multiple independently targeted warheads.

- Intercontinental Ballistic Missiles (ICBM)

ICBM is a strategic weapon with an intercontinental range and is an essential element of the national strategic deterrent forces under the control of the Air Force Global Strike Command. Minuteman III is the current generation of ICBM. A variety of communication systems can provide a direct and instantaneous connection between the President (or Secretary of Defense) and each launch crew. However, if communication capability is lost, specially designed E-6B airborne launch control center aircraft automatically assume command and control of the isolated

missiles.

- Department of Energy (DOE)/National Nuclear Security Administration (NNSA) Laboratories

NNSA was established by the US Congress in 2000 and is a semi-autonomous agency within DOE; its mission is to enhance national security through the military application of nuclear science and technology. NNSA can provide a technical base to sustain and improve nuclear deterrents.

The so-called "Nuclear Triad" (Air Bomber, ICBM, and SSBN) is known to be an essential part of the nuclear deterrent, but other technological systems supporting the Nuclear Triad are also essential parts of the nuclear deterrent system. The vulnerability of each component of the nuclear weapons system is also directly connected to the vulnerability of the nuclear deterrent.

6 Risk of Accidents

In highly complex technological systems like the NC3 system, there is always a risk of accidents, as proved by historical records. Table -1 lists the so-called "near-miss incident" for possible nuclear weapons use. In this table, there were three incidents: 1) the Quemoy-Matsu crisis during the second Taiwan Strait conflict in 1958, 2) the Okinawa incident during the Cuban missile crisis in 1963, and 3) the Korean DMZ crisis in 1976.[16] In all cases, nuclear weapons were directly involved in military operations during the conventional conflicts. It should be noted that once nuclear weapons are used, NC3 systems would likely fail due to potential impacts on computer and communication systems.

[16] For the Taiwan incident, see P. Hayes et al, *American Lake, Nuclear Peril in the Pacific, Penguin*, Melbourne 1987; for the August 1976 DMZ incident, see P. Hayes, Pacific Powderkeg, *American Nuclear Dilemmas in Korea*, Lexington Books, 1991, at: http://nautilus.org/wp-content/uploads/2011/04/PacificPowderkegbyPeterHayes.pdf ; for the 1962 Okinawa incident, see A. Tovish, "The Okinawa Missiles of October." *Bulletin of Atomic Scientists*,25 October 2015 at http://thebulletin.org/okinawa-missiles-october8826 and T. Tritten, "Cold War Missiles Refute Okinawa Near-Launch." *Stars and Stripes*, 23 December 2015 at: http://www.stripes.com/news/special-reports/features/cold-war-missileersrefute-okinawa-near-launch-1.385439.

Table 1 Incidents of near Nuclear Weapons Usage

Date	States involved	Incident & Cause
August 1958	China, US	Quemoy-Matsu Crisis: US contingent war planning has nuclear attack protocol
October 1962	US	Cuban missile crisis: Mistaken US Army order to launch missiles on Okinawa
October 1962	Soviet Union	Operation Anadyr, Cuban missile crisis: Submarine communication failure
Oct. 27, 1962	UK	Cuban missile crisis: British nuclear forces in conflict escalation
Oct. 27, 1962	US	Black Saturday, Cuban missile crisis: Conflict escalation and miscommunication
Nov. 22, 1962	Soviet Union	Penkovsky false warning: Soviet double agent tells UK of imminent attack
October 1973	Israel	1973 Arab–Israeli war: Conflict escalation as Israel considers nuclear event
August 1976	US	Korean DMZ Crisis: Pre-delegation of authority to restart Korean war
Nov. 9, 1979	US	NORAD: Soviet attack exercise scenario mistaken for reality
June 3, 1980	US	NORAD: Faulty computer chip sees warning system falsely report Soviet attack
Sept. 25, 1983	Soviet Union	Serpukhov-15: Technical error as Russian systems report five US ICBMs
Nov. 7-11, 1983	Soviet Union, US	Able Archer-83: Misperception of NATO training exercise
Aug. 18-21, 1991	Soviet Union	Failed coup: Loss of command and control structure
Jan. 25, 1995	Russia	Black Brant scare: Mistaken identity of research rocket launch
May-June 1999	India, Pakistan	Kargil crisis: Conflict escalation of military conflict over Kashmir
May 2002	India, Pakistan	Kashmir standoff: Conflict escalation at peak of new hostilities

Peter Hayes, "Nuclear Command, Control and Communication (NC3) in Asia-Pacific", NAPSNet Special Reports, September 21, 2021.
https://nautilus.org/napsnet/napsnet-special-reports/nuclear-command-control-and-communications-nc3-in-asia-pacific/

Eric Schlosser's famous book, "Command and Control" features one of the most dramatic nuclear missile accidents involving the Titan II missile in 1980 at Damascus, Arkansas.[17] The incident was later featured as a documentary film in 2017, and its producer and director Robert Kenner said during an interview with *The Verge*, "For me, the scariest statement in the film is [former Secretary of Defense] Harold Brown saying accidents are not unusual in the defense department, they happen every day."[18] Scott Sagan also concluded after research on nuclear weapon accidents that the "risks are even more probable than most analysts or policymakers are willing to admit" in his book entitled "The Limits of Safety" in 1993.[19]

Both Schlosser's and Sagan's conclusions were the age BEFORE the age of Cyber or AI. So, the risk analysis can be more complex and difficult.

[17] Eric Schlosser, "Command and Control: Nuclear Weapons, the Damascus Accident, and the illusion of Safety", Penguin Publishing Group, 2014.
[18] Rachel Becker, "Human error in a nuclear facility nearly destroyed Arkansas", *The Verge*, Jan. 11, 2017. https://www.theverge.com/2017/1/10/14232574/command-and-controll-titan-2-damascus-arkansas-nuclear-accident-1980.
[19] Scott Sagan, *The Limits of Safety: Organization, Accidents, and Nuclear Weapons*, Princeton University Press, 1993.

7 Risk of Cyber-attack

It was in the middle of the 1980s when the Hollywood movie "War Games" triggered the attention of US President Reagan regarding the possible risk of "hacking" into the US nuclear weapon system. That led to the first government report[20] on the vulnerability of US national security dependent on information technologies. But it was still the age of the analog system. Now, while increasing application of digital technologies can improve the safety and reliability of nuclear weapon systems, "cyber weapon" has become one of the major threats to nuclear weapon systems. What are the major risks caused by cyber-attacks against nuclear weapon systems?

First of all, the credibility of nuclear deterrence would be undermined by cyber-attacks, which could lead to a negative impact on so-called "strategic stability" among nuclear-armed states. The credibility of nuclear deterrence depends on the conviction that a nuclear weapon system would work reliably in retaliation against a possible enemy's nuclear attack. A possible cyber-attack could undermine such conviction. Unal and Lewis point out that NC3 can be vulnerable to cyber-attacks, which undermines the reliability of nuclear weapon systems.[21] Even a smaller nuclear-armed state could initiate a nuclear attack against the bigger nuclear-armed state with cyber weapons, which could damage their NC3 system. Supply chains of components of nuclear weapon systems could also be targets of cyber-attacks, which eventually undermine the reliability of nuclear weapon systems.

Second, some of the doctrines of nuclear-armed states suggest that cyber-attacks against not only nuclear weapon systems but also non-military targets, such as critical national infrastructures, may trigger nuclear weapon use in response to such attacks.[22] [23] It is possible that misinterpretation of possible cyber incidents or communication errors could trigger nuclear weapons use. Conventional warfare, which now involves information warfare, could also trigger a nuclear war. Wilson and Fitz argue that the current Ukraine-Russian conflict already involves cyber warfare, which could lead to nuclear war.[24]

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[20] The White House, "National Policy on Telecommunications and Automated Information Systems Security" (NSDD-145), 17 September 1984. https://fas.org/irp/offdocs/nsdd145.htm.

[21] Beyza Unal and Patricia Lewis, "Cybersecurity of Nuclear Weapons Systems: Threats, Vulnerabilities and Consequences," The Royal Institute of International Affairs, January 2018. https://www.chathamhouse.org/sites/default/files/publications/research/2018-01-11-cybersecurity nuclearweapons-unal-lewis-final.pdf.

[22] Wilfred Wan, Andraz Kastelic, and Eleanor Krabill, "The Cyber-Nuclear Nexus: Interactions and Risks," UNIDIR Report, *Nuclear Risk Reduction: Friction Points Series, Paper 2, 2021*. https://unidir.org/files/2021-11/NRR_CyberNuclear.pdf.

[23] For example, "US Office of the Secretary of Defense, "Nuclear Posture Review 2018", February 2018. https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF. Similar nuclear doctrines are now adopted by Russia and North Korea.

[24] Richard Wilson and Alexia Fitz, "Nuclear Weapons, Cyber Warfare, and Cyber Security: Ethical and Anticipated Ethical Issues," International Conferences on Cyber Warfare and Security, 18 (1): pp. 440-448, February 2023. https://www.researchgate.net/publication/368910546_Nuclear_Weapons_Cyber_Warfare_and_Cyber_Security_Ethical_and_Anticipated_Ethical_Issues.

Thirdly, escalation risk could be heightened due to the emergence of cyber weapons in the nuclear age. Acton argues that the following three possible escalation risks could be imminent[25]: 1) whether the cyber-attack is successful or not, due to the nature of cyber weapons, fear of cyber-attack, which could disable nuclear weapon systems, could lead to a premature nuclear strike; 2) misinterpret cyber-attack by non-state actors as a possible attack by a nuclear-armed state which could trigger a nuclear response; 3) virus in conventional weapon system could also undermine nuclear weapon systems.

Finally, due to the invisibility of cyber weapons, it is increasingly difficult to negotiate arms control and establish a credible deterrence strategy. The invisibility of cyber weapons is a major threat for security and disarmament experts to consider risk reduction measures.[26]

In response to increasing risks posed by cyber weapons, the Nuclear Threat Initiative (NTI) made specific policy recommendations by the experts from both the US and Russia, including the following: 1) Refrain from interfering with nuclear weapons and related systems, including nuclear command, control, communications, delivery, and warning systems; 2) Evaluate options to minimize entanglement and/or integration of conventional and nuclear assets; 3) Continue to improve the cybersecurity of their respective nuclear systems; 4) Increase transparency and expand communications during periods of increased tension; 5) Adopt procedures to ensure that any cyber, information, or other operation involving information and communications technologies emanating from the United States or Russia with the potential to disrupt another nation's nuclear deterrence mission be approved at the same level as required for nuclear use; and 6) Eliminate policies that threaten a nuclear weapons response to cyber-attack.[27]

While these recommendations are for the largest nuclear weapon states, Wilson and Fitz make broader recommendations involving non-nuclear weapon states that could be involved in cyber warfare. They recommend a stakeholder framework for identifying "the ethical and anticipated ethical issues with cyber warfare and nuclear warfare and relate these issues to the importance of cyber security."[28] This recommendation is important as the risk of cyber-attacks can and should be reduced by non-nuclear armed states.

8 Risk of Applying AI to Nuclear Weapon Systems

Another emerging risk is the impact of applying Artificial Intelligence (AI) to Nuclear Weapons

[25] James Acton, "Cyber Warfare & Inadvertent Escalation," *Daedalus*, Vol. 149, No.2, Spring, 2020, pp. 133-149. Daedalus, http://www.jstor.org/stable/485791317?seq=1.
[26] Fred Kaplan, "Dark Territory: The Secret of Cyber War," Simon & Shuster, 2016.
[27] Nuclear Threat Initiative (NTI), "Reducing Cyber Risks to Nuclear Weapons: Proposals from a U.S.-Russia Expert Dialogue", September 2023. https://www.nti.org/wp-content/uploads/2023/09/FINAL-Reducing-Cyber-Risks-to-Nuclear-Weapons_9.15.pdf.
[28] Richard Wilson and Alexia Fitz, "Nuclear Weapons, Cyber Warfare, and Cyber Security: Ethical and Anticipated Ethical Issues," International Conferences on Cyber Warfare and Security, 18 (1): pp. 440-448, February 2023.

Systems. There is an increasing concern that the application of AI to nuclear weapon systems could lead to catastrophic risks.[29] Stockholm International Peace Research Institute (SIPRI) published a series of reports on the impact of AI on strategic stability with more cautious views. The final report published in 2020 concludes the following[30]: 1) Advances in machine learning and autonomy, which are the major components of AI, could unlock new and varied possibilities for a wide array of nuclear force-related capabilities; 2)While the incorporation of AI into nuclear weapon systems is likely to be slow and steady, such adoption could have both stabilizing and destabilizing effects on strategic stability; 3) AI can have an impact on strategic stability even before they are fully developed; 4) AI could fail or be misused in ways that could trigger an accidental or inadvertent escalation of a crisis or conflict into a nuclear conflict.

The last point is important, as in the case of cyber warfare. AI has already been used in ongoing conventional Ukraine/Russia conflicts.[31] Johnson also concludes that incorporating AI could increase the risk of escalation between nuclear-armed adversaries during a conventional crisis or conflict. For example, the "security dilemma" theory ties in with the "capability/vulnerability paradox" in international relations, and the potential impact of such a paradox has increased in the context of the "information revolution" such as cyber and AI. Similarly, the confusion and uncertainty associated with the "fog of war" can increase inadvertent risk because of "misperception, misunderstandings, poor communications, and unauthorized or unrestrained offensive operations" and applying AI to the conventional- weapons domain or even part of the nuclear weapon system could increase such uncertainty.[32]

Johnson also concludes the following important points in his recent book, *AI and the Bomb*.[33]

1) The impact of AI technology is unlikely to have a significant qualitative impact on nuclear C2 (communication and control), which has synthesized automation but not autonomy.
2) AI's impact on states' nuclear strategy will depend on adversaries' perceptions of its capabilities and what a particular AI-powered application can do.
3) While human agency will limit AI's role in the nuclear domain for the foreseeable future, it

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[29] Zachary Kallenborn, "Giving an AI control of nuclear weapons: What could possibly wrong?", Bulletin of the Atomic Scientists, February 1, 2023. https://thebulletin.org/2022/02/giving-an-ai-control-of-nuclear-weapons-what-could-possibly-go-wrong/.

[30] Vincent Boulanin, Lora Saalman, Petr Topychakonov, Fei Su and Moa Peldan Carlsson, "Artificial Intelligence, Strategic Stability and Nuclear Risk", June 2020. https://www.sipri.org/sites/default/files/2020-06/artificial_intelligence_strategic_stability_and_nuclear_risk.pdf.

[31] The Economist, "How Ukraine is using AI to fight Russia: From target hunting to catching sanctions-busters, its war is increasingly high-tech", April 8, 2024. https://www.economist.com/science-and-technology/2024/04/08/how-ukraine-is-using-ai-to-fight-russia.

[32] James Johnson, "Inadvertent escalation in the age of intelligence machines: A new model for nuclear risk in the digital age," *European Journal of International Security (EJIS),* Cambridge Core, Cambridge University Press, 15 October 2021. https://www.cambridge.org/core/journals/european-journal-of-international-security/article/inadvertent-escalation-in-the-age-of-intelligence-machines-a-new-model-for-nuclear-risk-in-the-digital-age/D1F1FC47D12FA4DCB12D1648412B696B.

[33] James Johnson, *AI and the Bomb: NuclearSstrategy and Risk in the Digital Age*, Oxford University Press, UK, 2023.

may still influence strategic decisions involving nuclear weapons. Escalations that begin at a *tactical level* can have *strategic effects,* generating inadvertent escalation risk caused by accidents, disinformation, or misperception.

4) Regional-based deterrence assumptions are becoming obsolete in the age of AI. In a multipolar nuclear world, with imperfect information about the balance of power and resolve, incentives, as well as new tools to misrepresent and manipulate others' perceptions and emotions of the information landscape, which would be accelerated by the introduction of AI, the risk of nuclear use increases.
5) AI is creating new and disrupting old rungs on the escalation ladder. While nuclear states have a mutual interest in avoiding nuclear ware, they tend to place a high value on their nuclear forces, which AI-enhanced conventional counterforce weapons increasingly threaten.
6) AI creates new tools and novel pathways for third-party actors to spark accidental nuclear war. There are three important emerging features in the digital age, they are: Information complexity, greater automation of NC3 systems, and information manipulation disinformation. They are, in essence, complicating nuclear crisis management. And possible third-party actors could exploit these complex situations.

In sum, while it seems that AI has not been employed as a key decision-making tool in nuclear weapon systems, it has already made nuclear deterrence strategies much more uncertain and complex. As a result, the risk of nuclear weapon use has increased further.

9 Conclusion

Risk analysis of nuclear weapon systems has typically been focused on the humanitarian consequences of nuclear weapons use, i.e., it focuses on the risk AFTER nuclear weapons are used. Risk analysis of nuclear deterrence should focus on risk BEFORE nuclear weapons are used. Nuclear deterrence is a political theory, but in reality, it depends on highly sophisticated, complex technological systems. The so-called NC3 system (Nuclear Command, Control, and Communication system) is essential to maintain the credibility of nuclear deterrence. Therefore, risk assessment of nuclear deterrence would inevitably assess the risk of complex technological subsystems supporting nuclear weapon systems. In other words, scientific and technological assessment is essential, along with social/political assessment of international relations, to assess the risk of nuclear deterrence.

Scientific and technical advice in policy decision-making is, in general, also critical. National security policy, most notably nuclear weapons policy, is no exception. However, unlike many other international issues, such as environmental and health policy, there is no international scientific advisory organization on nuclear disarmament and arms control. Therefore, establishing SAG under the TPNW is a milestone in this field. The mission given to the SAG is also unprecedented, as it focuses on the risk assessment of nuclear deterrence.

As we discussed above, in this new digital age and the rapid development of so-called disruptive technologies, the role of SAG in nuclear disarmament is critically important. In this chapter, cyber and AI technologies are cited as examples of such technologies to illustrate how disruptive technologies could undermine the credibility of the nuclear deterrence system. Security policies highly dependent on nuclear deterrence could increase the risk of nuclear weapons use due to the increasing uncertainties involving disruptive technologies. Again, it should be noted here as a concluding remark.

"Science without policy is science, but policy without science is gambling."

III. Discussions and Issues on Victim Assistance in the TPNW

Toshinori Yamada

1 Introduction

The Treaty on the Prohibition of Nuclear Weapons (TPNW) contains provisions for providing assistance to victims of the use or testing of nuclear weapons (hereafter referred to as nuclear victims) and for remediating the environment in areas contaminated by related activities (Articles 6 and 7). These provisions are called "positive obligations," in contrast to the negative obligation prohibiting the use or threat of nuclear weapons, etc., as provided for in Article 1. They are a crucial aspect of the TPNW's effectiveness.

The effectiveness of the TPNW is occasionally called into question because no nuclear-weapon states are parties to the treaty.[1] However, an examination of Articles 6 and 7 reveals that countries with nuclear victims, such as Kazakhstan and Kiribati, are parties to the treaty. In terms of the treaty's positive obligations, the TPNW can be considered fully effective in promoting assistance to nuclear victims. Therefore, the implementation of Articles 6 and 7 is of great importance.

In this paper, we will refer to the Policy Proposal by Nagasaki University in April 2022 (hereinafter referred to as the Nagasaki University Proposal)[2] to examine the discussion surrounding Articles 6 and 7, focusing on the issue of assistance for nuclear victims. We will then point out some issues and make some recommendations.

2 Overview of Articles 6 and 7

First, the TPNW requires that States Parties that have jurisdiction over individuals affected by the use or testing of nuclear weapons provide assistance to these individuals (Article 6 (1)). It also requires States Parties that have jurisdiction or control over areas contaminated as a result of activities related to the testing or use of nuclear weapons to take measures for the environmental remediation of those areas (Article 6 (2)). Second, other States Parties ("[e]ach States Parties in a position to do so") are obligated to provide assistance to the above-mentioned States Parties through international cooperation (Article 7 (3)) and to provide assistance for nuclear victims (Article 7 (4)). It is noteworthy that Article 7 (4), does not limit the location of nuclear victims

[1] For example, the P5 criticize the TPNW for not reducing any nuclear weapons. See the P5 Joint Statement at the First Committee of the UN General Assembly on October 27, 2021, available at https://reachingcriticalwill.org/images/documents/Disarmament-fora/1com/1com21/eov/L17_P5.pdf, last visited on June 11, 2024.

[2] Nagasaki University, "Policy Proposal for Support to Radiation Victims in accordance with the Treaty on the Prohibition of Nuclear Weapons," Research Center for Nuclear Weapons Abolition (RECNA), April 2022, available at http://hdl.handle.net/10069/00041393, last visited on June 11, 2024.

who can receive assistance, and it can be interpreted that nuclear victims in non-States Parties are also covered. Third, States Parties that have used or tested nuclear weapons shall also have a responsibility for providing assistance to the above-mentioned States for victim assistance and environmental remediation (Article 7 (6)).

In this way, the TPNW has a mechanism of "shared responsibility," in which the so-called "victim states" that have victims and contaminated areas are the first to bear the burden of victim assistance and environmental remediation, and other state parties assist these victim states through international cooperation.[3] This mechanism is characteristic of treaties based on the idea of humanitarian disarmament that preceded the TPNW (particularly the Convention on Cluster Munitions (CCM)). Here, we can see a victim-centered approach, in which the state closest to the victims is responsible for redressing the human rights violated by the damage caused by prohibited weapons. The CCM was established under the influence of the Convention on the Rights of Persons with Disabilities, a human rights treaty (CCM Preamble 9). The TPNW, which is modeled on the CCM, also reaffirms the need to comply with international human rights law (TPNW Preamble 8) and refers to the provision of assistance in accordance with international human rights law (Article 6 (1)).

However, there were persistent voices calling for the responsibility of the "perpetrator states" at the TPNW negotiating conference, and as a result, the provision of Article 7 (6) was inserted. Nevertheless, this clause applies only to the "state parties" that have used or tested nuclear weapons, and does not impose responsibility on non-signatory perpetrator states. For example, in the case of the United States, which dropped the atomic bombs, the responsibility for providing assistance under this clause will only arise for the United States if it becomes a state party to the TPNW. There is a concern that this clause may be a factor that makes "perpetrator states" hesitant to join the TPNW (see below). However, as can be seen from the proviso that the clause states "without prejudice to any other duty or obligations that [such State Party] may have under international law," the clause does not deny the responsibility of non-signatory states. This is left to the interpretation of general international law that is outside the TPNW.

3 The Vienna Action Plan

The Vienna Action Plan adopted at the First Meeting of States Parties (1MSP) in June 2022 committed to taking the following actions regarding victim assistance and environmental remediation.[4]

First, it clearly stated that the purpose of the Plan is to address past, ongoing and future nuclear

[3] Bonnie Docherty, "From Obligation to Action: Advancing Victim Assistance and Environmental Remediation at the First Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons," *Journal for Peace and Nuclear Disarmament*, 3(2), 2020, p. 254.
[4] Vienna Action Plan, TPNW/MSP/2022/6, Annex II.

harm, and stipulated that stakeholders and affected communities would be consulted, engaged and informed (Action 19).

Second, the principles of assistance were confirmed as accessibility, inclusivity, non-discrimination and transparency, and victim assistance based on cooperation with affected communities, consideration for women and indigenous peoples, and consideration for age and gender was confirmed (Action 25). This almost completely reaffirms the elements stipulated in the Treaty, and is significant as a basic direction for future assistance measures, but further elaboration is a matter. First of all, unlike the CCM, the TPNW does not include definitions of terms due to consideration of its relationship with the NPT. The definition of victims in the CCM (Article 2 (1)) can be used as a reference, but the definition of nuclear victims includes many controversial elements, such as the effects of radiation. The Action Plan avoided a simple definition of "victims" and emphasized cooperation and inclusiveness with stakeholders. The fact that it includes the possibility of providing a wide range of assistance was welcomed by the victims of nuclear weapons and civil society, but attention must also be paid to the factor of avoiding the burden of assistance for State Parties.

Third, with regard to mechanisms for monitoring the implementation by States Parties, it stipulated the developing of guidelines and reporting formats for voluntary reporting (Actions 27 and 28), and called for the completion of an initial assessment of the effects of nuclear weapons use and testing by the Second Meeting of the States Parties (2MSP) (Action 30), and the developing of national plans and reporting to the 2MSP (Action 31). The challenge is to build a mechanism for international monitoring of the implementation of these items as a foundation.

Fourth, from the perspective of building an assistance system by other States Parties, it stipulated the coordination and development of international assistance mechanisms and the formulation of an implementation framework for international cooperation (Actions 23 and 24). It also stipulated consideration of an international trust fund (Action 29). It was stipulated that the actions of States Parties in a position to do so are based on the obligations under Article 7 (3) of the Treaty, and there is no reference to Article 7 (4) (Action 32). However, the reference to the international trust fund was not limited to States Parties that have been affected by the use or testing of nuclear weapons (Action 29). The issue of how to deal with nuclear victims located in non-States Parties to the TPNW remained to be resolved.

Fifth, with regard to States that have used or tested nuclear weapons, it was resolved to engage and promote information exchange on the provision of assistance with those States that are currently not States Parties to the TPNW (Action 20).

In the 1MSP, an intersessional mechanism was established, and an informal working group co-chaired by Kazakhstan and Kiribati was set up with regard to Articles 6 and 7 to advance work on three areas: (1) national implementation measures, (2) reporting, and (3) the feasibility of and

possible guidelines for a voluntary trust fund.[5]

4 Discussions at the Second Meeting of States Parties

At the 2MSP in November and December 2023, the continued implementation of the Vienna Action Plan was confirmed (the Declaration of 2MSP, para. 35), and two decisions were adopted regarding victim assistance.[6]

The first was regarding voluntary reporting on Articles 6 and 7, and decided to provisionally adopt the reporting guidelines and reporting format submitted by Kazakhstan and Kiribati for voluntary use by States Parties, and also recommended continuing to review these guidelines and formats for further improvement (Decision 3).

The second was regarding an international trust fund for victim assistance and environmental remediation, and decided to intensively discuss the feasibility and guidelines for establishing this fund in the informal working group on Articles 6 and 7, and to submit recommendations on this matter to the Third Meeting of States Parties (3MSP) (Decision 4).

In addition, the following discussions were held at the 2MSP regarding victim assistance and environmental remediation.[7]

A Current Status of Nuclear Damage

Kazakhstan and New Zealand submitted reports on nuclear victims and contaminated environments respectively.[8] The Scientific Advisory Group (SAG) report also mentioned research on nuclear damage.[9] In addition, the participating countries and civil society made statements about their respective nuclear damage. However, these do not necessarily cover all damage caused by the use and testing of nuclear weapons. It is noteworthy that the damage is not limited to radiation damage, that there are concerns about the impact on future generations, that the impact on indigenous peoples is mentioned, that damage in non-signatory countries is also claimed, and that damage not necessarily caused by the use and testing of nuclear weapons is claimed. The fact that such diverse aspects of nuclear damage have been pointed out will contribute to the formation of a comprehensive definition of nuclear victims in the future.

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[5] For information about activities during the session, see "Intersessional Progress on the TPNW," on the website of ICAN, available at https://www.icanw.org/tpnw_intersessional_work, last visited on June 11, 2024.
[6] Report of the second Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons, Annex I and II.
[7] The following summary of the positions taken by participants at the 2MSP is based primarily on reports and working papers submitted to the 2MSP, and statements made at the general debate (4th to 6th meetings) and on victim assistance, environmental remediation, and international cooperation and assistance (7th and 8th meetings).
[8] TPNW/MSP/2023/10 (Kazakhstan) and TPNW/MSP/2023/11(New Zealand).
[9] TPNW/MSP/2023/8.

B The Significance of Articles 6 and 7

Many states parties and civil society have referred to the humanitarian objectives of Articles 6 and 7 or the Treaty itself, and there is no disagreement that victim assistance and environmental remediation are necessary from a humanitarian perspective. Civil society (Article 36 and ICAN) and some countries (Nepal) have referred to the rights-based approach or the rights of victims. These views position Articles 6 and 7 from the perspective of human rights protection, which is closely related to humanitarianism but is strictly speaking different, but these claims have not necessarily been put forward.

In addition, views have been expressed that understand the significance of victim assistance as social inclusion. In other words, they claim that it can return local communities that have suffered nuclear damage to the path of integral development (Vatican), or that it is meaningful in rectifying the harms suffered by socially marginalized vulnerable people (Ireland).[10]

Furthermore, views have been expressed from civil society that refer to the relationship between assistance for nuclear victims and the abolition of nuclear weapons, as pointed out in the Nagasaki University Proposal.[11] For example, some argue that the ongoing humanitarian and environmental impacts of nuclear weapons are key evidence that they must be stigmatised and eliminated (Article 36), or that victims' testimonies are what shape a taboo against nuclear weapons, effectively "deterring" their development, testing, production, manufacture, use, and proliferation (Study Group of Nuclear Victim Assistance Systems: SGNVAS).

However, doubts have also been raised about Articles 6 and 7. The Marshall Islands (non-signatory), a country that has suffered from nuclear testing has raised the issue of the responsibility of the user and test states, and has shown a reluctant attitude toward becoming a state party and assuming the burden of Article 6. In response, civil society has expressed the view that it supports the current provisions of the treaty and places importance on the realization of victims' rights, based on the understanding that the excessive burden on victim states under Article 6 will be shared by other states, international organizations, and civil society (Civil Society Joint Statement).

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[10] Based on humanitarianism, which focuses on human suffering and the need to alleviate it, it is a natural consequence of asserting the need or responsibility to provide assistance and relief to nuclear victims. Humanitarian disarmament can be said to present an alternative to framing disarmament from the perspective of national security. For a reference on efforts that utilize international human rights mechanisms in contrast to humanitarian disarmament, see Treasa Dunworth, *Humanitarian Disarmament: An Historical Enquiry*, CUP, 2020, p. 33, and pp. 396-402.

[11] See *supra* note 2, p. 7. "As stated in the preamble to the TPNW, there is a need to recognize the status of people who have suffered injuries from nuclear explosions. It is only by promoting their relief that we will be able to gain full awareness of the intolerable pain that is caused by nuclear weapon usage and testing, as well as recognize both the unlawfulness and inhumanity of those weapons. Moreover, the acknowledgment of these experiences may be a critical factor in persuading the international community to recognize the importance of abolishing nuclear weapons. In sum, the combined activism of civil society, nation states, and international organizations is expected to raise international awareness about the importance of the humanitarian aspect of the use or threat of use of nuclear weapons."

In this regard, the participation of user and test states in TPNW will be an issue. From the perspective of universalizing the treaty, these countries have been called upon to sign and ratify the TPNW from the beginning (Declaration of 1MSP).[12] However, there has been no similar appeal based on the necessity of providing assistance to nuclear victims. In the first place, for nuclear-weapon states, accepting the norm of prohibition of nuclear weapons in Article 1 is more critical than the burden of providing assistance under Article 7 (6). Furthermore, it is expected that countries that have made the major policy decision to accept the prohibition norm of the TPNW would also actively engage in providing assistance to nuclear victims. From this point of view, Article 7 (6) is unlikely to immediately become an obstacle to nuclear-weapon states joining the TPNW. In any case, there is a certain degree of latitude in the interpretation of the nature, scope, and content of the responsibility under Article 7 (6), and this issue will become more apparent as the participation of nuclear-weapon states in the treaty becomes more realistic.

C Definition and Scope of Victims

Under the present circumstances, there is no attempt to clearly define those who are eligible for assistance under Article 6 (1) as in the CCM. The Vienna Action Plan refers to "communities," which are not included in the article, and since then, many States Parties have also mentioned them in the 2MSP. There is no disagreement that indigenous peoples are also eligible. In this way, through the discussions of the MSPs, a consensus has gradually been formed on the extension of the concept of victims who should be provided with assistance. The issue for the future is to determine the extent to which nuclear victims should be included as eligible for assistance, such as victims of nuclear weapons-related activities like uranium mining, nuclear victims in non-State Parties, and second and third generations of victims.

D Necessity of Investigation

In relation to the above, the need for detailed investigations has been pointed out in terms of clarifying the nuclear damage (ICRC, Costa Rica and Peace Boat). There are also voices calling for disclosure of information by nuclear testing states (Article 36, Nuclear Truth Project and Fellows of the Arms Control Negotiation Academy). At the same time, there are also voices calling for assistance with independent reviews (Fiji). On the other hand, there are also views expressed that emphasize the memories and records of affected local communities (Nuclear Truth Project and SGNVAS).

In this regard, the Nagasaki University Proposal pointed out the importance of evaluating radiation exposure doses, and called for some kind of radiation exposure dose estimation system,

[12] Declaration of the first Meeting of States Parties to the Treaty on the Prohibition of Nuclear Weapons, TPNW/MSP/2022/6, Annex I, para. 15.

making specific recommendations for preliminary arrangements. In addition, it stated that case studies and information sharing are essential for understanding the respective institutional conditions.

E Methods and Contents of Assistance

First, it is called for the promotion of the development and implementation of national plans by the recipient countries (Costa Rica, Kiribati, and Joint Statement of Civil Society). More concrete responses have been proposed by civil society (Manhattan Project and Article 36). Kazakhstan and Kiribati (as well as Austria) have also mentioned non-financial assistance.

The Nagasaki University Proposal called for the formulation of assistance guidelines, categorizing support approaches by types. While the proposal focused on relief for radiation victims, some have mentioned the need to address non-radiation damage (evacuation/relocation, atomic bomb orphans, psychological effects, etc.) (SAG, ICRC, Vatican and Peace Boat).

F International Cooperation

In relation to the international cooperation stipulated in Article 7, some have pointed out the need to strengthen international cooperation and assistance (Kiribati, ICAN, Joint Statement of Civil Society and International Human Rights Clinic). Some have emphasized that the article is not limited to financial assistance (Manhattan Project and Cuba). In addition, the possibility of cooperation from international organizations (IAEA and CTBTO Preparatory Commission) has been discussed (Austria and Kazakhstan).

G Voluntary Reporting

Many participants supported the reporting format proposed by Kazakhstan and Kiribati, which led to its provisional adoption at 2MSP. Cuba, however, requested that no further burdens should be imposed on countries that are not affected. In light of the claims of civil society, the format may have some shortcomings, and appropriate revisions will be required in the future.

Although an initial assessment was to be reported to 2MSP (Action 30), in reality, only Kazakhstan and New Zealand submitted voluntary reports, and Kazakhstan did not use the format it proposed. The content of Kazakhstan's report also focuses on the effects of radiation, with a little reference to the issue of migration after nuclear testing. New Zealand's report also only reports on victim assistance, and from the perspective of understanding the extent of the effects of nuclear testing in the Pacific, it cannot be said to be complete. The issue is how much of the full extent of the nuclear damage will become clear through voluntary reporting. Another issue for the future is to establish a mechanism within the MSPs to review each country's voluntary reports. In particular, it would be wise to consider utilizing the advice of the SAG, including the

appropriateness of the damage assessment method.

H International Trust Fund

The co-chairs of the Working Group (Kazakhstan and Kiribati) had already presented questions regarding the establishment of the fund before the 2MSP, listened to the opinions of states and NGOs, and submitted the report.

In the 2MSP, many states and NGOs expressed the need for deeper discussion. They also pointed out the need to expand and secure resources (ICAN, Switzerland). Regarding contributors to the fund, the Nagasaki University Proposal proposed an approach similar to the way in which COVID-19 vaccines are supplied. In the same way, there are views that it should be expanded to non-signatory countries and the private sector (Know Nukes Tokyo, Vatican, Peace Boat). Limiting contributors to the State Parties could create a situation in which countries considering ratification hesitate to ratify for financial reasons, as the Nagasaki University Proposal fears. There was also concern that contributions from user and testing states could be used as an excuse to avoid joining the TPNW (Fiji). This point is also linked to the issue of relations with non-State Parties (next section).

Regarding recipients of Fund grants, just as with the aid recipients mentioned above, civil society has called for grants to be provided to victims in non-signatory countries (SPARK/IALANA, Peace Boat, Reverse the Trend (RTT)).

Regarding the scope of grants, in line with the provisions of the treaty, victim assistance and decontamination of the natural environment are considered (ICRC). However, ideas such as technical assistance and consultation support have also been raised (Kazakhstan). There has also been a call for grants for research projects (Peace Boat).

An opinion has been expressed that the decision on fund allocation should be left to the discretion of the State Parties (Vatican).

I Relationship with Non-Parties

Some non-State Parties expressed interest in cooperation in victim assistance and environmental remediation (Germany, Switzerland, Marshall Islands). However, it is unclear whether this will be through the Trust Fund. They have only mentioned cooperation in the NPT (Switzerland) and expressed support for certain project work (Germany). In both cases, the major issue is to consider a method of cooperation that incorporates the intentions of these countries.

Resolution 78/240, submitted by Kazakhstan and Kiribati to the UN General Assembly just prior to the 2MSP, (1) encourages international cooperation and discussion on nuclear victim assistance

and environmental remediation, (2) urges that Member States, which have used or tested nuclear weapons, to share information on humanitarian and environmental consequences, and calls upon Member States, in a position to do so, to contribute technical and financial assistance, and (3) recognizes that the responsibility to address the harms resulting from a detonation of using or testing a nuclear weapon lies, respectively, with the Member States that have done so.[13] It was adopted by a large majority.[14]

However, the resolution does not necessarily call for efforts based on the TPNW. There is a need to establish a mechanism that allows cooperation with non-signatory states, not just through the work of the International Trust Fund. The assistance provided by the TPNW is not limited to financial assistance. Assistance provided to individual victims includes medical care, rehabilitation and psychological assistance (Article 6 (1)), and international cooperation and assistance includes technical and material assistance (Article 7 (3)). Several countries in the 2MSP also mentioned technical assistance, medical assistance and consultation support (Kazakhstan, Austria, etc.). It can be said that there is a lot of room for non-signatory states with a track record of providing support to atomic bomb victims, such as Japan, to contribute to non-financial aspects, such as providing medical data and medical assistance.

J Modalities and Current Status of Work

Regarding the status of work, it has been pointed out that no concrete progress has been made (Austria, Costa Rica). It will be necessary to accelerate the work.

Many countries have pointed out the need to include affected local communities, indigenous peoples, women, young people and other stakeholders. It is hoped that this will be achieved further within the intersessional mechanism.

In addition, the informal working group is currently being held intermittently under the leadership of Kazakhstan and Kiribati, who will continue to serve as co-chairs towards the 3MSP, and discussions are progressing, particularly regarding the international trust fund.

5 Conclusion and Recommendations

Based on the preceding considerations, the following issues and suggestions are presented for future consideration.

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[13] United Nations General Assembly Resolution 78/240, “Addressing the legacy of nuclear weapons: providing victim assistance and environmental remediation to Member States affected by the use or testing of nuclear weapons,” A/RES/78/240, adopted on 22 December 2023.

[14] The vote at the UN General Assembly plenary meeting on December 22, 2023 was 161-4-6, with the Democratic People's Republic of Korea, France, Russia, and the UK voting against. The abstentions were China, India, Israel, Pakistan, South Sudan, and the US. Japan voted in favor.

(1) Promoting understanding of the Actual State of Nuclear Damage and the Needs of Victims

Firstly, it is necessary for states parties to submit more voluntary reports on the assessment of nuclear damage. The provisional reporting format was only recently adopted by the 2MSP, and the actual number of reports is relatively limited. It is anticipated that further reports will be forthcoming in the future. Information provided by non-state parties should also be welcomed.

Secondly, it is recommended that reports from nuclear victims themselves and civil society be encouraged. This will facilitate the acquisition of information on the actual state and needs that are not reflected in the voluntary reports of states parties mentioned above. Attention should be paid not only to radiation damage but also to non-radiation damage as the whole state of damage. For example, attention should be paid to the existence of indigenous peoples who have lost their ancestral sacred land and victims whose communities have been destroyed by nuclear testing. In preparing their reports, civil society groups should first utilize the provisionally adopted format, and then add additional information that is not fully reflected to the report, which will clarify areas for improvement in the reporting format itself.

In addition, in future MSPs, a "Nuclear Victims Forum" (tentative name) should be convened in accordance with the objectives set forth in Article 7 (4) of the TPNW. The forum should actively consider reports from victims, including non-state parties and related civil society organizations.[15] At the same time, it is necessary to listen to the voices of victims who find it difficult to report. For this reason, in preparation for the above-mentioned MSP "Nuclear Victims Forum," various voices should be collected through regional holding of the forum around the world and outreach.

Furthermore, in order to encourage the involvement of non-state parties in this "Nuclear Victims Forum," it should not only be held within the MSP (for example, as a thematic discussion), but also outside the MSP on a date close to that of the MSP, and should be held based on a UN General Assembly resolution.

Finally, it is necessary to request information disclosure from nuclear weapon user and nuclear testing states. This has already been confirmed in the Action Plan, pointed out in the 2MSP, and called for in the aforementioned UN General Assembly resolution. Information disclosure by these states is essential to accurately understand the actual state of nuclear damage.

(2) Promoting Actual Victim Assistance and Environmental Remediation

This is primarily an obligation of the State Parties that have victims or contaminated areas under

[15] Similar recommendations were made by civil society in the 2MSP. See Working Paper submitted by the Study Group of Nuclear Victim Assistance Systems, TPNW/MSP/2023/NGO/11, paras. 4-10.

their jurisdiction. These countries are requested to promote the work of assistance and remediation. The current status of this work needs to be clarified through the above-mentioned voluntary reports and communications from victims, and it must be evaluated in the light of Article 6 of the TPNW.

In the MSP, while avoiding a clear definition of the concept of “victims” (connotation) who are the recipients of assistance, the work appears to be moving in the direction of clarifying points of agreement through discussion regarding the extension of the concept of victims. As a result, for example, there is consensus on the inclusion of “communities.” This approach to problem-solving is unavoidable given the multifaceted nature of nuclear damage. However, there are some discrepancies regarding scientific knowledge about nuclear damage (radiation damage), and careless definition may undermine inclusiveness. This issue requires careful consideration.

Conversely, the evaluation criteria for assistance and remediation work have yet to be refined beyond the wording of Article 6, as outlined in the Action Plan and Declarations to date. It is anticipated that as future investigations into the current status of assistance and remediation and the needs of victims progress, these will be discussed and clarified. It is important to emphasize that the perspective of international human rights law should be viewed as “as a common standard of achievement for all peoples and all nations” (Preamble to the Universal Declaration of Human Rights). The treaty makes reference to international human rights law (Preamble and Article 6). However, there is no mention of the “right…of…victims" as seen in the Convention on Cluster Munitions. Furthermore, this topic is not extensively discussed in the statements of states parties at the MSP.

Assistance to nuclear victims should be reaffirmed from the perspective of human rights. Civil society and states parties should aim to develop a “Declaration on the Rights of Nuclear Victims” that clarifies the rights of nuclear victims from the perspective of existing international human rights law and international humanitarian law, based on an understanding of the actual damage and needs. This “Declaration” will serve as a standard for evaluating the current state of assistance to nuclear victims and as a guiding star for further progress. Moreover, as will be discussed subsequently, if the objective is to engage non-state parties, it is advisable to pursue this endeavor with the intention of presenting it for adoption at the UN General Assembly. It is anticipated that the evaluation criteria for assistance and remediation will be refined through this process.

(3) Establishing the Effective Operation of the Victim State Assistance Mechanism based on Article 7

Some non-State Parties are reluctant to become parties due to the obligation to provide assistance under Article 6. It is therefore necessary to demonstrate the effectiveness of this mechanism in order to address this concern.

Firstly, it is essential to confirm that the assistance measures currently in place in countries that may become Parties to Article 6 will be duly evaluated as national implementation measures. Furthermore, it is vital to reaffirm that, as stated in Article 6 (3), the rights and obligations of other non-State Parties will remain unaffected. In other words, if some agreement (rights and obligations) regarding assistance has already been reached with other countries (non-Parties), even if they subsequently join the TPNW, those rights and obligations will remain unaffected, and they will continue to receive assistance as before.

Secondly, the Action Plan expresses a commitment to assistance under Article 7 (3) and it is necessary to ensure that this commitment is fulfilled (Action 32). In this regard, it can be argued that the establishment of an international trust fund is a crucial step. It is essential that the fund be of a sufficient size and contain appropriate resources to attract the interest of non-state parties who are reluctant to become parties. For instance, for countries that may become Article 6 States Parties, the amount of assistance provided by the Fund must be substantial enough to offset the burden of providing assistance to nuclear victims in their own countries, while also ensuring that the amount does not compete with other international assistance already being provided.

In addition, the wording of Article 7 (4) indicates that each State Party is obliged to provide assistance for victims in non-State Parties, should they be "in a position to do so". The Action Plan does not mention this point, which could be interpreted as an indication of reluctance on the part of State Parties. However, it is understood that the Trust Fund is intended to cover any "states that have been affected" (Action 29). It is true that the needs of nuclear victims in non-State Parties are expressed in the 2MSP. It is imperative to take action in accordance with Article 7 (4) without impeding the incentives of non-state parties to join the Treaty. In this regard, it is noteworthy that in the discussions surrounding the Fund, while priority was given to victims in State Parties, assistance to victims in non-State Parties has also been proposed.[16]

(4) Considering the Implications of Assistance and Remediation on the Universalization of the Treaty

Firstly, as confirmed in the Action Plan, universalization does not only mean expanding the number of States Parties, but also "promoting the underlying rationale of the total elimination of nuclear weapons" in non-States Parties (para. 6). As the Nagasaki University Proposal indicated, and as civil society organizations have asserted in the 2MSP, addressing the need for humanitarian victim assistance and environmental remediation could facilitate the universalization of the treaty and, ultimately, the realization of nuclear weapon abolition (see III, B above). It is also important

[16] Harvard Law School International Human Rights Clinic, DESIGNING A TRUST FUND FOR THE TREATY ON THE PROHIBITION OF NUCLEAR WEAPONS: PRECEDENTS AND PROPOSALS, January 2023, available at https://humanrightsclinic.law.harvard.edu/wp-content/uploads/2023/01/011323_Trust-Fund-Report-Combined.pdf, last visited on 4 June 2024.

to consider that discussing the linear link between relief for nuclear victims and the strengthening of the norms prohibiting nuclear weapons could potentially alienate cooperation in providing nuclear victim assistance from non-States Parties that rely on nuclear weapons. However, as demonstrated subsequently, there is also a certain degree of support for nuclear victim assistance from NATO member states and others. Given that NATO is opposed to the TPNW, these countries appear to differentiate between nuclear victim assistance and the strengthening of the norms prohibiting nuclear weapons.

Secondly, we should build cooperative relationships with non-States Parties regarding this issue. Non-States Parties have already shown interest and support. There are countries such as Germany and Switzerland that are showing enthusiasm and interest, and the UN General Assembly resolution proposed by Kazakhstan and Kiribati mentioned above has the support of the majority.[17] It is also believed that there is a certain degree of agreement in the NPT.[18] Assistance to nuclear victims and environmental remediation are being recognized as common humanitarian issues that go beyond the framework of the TPNW. With the support of these countries as a backdrop, we should aim to establish a mechanism in which these countries can be involved. The UN General Assembly resolution already requires a Secretary-General's report that contains the views of member states. We should also pursue the collection of information on the current status of assistance and remediation by non-TPNW signatory countries in the UN Secretariat (Office for Disarmament Affairs).

In addition to the aforementioned work of developing the "Declaration on the Rights of Nuclear Victims", it is imperative to leverage existing human rights mechanisms. Based on the actual state of nuclear damage collected through the MSP, it is possible to pursue the request for victim relief, especially from non-signatory countries, through existing human rights mechanisms. The issue of nuclear weapons has already been raised through the reporting system at the United Nations Human Rights Council and various human rights bodies.[19] In particular, General Comment No. 36 of the UN Human Rights Committee on the right to life provides the foundation for this argument.[20]

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[17] See *supra* note 14.
[18] See the Draft Factual Summary of the First Session of the Preparatory Committee for the 2026 NPT Review Conference, NPT/CONF.2026/PC.I/CRP.3, para. 16.
[19] For example, in March 2021, the Human Rights Committee, based on information provided by civil society, called on the DPRK to include in its national reporting the environmental impact of nuclear test sites, including responses to contamination and radiation exposure. (List of issues prior to the submission of the third periodic report of the Democratic People's Republic of Korea, CCPR/C/PRK/QPR/3, para. 12.)
[20] In the General Comment, the Human Rights Committee noted that "[States Parties to the ICCPR] must also respect their international obligations …to afford adequate reparation to victims whose right to life has been or is being adversely affected by the testing or use of weapons of mass destruction, in accordance with principles of international responsibility." Human Rights Committee, General comment No. 36, Article 6: right to life, CCPR/C/GC/36, para. 66. While China remains a signatory, all other nuclear armed states are state parties to the ICCPR.

(5) Strengthening the SAG

Capacity building in the areas of assistance and remediation should be pursued. The SAG, based on its mandate, should expedite the creation of a network of experts, with the Nagasaki University Proposal as a point of reference. There are already competent and well-known experts around the world, including on the SAG reserve list.

(6) Involving Nuclear User and Testers further

First and foremost, as previously agreed upon the Action Plan, there is a need for further disclosure of information should be sought.

Secondly, nuclear user and testers should be requested to acknowledge the fundamental truth that nuclear damage is an indespensable sacrifice (cost) for nuclear-armed states to build their current nuclear posture and nuclear deterrence policy. The proposition that the prevailing nuclear posture and nuclear deterrence policy are based on the sacrifice of nuclear damage that continues to this day is the foundation for challenging the legitimacy of security based on nuclear deterrence.

(7) Placing Nuclear Victim Assistance and Environmental Remediation as Long-term Issues for Humanity beyond the Treaty

The long-term implications of nuclear victim assistance and environmental remediation extend beyond the scope of the treaty, as the affected populations and areas of contamination are not limited to the states that are parties to the treaty. Long-term initiatives are required to provide assistance and remediation. While discussions on the post-SDGs are currently underway, it is imperative to disseminate and enhance comprehension of the fact that assistance and remediation for nuclear damage are also issues that humanity will have to continue to address even after 2030.

IV. Issues for the TPNW toward the Realization of a World free of Nuclear Weapons

Michiru Nishida

1 Introduction

The Treaty on the Prohibition of Nuclear Weapons (TPNW), adopted at a negotiating conference at the United Nations in July 2017, was opened for signature in September of the same year. The treaty entered into force on January 22, 2021, 90 days after the number of ratifying countries required for the treaty to enter into force reached 50, according to Article 15 of the Treaty. Since then, the number of signatories and ratifiers has continued to increase, and as of this writing in May 2024, the number of signatories is 93 and the number of ratifiers is 70.[1] Since more than 120 countries have voted in favor of the TPNW resolution at the UN negotiating conference and at the UN General Assembly First Committee every year, the number of ratifying countries is expected to reach around 120 eventually. Since the Treaty's entry into force, two meetings of the States Parties have been held, and various working groups have been established, showing a smooth and active start.

So, if we ask, "Is TPNW on the straight-line path toward a nuclear-weapons-free world?" The answer is not necessarily so. Obviously, given the fact that no nuclear-weapon states have joined the TPNW with no prospect for their participation, it is only natural that there is no roadmap in sight. This paper, putting aside such political and diplomatic perspectives, discusses whether the TPNW could be a catalyst or receiving body for a world without nuclear weapons and what challenges the TPNW might face even in a hypothetical situation where the international politics and international security situation could be such that the nuclear-weapon states and their allies could participate and a world without nuclear weapons could be realized. Since it would not be enough to simply "realize" a world without nuclear weapons, but it would be necessary to also "maintain" that world, issues that would be involved in maintaining a realized world without nuclear weapons will also be discussed.

Note that this paper will focus on issues since the assigned theme is "issues." Still, I want to make it clear that the TPNW has the potential to set norms, stigmatize nuclear weapons, and change the current values based on nuclear deterrence policy by imposing a double nonproliferation obligation in addition to the NPT[2] and by banning all aspects related to nuclear

[1] See the UN Office of Disarmament Affairs website. https://treaties.unoda.org/t/tpnw/participants.

[2] On the other hand, there is the problem of forum shopping, whereby one can choose between the NPT and the TPNW. That is, it is theoretically possible to withdraw from the NPT and enter the equal and equitable TPNW as an expression of dissatisfaction with the inherently unequal and unfair NPT due to lack of progress on nuclear disarmament. If such an option were taken, the nonproliferation significance of the TPNW could be diminished, since, as discussed below, some aspects of the TPNW's nonproliferation obligations are weaker than those of the

weapons.[3] Of course, we do not know whether this approach will work, as international politics and international security are not driven solely by norms. On the contrary, from the perspective of general theories of international politics and international security, it must be said that the likelihood of it working is extremely low. Nevertheless, just as whaling and slavery, which had been accepted until recently, have become unacceptable in the modern era (on the assumption that it is clear that nuclear weapons, which are positioned at the core of international politics and international security, cannot be discussed simply and in the same breath as whaling and slavery), the possibility of a major shift in values in the world cannot be completely ruled out.[4] Hence, the TPNW deserves attention from the political movement rather than the legal perspective of transforming the world's values on nuclear weapons.

On the other hand, it must be said that even if the world's values were to be transformed, there would still be severe challenges for the TPNW to be on the receiving end. In some aspects, this was unavoidable because the TPNW gave priority to an early conclusion of negotiations from the perspective of political campaigning rather than ensuring the effective realization of a world without nuclear weapons, as indicated by the fact that the negotiations were concluded in only two negotiating sessions partly because a world free of nuclear weapons was not in sight at the time of the TPNW negotiations. However, even if the roadmap to a nuclear-weapon-free world is not yet clear, identifying issues and challenges of the TPNW and making efforts by its signatories to rectify them now will nullify unnecessary criticism and further enhance the significance of the TPNW as a political movement.

2 Issues for the TPNW toward the realization and maintenance of a world free of nuclear weapons

This section, putting aside those political and diplomatic issues mentioned above, will discuss the issues of the TPNW, which are primarily divided into substantive and institutional. In terms of the substance, this section discusses i) the fact that the TPNW fully recognizes the right to the peaceful uses of nuclear energy, ii) it does not prohibit the production of fissile materials for nuclear weapons, and iii) it does not contain a provision on the means of delivery of nuclear weapons. Regarding the institution, it will discuss i) the weakness of the verification framework

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NPT.

[3] Nevertheless, for example, a ban on "financing" nuclear weapons production was proposed by several countries, but was not reflected in the draft text. Also, from the beginning of the negotiations, the means of delivery of nuclear weapons and the ban on the production of fissile materials for nuclear weapons were not even discussed, as will be described later in both cases. See, for example, "Compilation of amendments received from States on the President's draft text dated 22 May 2017" (20 June 2017), https://www.reachingcriticalwill.org/disarmament-fora/nuclear-weapon-ban/negotiation/documents. Thus, there are aspects of the TPNW that were enacted that were not necessarily ideally sufficient but were the product of negotiated compromises, or that the necessary issues were not adequately considered.

[4] Michiru Nishida, "Achieving Nuclear Weapons Abolition - The Necessity of Building a World Without the Need for Nuclear Weapons," RECNA Policy Paper 2, March 2016, p14-16. https://www.recna.nagasaki-u.ac.jp/recna/bd/files/ REC-PP-02.pdf.

for both nuclear-armed and non-nuclear-armed states, ii) the lack of an enforcement framework to deal with potential violations, and iii) the fact that the withdrawal provision remains standard.

(1) Substantive issues

Lack of restrictions on peaceful uses of nuclear energy

TPNW recognizes the right to the peaceful use of nuclear energy without limitation in its preamble, "Emphasizing that nothing in this Treaty shall be interpreted as affecting the inalienable right of its States Parties to develop research, production and use of nuclear energy for peaceful purposes without discrimination."[5] Suppose we recall that the "peaceful use" of nuclear energy originally began with the military use for developing atomic bombs. Wouldn't there be any problem in allowing unlimited peaceful use of nuclear energy without any hesitation in a world without nuclear weapons? At least from the views of states in working papers and the Chairman's draft, it appears that the basic premise of the TPNW was that the peaceful use of nuclear energy is an "inalienable right" and that no restrictions should be imposed on it. One has to wonder how much was discussed in just two TPNW negotiating conferences. However, it must be said that this concept of "inalienable right" is too much caught up in the mindset in the NPT, where states parties have struck a grand bargain, allowing five states to possess nuclear weapons for the time being in exchange for granting the inalienable right to peaceful use of nuclear energy as a quid pro quo. Even in the NPT, there is an argument that the right to peaceful use of nuclear energy should be restricted to a certain degree for states that violate their nonproliferation obligations in order to ensure the effectiveness of the nonproliferation regime.[6]

In a working paper submitted to the 2017 negotiating conference, the Arms Control Association (ACA) noted that if the TPNW were to ban fissile material production and nuclear weapons-related research and development, there would be verification challenges, as some of these materials could be used for civilian purposes.[7] Perhaps the TPNW did not touch on the peaceful use of nuclear energy at all because doing so would attract complex verification issues, as the ACA's working paper points out. Perhaps TPNW proponents may have had the political intention to avoid the risk of losing NAM's support by using a great deal of energy to persuade NAM countries that the right to peaceful use of nuclear energy would be subject to some restrictions even in the future world free of nuclear weapons.

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[5] https://documents.un.org/doc/undoc/gen/n17/209/73/pdf/n1720973.pdf?token=UYJxBfbgQhxQpsxCEt&fe=true.
[6] See, for example, The United States, "Recommendations to the 2005 NPT Review Conference on strengthening the implementation of articles I, II, III, IV," (NPT/CONF.2005/PC.III/WP.19), 30 April 2004; Australia, Austria, Canada, Denmark, Hungary, Ireland, the Netherlands, New Zealand, Norway and Sweden, "Article III and preambular paragraphs 4 and 5, especially in their relationship to article IV and preambular paragraphs 6 and 7 [Compliance and Verification]," (NPT/CONF.2005/ WP.10), 26 April 2005.
[7] Arms Control Association, "Topic 2: Core Prohibitions," (A/CONF.229/2017/NGO/WP.18), 31 March 2017.

However, in building a "nuclear abolition regime" for a world without nuclear weapons from the current "nuclear nonproliferation regime" and maintaining it stably thereafter, how to deal with the peaceful use of nuclear energy that can be diverted to nuclear weapons production is a critically important issue. Especially in a world without nuclear weapons, the strategic value of a single nuclear weapon would increase overwhelmingly. Should one country clandestinely possess a nuclear weapon, other countries would instantly be at a strategic disadvantage. One idea would be to ban at least the parts of nuclear energy that involve sensitive technologies, such as enrichment and reprocessing.[8] However, the logical conclusion that can be drawn will vary depending on the feasibility of such an idea and under what circumstances a world without nuclear weapons would be achieved (e.g., whether it would be achieved under the same international political system as today, consisting of equal sovereign states and no higher supranational organization, or in a world based on a new order in which sovereign states are no longer the main actors, etc.).[9] In any case, the treatment of peaceful uses of nuclear energy is one of the most important issues for the future that should have been discussed with more care and deliberation in the development of the TPNW.

Lack of ban on the production of fissile materials for nuclear weapons

As is clear from the "Principles and Objectives" adopted at the 1995 NPT Review and Extension Conference along with the Treaty's indefinite extension, it can be said a basic consensus exists in the international community that, in addition to a ban on nuclear testing, a ban on the production of fissile materials for nuclear weapons (for example, highly enriched uranium and plutonium) is an essential element for achieving a world without nuclear weapons. Nevertheless, it is puzzling that the ban on the production of fissile materials for nuclear weapons was not included without discussion as one of the general obligations of the TPNW, whose purpose is to realize a world without nuclear weapons.

One reason for this may be that the matter can be left to the negotiations on a Fissile Material Cut-off Treaty (FMCT), but was not the TPNW initiated in the first place to achieve nuclear abolition as quickly as possible out of frustration with the slow progress of the step-by-step approach such as the entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and negotiations for an FMCT? If so, wouldn't it have been necessary to make firm provisions in the TPNW itself rather than leaving it to a future FMCT, which has not even begun full-scale negotiations for 30 years? Currently, there is little prospect of the start of FMCT negotiations. If the objective of the TPNW is to achieve a nuclear-weapon-free world as fast as possible rather

[8] Michiru Nishida, "Peaceful Use of Nuclear Energy after Abolition of Nuclear Weapons," Main Issues on Nuclear Weapons: International Politics and Security, RECNA Policy Paper 17 Revised Edition, June 2023. https://www.recna.nagasaki-u.ac.jp/recna/bd/files/REC-PP-17-Rev.pdf.

[9] For details, see Kazuko Hikawa and Michiru Nishida, "The Post-NPT Stabilization Scheme after Nuclear Abolition," which will be included as Chapter 2, Section 6 in the publication to be published this year by Waseda University Press.

than a time-consuming step-by-step approach, it was logically necessary (apart from practical considerations) to include a ban on the production of fissile materials for nuclear weapons in the TPNW.

The absence of a ban on the production of fissile materials for nuclear weapons in the TPNW is not merely a matter of inconsistency with such logical consequences derived from the process leading to its creation. Combined with the lack of restrictions on the peaceful use of nuclear energy, some important issues arise, such as the following:

One could argue that since the TPNW prohibits the development, testing, production, manufacturing, acquisition, possession, and stockpiling of nuclear weapons or nuclear explosive devices, even if fissile material for nuclear weapons were produced, it would be a violation of the TPNW at the time it enters the next stage. Thus, there would be no problem with not having a provision prohibiting fissile material production. However, if it is clear that the production of fissile material for nuclear weapons, which is in the preceding stage of developing and possessing nuclear weapons, is allowed, would it be possible to maintain a world free of nuclear weapons stably? Rather, allowing neighboring countries or countries that one perceives as a threat to retain the capability to produce fissile material for nuclear weapons may make states become skeptical and dissuade them from seeking to enter the TPNW at the cost of giving up their nuclear options. Or, even if they did join the TPNW, they would be equally skeptical and try to maintain the same level of capability. Both sides would maintain a state in which they could break out at any time; in other words, they could withdraw from the TPNW at any time and reacquire nuclear weapons. Such a nuclear abolition regime would be unstable, and even if a world without nuclear weapons could be achieved, it would be extremely difficult to maintain. This any-time-break-out state may not be all that bad. One could argue that such a state may not be ideal but a second best as countries could create a state of virtual mutual deterrence, making it easier for states to abandon physical nuclear weapons. Furthermore, since enrichment and reprocessing are difficult to draw a clear line between peaceful and nuclear weapons purposes, it may be more practical to legally allow the production of fissile material either for peaceful or nuclear weapons purposes.[10] In any case, this is also one of the important issues for the future that should have been discussed with more care and deliberation in the development of the TPNW.

Lack of article on means of delivery of nuclear weapons

There is no mention in the TPNW of means of delivery of nuclear weapons. Indeed, it may be that all that is needed is a ban on nuclear weapons. But is that really enough? When we speak of a "world without nuclear weapons," to what extent do we mean "nuclear weapons"? Is it simply

[10] See Kazuko Hikawa and Michiru Nishida, "The Post-NPT Stabilization Scheme after Nuclear Abolition."

nuclear warheads? What about fissile material? Even so, it is not easy to determine a clear scope in both cases, and as noted above, there is no explicit prohibition on the production of fissile materials. What about delivery systems? Generally speaking, the term "nuclear weapons system" includes not only nuclear warheads but also their means of delivery and parts related to command and control. While Article 1 of the TPNW, which stipulates general obligations, refers to nuclear weapons, Article 4, which stipulates verification, refers to the "nuclear-weapon programme" rather than just "nuclear weapons" as the object of verification of irreversible elimination. Does this "nuclear-weapon programme" include the means of delivery? If not, how does it differ from "nuclear weapons" in Article 1?

As has been the case between the United States and the Soviet Union, and the United States and Russia since the Cold War, nuclear arms control and disarmament originally began with the restriction of the means of delivery of nuclear weapons, such as ballistic missiles and bombers. This was because the verification technologies of the Cold War period were not sufficient to verify the limitation of nuclear warheads, and they had to start with limiting the means of delivery, such as ballistic missiles, which are so large that they can be seen from satellites in space. One could argue that now, or in the future when a world without nuclear weapons is actually realized since there is or will be technology to verify the absence of nuclear warheads on the ground, there should be no problem in not verifying means of delivery. It could also be argued that in the past, it was militarily meaningless to mount conventional warheads on ballistic missiles that lacked precision. Still, now that precision has increased and more ballistic missiles carry conventional warheads, it would be impractical to ban ballistic missiles altogether.[11]

All of the above is true, but does this mean that in a world without nuclear weapons, there is no need to make any provision for the means of delivery? As with the issue mentioned above of the peaceful use of nuclear energy, a total ban not only on nuclear weapons, as represented by nuclear warheads but also on the means of delivery of nuclear weapons would be ideal in a stable nuclear abolition regime. Nevertheless, as with the peaceful use of nuclear energy, from the standpoint of its dual nature,[12] indeed, a total ban on means of delivery would certainly entail various difficulties. Ultimately, a ban on means of delivery is not absolutely essential as long as the production of nuclear warheads is prohibited. However, even if not a total ban, the TPNW could have imposed significant restrictions on super long-range means of delivery, such as intercontinental ballistic missiles (ICBMs), which at least at present find their primary military significance in carrying nuclear warheads.[13] This would make a nuclear weapons-free world

[11] See Michiru Nishida, "The Relationship between Missile Proliferation and Nuclear Disarmament," Main Issues on Nuclear Weapons: International Politics and Security, RECNA Policy Paper 17 Revised Edition, June 2023. https://www.recna.nagasaki-u.ac.jp/recna/bd/files/REC-PP-17-Rev.pdf.

[12] Dual nature in the case of nuclear energy means peaceful and nuclear weapons purposes, while in the case of means of delivery the dual nature for nuclear warheads and for conventional warheads.

[13] In the past, super long-range ballistic missiles such as ICBMs had no military significance other than to carry nuclear warheads, but today, concepts such as the Conventional Prompt Global Strike (CPGS), in which an ICBM is equipped with conventional warheads, are also a fact of life that requires careful consideration.

more effective than one in which only the production of nuclear warheads is prohibited. As to the delivery means with a range of less than an ICBM, the TPNW could have at least ensured they do not carry a nuclear warhead. Or, it could have mandated to verify the design of means of delivery to ensure that nuclear warheads could not be carried. The means of delivery is another important future issue that requires detailed study from the perspective of making the nuclear abolition regime more effective.

(2) Institutional issues

Weaknesses in the verification framework

Weaknesses in TPNW's verification aspect are twofold: the lack of a concrete verification framework for formerly nuclear-armed states to abandon their nuclear weapons and the weak nonproliferation verification of non-nuclear-armed states.

First, the former is evident from the fact that the TPNW itself has established a working group to address this issue. Article 4 stipulates the verification of cases in which a nuclear-armed state abandons its nuclear weapons as it joins the TPNW and provides for two routes. In the first route, a nuclear-armed state first abolishes its nuclear weapons and then joins the TPNW. In that case, that state shall cooperate with "the competent international authority" for the purpose of verifying the irreversible elimination of its nuclear-weapon programme, and the international authority reports back to the parties. Under the second route, the nuclear-armed state would first join the TPNW and then abolish its nuclear weapons. In that case, that state would negotiate a plan for nuclear abolition with the international authority, which would need to be approved by the meeting of States Parties or a review conference. For either route, it is not specified which organization is specifically referred to as the "competent international authority," nor is there a specific basic framework for verification. If we consider North Korea in this context, wouldn't negotiations with the international authority be carried out at North Korea's pace? Moreover, if there are any problems or defects in negotiations with the international authority, there is no mechanism for double-checking under the first route. Although there is a system for double-checking under the second route, at present, since only non-nuclear-armed states with little or no practical knowledge of nuclear weapons verification are signatories to the TPNW, the question naturally arises as to how far they can detect and point out such deficiencies.[14] As for

[14] The International Partnership for Nuclear Disarmament Verification (IPNDV), initiated by the United States in 2014, discusses and examines measures and technologies for nuclear disarmament verification between nuclear weapons states and non-nuclear weapons states. See https://www.ipndv.org/. In addition, a Governmental Expert Group (GGE) on Verification of Nuclear Disarmament has been established under a UN General Assembly resolution. Some of the participating countries in these initiatives (Algeria, Chile, Kazakhstan, Mexico, Nigeria, the Philippines, and South Africa) are also signatories to the TPNW. These countries could provide some insights, but they do not have the same security stakes as Japan in verifying the denuclearization of North Korea. The level of expertise in nuclear verification is also questionable compared to Japan with a large scale of civil nuclear programs subject to the IAEA safeguards.

the verification of nuclear renunciation by nuclear-armed states, the verification provisions are inadequate at the moment and pose a serious problem for Japan's security.[15]

Next, regarding the latter verification aspect, which is safeguards by the International Atomic Energy Agency (IAEA) for non-nuclear-armed states, criticisms were made immediately after the TPNW was enacted, particularly that it did not obligate non-nuclear-armed states to ratify the Additional Protocol. In response to this criticism, it was argued that even the NPT does not mandate ratification of the Additional Protocol, not even in a political document of a review conference, and that this is unfair criticism. It was further argued that the fact that the TPNW clearly obligates the conclusion of a revised version of the comprehensive safeguards agreement, "INFCIRC/153 (Corrected)," rather exceeds that of the NPT. It is also pointed out that even if a state party to the TPNW were to withdraw from the NPT with the idea of "forum shopping," no particular problem would arise since the TPNW obligates a state party to maintain the safeguards agreements in place at that time.[16]

These are all reasonably valid counterarguments if we are talking about the current world, which is not a world without nuclear weapons but one in which a large number of nuclear weapons still exist. However, these arguments are neither substantive criticisms nor substantive counterarguments. This is because the TPNW aims to realize a world without nuclear weapons, and as discussed in the previous section on the peaceful use of nuclear energy, it requires a higher level of measures than the NPT. This is also true for verification and safeguards for non-nuclear-armed states.

Currently, the nuclear non-proliferation obligations of non-nuclear-weapon states under Article II of the NPT are not directly verified. Yet, it is only assumed that non-nuclear-weapon states comply with the Article II prohibition on the development and possession of nuclear weapons by fulfilling their obligations of safeguards under Article III of the NPT that is applied to nuclear materials. In a world with a large number of nuclear weapons, as is the case today, the current level of verification regime, which does not fully verify nuclear non-proliferation obligations, does not pose a major problem. However, as we approach a world without nuclear weapons, the nuclear-armed states will gradually approach the status of non-nuclear-armed states. As noted above, the strategic value of a single nuclear weapon will increase. If a non-nuclear-armed state clandestinely possesses even a single nuclear weapon in violation of its nuclear non-proliferation obligations, the implications will also increase in severity. Therefore, from the perspective of

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[15] These issues are discussed in details in Michiru Nishida, "Logic (or illogic?) of Japan's aversion to the TPNW and charting a path forward," *Journal for Peace and Nuclear Disarmament*, forthcoming. https://doi.org/10.1080/25751654.2024.2379085 An abstract is also included in the next section of this policy paper (5. Future challenges for TPNW toward a nuclear-weapon-free world).

[16] Tytti Erästö, "The NPT and the TPNW: Compatible or conflicting nuclear weapons treaties?," SIPRI Commentary, 6 March 2019. https://www.sipri.org/commentary/blog/2019/npt-and-tpnw-compatible-or-conflicting-nuclear-weapons-treaties.

the nuclear-armed states, it will be difficult for them to achieve significant nuclear reductions, much less nuclear abandonment, without more rigorous verification of non-nuclear-armed states. In a nuclear-weapon-free world, as a matter of course, and even at the stage of approaching a nuclear-weapon-free world from the current one, it is necessary to actually and rigorously verify compliance with NPT Article II nonproliferation obligations, in addition to further strengthening IAEA safeguards under NPT Article III. Even the strongest safeguards at the moment, the combination of the Comprehensive Safeguards Agreement and Additional Protocol, would not be sufficient in a world approaching nuclear abolition and in a world free of nuclear weapons.[17]

From this perspective, it is inadequate to boast that the TPNW is slightly legally superior to the NPT by mandating a revised comprehensive safeguards agreement. Even in the NPT, while the Additional Protocol has not yet been agreed upon as a universal legal obligation, there is a general consensus in making the Additional Protocol a standard verification measure. There is a consensus that once a country ratifies the Additional Protocol, it will be legally binding (as a matter of course). The TPNW has not paid any attention to such an accumulation of years of political agreements in the NPT. Rather, even though the political direction of the NPT is to make the Additional Protocol a standard verification measure (even if there is resistance to making it a legal obligation universally), the TPNW ignores this point and simply stipulates that the status quo should be maintained. This could mean that the TPNW provides a legal basis for non-nuclear-armed states that have concluded only a comprehensive safeguards agreement when joining the TPNW are not required to ratify the Additional Protocol. It would have been necessary for the TPNW to at least indicate a direction to universalize the Additional Protocol in line with the NPT rather than just maintaining the status quo. Furthermore, even if the TPNW could have been at least at the same level as the NPT (i.e., a comprehensive safeguards agreement plus the direction to universalize an additional protocol) at present, when a large number of nuclear weapons exists, it was essential to include a direction to review and strengthen the safeguards mechanism as we move closer to a world free of nuclear weapons.

Another problem is that, although one of the objectives of the TPNW is to correct the unequal nature of the NPT, inequality has arisen in the safeguards that are obligated for the nuclear-armed and non-nuclear-armed states. As mentioned above, even the Comprehensive Safeguards Agreement with an Additional Protocol is insufficient in a world without nuclear weapons in the first place, but while the Comprehensive Safeguards Agreement with an Additional Protocol is obligatory for nuclear-armed states and former nuclear-armed states based on Article 4 of the TPNW, it is not mandatory for non-nuclear-armed states based on Article 3 of the TPNW. (Although non-nuclear-armed states can always accept additional relevant instruments, including an Additional Protocol). Thus, it is puzzling that inequality is created in the TPNW in

[17] See Michiru Nishida, "Process toward Nuclear Abolition and Transition to Post-NPT" in Chapter 2, Section 5 of the publication to be published this year by Waseda University Press.

a way that is reversed from the NPT.[18] It is not clear whether the inequality experienced in the NPT is intended to be now turned against nuclear-armed states and former nuclear-armed states in the TPNW, but this could be another disincentive for nuclear-armed states to join the TPNW.

Even if the TPNW is legally half a step ahead of the NPT, it is a serious and generally unnoticed political step backward, despite the fact that the TPNW, which is supposed to be the receiving body of a nuclear-weapon-free world, must far surpass the NPT both in terms of nuclear disarmament and nonproliferation. In other words, as long as the TPNW is competing with the NPT, it is as if the TPNW is giving up its own qualification to be the receiving body of a nuclear-weapon-free world. Even if the TPNW only obligates a comprehensive Safeguards Agreement and an Additional Protocol (or at least in that direction), since the TPNW requires a higher level than the NPT, the TPNW should have stipulated that the safeguards mechanism be strengthened and revised from the current one that only applies to nuclear materials to the one that actually verifies the non-possession of nuclear weapons themselves as we approach a world without nuclear weapons.[19]

Lack of enforcement system

In a world without nuclear weapons, as has been mentioned a few times, the strategic value of a single nuclear weapon due to a breach is extremely high compared to a breach in the current world with a large number of nuclear weapons. In the current world, a small country (e.g., North Korea) can secure an equal or near-equal position with a nuclear superpower if it possesses nuclear weapons, which is also a game-changing move in a sense. In a world without nuclear weapons, if a small country violates the TPNW and acquires nuclear weapons, the degree of the game changer will increase dramatically, to the extent that it will tip the military balance in relation to the major powers in one stroke. That is why, as noted above, the verification regime must be greatly strengthened from the current one, and the same applies to the enforcement regime. The current NPT also does not stipulate a specific enforcement system for violations. Still, based on the IAEA Charter, if a material breach is found in a non-nuclear-weapon state under the IAEA safeguards, it is reported to the IAEA Board of Governors and, if necessary, to the UN Security Council as "non-compliance." Since the TPNW has no provisions on enforcement mechanisms and only a safeguards agreement with the IAEA, it can be inferred that the TPNW's enforcement is the same mechanism as the NPT. However, as mentioned above, in a world without nuclear weapons, it is necessary to establish a more robust enforcement system as well as a verification system, and it must be said that the same system as the NPT is completely inadequate.

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[18] Masahiko Asada, *International Law of Nuclear Nonproliferation and Disarmament*, Yuhikaku, 2023, p.289.

[19] As noted above, in a world without nuclear weapons, if we were to disallow any peaceful use of nuclear energy, one of the purposes of verification would be to confirm that nuclear energy is not being used in the first place, rather than as a safeguard to ensure that nuclear materials intended for peaceful use are not being diverted to nuclear weapons purposes.

In the UN Security Council, which is currently the only body that can make internationally legally binding enforceable decisions, the five countries authorized to possess nuclear weapons under the NPT (N5) have veto power as permanent members of the Security Council (P5). Even if the current Security Council were to become the enforcement body of the TPNW, it is obvious that the Council would become dysfunctional if a violation by any of the P5 were reported to the Security Council. It would be necessary to establish an enforcement system in conjunction with reform of the Security Council, such as not being able to veto at least those cases that concern itself.[20] The necessity of establishing such an enforcement regime is not only not clearly stated in the TPNW but has not been discussed at the TPNW, including at the Meetings of States Parties, so far.

Weakness of Withdrawal Provisions

In order to maintain a stable, nuclear-weapon-free world, ideally, the risk of a country deviating from that world should be reduced to zero, and in any case, that risk must be minimized. One way to achieve this is to reduce the risk of withdrawal from a legal framework such as the TPNW. If the TPNW is the only legal framework for a nuclear-weapon-free world, it would be ideal not to allow any withdrawal from the TPNW. However, assuming that the international order when a world without nuclear weapons is achieved remains based on a system of sovereign states, not allowing any right of withdrawal would make it very difficult for states to join the TPNW. Therefore, it would be essential to strike a balance between recognizing the right of withdrawal and the need to make it as difficult as possible for a state party to withdraw from the TPNW. It would be essential to create a mechanism whereby the withdrawing country would bear a significant cost if a state party were to withdraw.

However, Article 17, which establishes the right to withdraw from the TPNW, follows the standard withdrawal provision, with little consideration given to minimizing the risk of withdrawal or creating a cost burden mechanism for the withdrawing state. The only thing that is commendable is that the TPNW sets 12 months for withdrawal compared to the NPT, where the withdrawal takes effect three months after notification of withdrawal. This is expected to lower the risk of withdrawal taking effect by allowing a longer period for diplomatic efforts to reverse the withdrawal after notification of withdrawal.

On the other hand, unlike the NPT, which requires notification of withdrawal to all parties and the Security Council, the TPNW requires notification only to the depositary, the UN Secretary-General, according to Article 19. This, in addition to lowering the procedural cost of not having

[20] The need for a robust enforcement mechanism is also discussed in Kazuko Hikawa and Michiru Nishida, "The Post-NPT Stabilization Scheme after Nuclear Abolition."

to notify all states and the Security Council, may lower the political cost of withdrawal by demonstrating that the TPNW lacks the recognition that withdrawal from the TPNW is a matter of international peace and security, which is the primary mandate of the Security Council. Since the N5 of the NPT has the veto power as P5 of the Security Council, it may have intended to avoid notifying the Security Council. Even if that were the case, instead of avoiding the issue, it should have included language such as those that recognize the need for the Security Council reform and that recognizes that withdrawal from the TPNW is fundamentally unacceptable because of its potentially grave impact on international peace and security.

In order to maintain a stable world free of nuclear weapons, it is necessary to minimize the risk of suspicion and breakout among nations, but under the standard withdrawal provisions of the TPNW, it would be difficult to maintain a stable world free of nuclear weapons because of the need to remain constantly vigilant against the risk of breakout by other nations. Article 17 of TPNW alone cannot be considered sufficient to address these risks. At least in the NPT, since North Korea declared its intention to withdraw from the NPT again in 2003, there have been discussions on various measures to increase the cost of withdrawal while recognizing the right to withdraw from the NPT.[21] Drawing lessons from such discussions in the NPT, the TPNW could create some innovative mechanisms, including the ideas mentioned above. The withdrawal provision of the TPNW may be a bit stronger than or equivalent to that of the NPT, but as mentioned above, for safeguards issues, the TPNW should be equipped with much more robust provisions for it to be a receiving body of a world without nuclear weapons. This issue of withdrawal, as well as the enforcement mechanism mentioned above, has not been discussed at any TPNW meeting, including Meetings of States Parties, so far. However, it is one of the important issues as we advance in realizing a stable world without nuclear weapons.

3 Conclusion

Some may argue that it is not necessary to venture to address the various problems mentioned above in the current situation where the path to a nuclear-weapon-free world is not yet clear and that it is unfair to demand such a high level from the TPNW. However, if that is the case, it could be an admission that the TPNW is merely a political campaign document rather than a serious attempt to be a receiving body for realizing a world without nuclear weapons.

Of course, no one is claiming that the TPNW is without challenges. The TPNW itself admits that there are issues to be dealt with, particularly in its verification system, which is why it is trying to address them by establishing a working group. In line with this, the TPNW, instead of procrastinating on issues and challenges such as those identified in this chapter as a matter of

[21] Michiru Nishida, "Withdrawal from the NPT," Main Issues on Nuclear Weapons: International Politics and Security, RECNA Policy Paper 17 Revised Edition, June 2023. https://www.recna.nagasaki-u.ac.jp/recna/bd/files/REC-PP-17-Rev.pdf.

the future, should now face them squarely and start making efforts to become a true receiving body in realizing and maintaining a stable nuclear-weapon-free world.

However, there is little evidence that many of the issues discussed in this paper have been discussed in the TPNW, except for certain parts of the issues involved in the verification. To what extent verification is treated as a priority issue is also questionable. Other issues, such as victim assistance and the universalization of the TPNW, seem to be addressed as higher-priority issues. It remains to be seen whether the TPNW will seriously address not only some of the verification issues but also at least the other issues discussed in this chapter in order to realize and maintain a stable, nuclear-weapon-free world.

V. Logic (or illogic?) of Japan's Aversion to the TPNW and Charting a Path forward (Abstract)

Michiru Nishida

Japan, the only country to have experienced atomic bombs during wartime, is the only one among the US allies to have positively evaluated the Treaty on the Prohibition of Nuclear Weapons (TPNW) at the highest political level, with Prime Minister Kishida saying that as "a very important treaty that can serve an exit as we seek to realize a world without nuclear weapons". Yet Japan has distanced itself from the TPNW, not participating even as an observer in the TPNW's Meeting of States Parties.

This paper attempts to explain Japan's stance toward the TPNW process, before and after the formation of the treaty, based on a hypothesis that Japan's nuclear policy is formed by a balancing act between two factors: humanitarian and security concerns.

It then attempts to chart a path forward for any possible engagement between Japan and the TPNW. It argues that a substance-over-formality approach, not sticking to the TPNW formalities but in a framework separate from the TPNW, may open a window of opportunity for cooperation. Japan can also flexibly consider security benefits in engaging with the TPNW and comprehensively calculate possible security benefits and drawbacks without a predetermined conclusion.

Since the NPT may not be sustainable unless there is a significant progress in nuclear disarmament, which itself is unlikely, like it or not, the TPNW cannot be ignored indefinitely and the time may come in the not-too-distant future when Japan will eventually have to consider engagement with the TPNW.

VI. Nuclear Deterrence from a Planetary Health Perspective: With the Economy for the Common Good as the Axis

Kazuko Hikawa

1 Introduction

Is the nuclear deterrence policy sustainable? This issue can be discussed from several perspectives. For instance, is it sustainable in terms of Japan's security, or is it sustainable for the interests of Western countries? We can also discuss whether this is sustainable for international peace and security. This paper considers it more holistic, namely, whether the nuclear deterrence policy is sustainable from the perspective of planetary health when considering the entire planet's future.

In writing this paper, from a more holistic perspective, there are three main concerns in the background. First, why is it that nearly 80 years after the actual use of nuclear weapons in World War II and the initiation of efforts to abolish these terrible weapons, security policies relying on nuclear weapons continue to be adopted, and no concrete solutions can be found, even among experts? Why are nuclear weapons states and states under the umbrella of extended deterrence unable to break away from security policies that depend on nuclear weapons? Second, are there sufficient discussions taking place on the issue of why states possessing nuclear weapons and states under the nuclear umbrella have not been able to break free from security policies that depend on nuclear weapons? Third, discussions on nuclear deterrence and nuclear abolition seem to have so far been limited to the fields of disarmament, non-proliferation, security, and the peace movement, and more holistic discussions are needed.

Against the backdrop of these concerns, this paper will first examine what kind of perception the Member States of the United Nations established for the primary purpose of maintaining international peace and security have when considering the future of humankind and how they are attempting to address the challenges facing the international community. It will then discuss the sustainability of nuclear deterrence policy from the perspective of planetary health, which is essential for the survival of humankind, based on the concept of an "Economy for the Common Good."

2 Perception of the UN Member States

The UN Member States are united by the resolution adopted by the UN General Assembly in recognizing that the issue of nuclear weapons is interrelated with other problems we face and requires a cooperative approach. In September 2020, as the world was forced to respond to an unprecedented pandemic of COVID-19, the UN General Assembly adopted the "Declaration on

the 75th Anniversary of the United Nations"[1] to mark the 75th anniversary of the founding of the United Nations. In the Declaration, the UN Member States recognized the interconnectedness of the various problems facing the international community, not only the global crisis brought about by COVID-19 but also the increasingly severe problems of climate change, inequality, and armed conflicts, and that the three pillars of the UN—peace and security, development, and human rights—are of equal importance and interconnectedness. It then proposes the revitalization of multilateralism and cooperative efforts to resolve these challenges.[2]

In the Declaration, UN Member States make 12 commitments to taking measures necessary for humankind's very survival, one of which, "Peace Promotion and Conflict Prevention," includes the issue of nuclear weapons.[3] The 12 commitments are not meant to replace the Sustainable Development Goals (SDGs) that will expire in 2030 but to accelerate achieving those goals in line with the SDGs. Transforming our world: The "2030 Agenda for Sustainable Development," which established the SDGs, states in its preamble, This Agenda is a plan of action for people, planet, and prosperity. Although SDGs are often trivialized by their title as an action plan for development, their purpose is not development per se but "people, planet, prosperity, and peace." The "Our Common Agenda" report released by UN Secretary-General Guterres in September 2021 based on the "Declaration on the 75th Anniversary of the United Nations"[4] also opens with the words, "Humanity's welfare – and indeed, humanity's very future – depend on solidarity and working together as a global family to achieve common goals. For people, for the planet, for prosperity and peace." In other words, what UN Member States should aim for is not to promote development and progress in the dark but to pursue what is suitable for people, the earth, prosperity, and peace. Thus, these issues are interrelated and interdependent, which is precisely why cross-sectoral efforts are needed.

Based on the proposals contained in the "Our Common Agenda," the UN will hold a "Summit of the Future" in September 2024 to finalize an action-oriented "Pact for the Future" consisting of a preamble and five chapters. The themes of the five chapters have already been decided: 1) "Sustainable development and financing for development," 2) "International peace and security," 3) "Science, technology, innovation, and digital cooperation," 4) "Youth and future generations" and 5) "Transforming global governance."[5] As is evident from this chapter structure, the future envisioned by this Pact is not focused solely on development issues. Still, it is a more

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[1] Declaration on the commemoration of the 75th anniversary of the United Nations: resolution / adopted by the General Assembly (A/RES/75/1), https:// digitallibrary.un.org/record/3885081?ln=en&v=pdf.
[2] *Ibid*., "Our challenges are interconnected and can only be addressed through reinvigorated multilateralism" (para 5); "The three pillars of the United Nations—peace and security, development and human rights - are equally important, interrelated and interdependent" (para 6).
[3] The United Nations has prepared an easy-to-understand overview document of the 12 commitments. https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Key_Proposals_ English.pdf.
[4] *OUR COMMON AGENDA, Report of the Secretary-General,* https://www.un.org/en/content/common-agenda-report/assets/ pdf/Common_Agenda_Report_English.pdf.
[5] *Scope of the Summit of the Future (A/DEC/77/568),* https://digitallibrary.un.org/record/4020326?ln=enhttps:// documents.un.org/doc/undoc/ltd/n23/252/95/pdf/n2325295.pdf?token=H4qG30nx5V3rZPI68x&fe=true.

comprehensive set of issues, with “people, planet, prosperity, and peace” as keywords.[6]

3 The Nature of the Problem—The Great Contradiction in Our Society

A review of the perceptions of UN Member States shows that they are in agreement that efforts must be made in various fields in solidarity and cooperation for the sake of “people, planet, prosperity, and peace”. However, since the adoption of the “Declaration on the Commemoration of the 75th Anniversary of the United Nations” in 2020, the various issues mentioned in the Declaration have not improved but rather have worsened. First, CO2 emissions, the main cause of global warming and climate change, reached a record high in 2023. Russia invaded Ukraine in 2022, the Israeli-Palestinian conflict erupted in Palestine in 2023, and as of May 2024, no solution to either has been found. Where is the spirit of solidarity and cooperation that the UN Member States united in the “Declaration on the 75th Anniversary of the United Nations” gone?

What are the problems? There are two problems with the perceptions presented by the Declaration and proposals based on it. First, although the Declaration recognizes the interrelatedness and interdependence of the issues that must be addressed by the UN Member States, as the above draft of the "Pact for the Future"[7] shows that the agenda is set for each of these problems as individual issues rather than cross-cutting, and the issues are handled within the mechanism of each individual framework on their own. Second, there is no doubt that solidarity and cooperation are important. Still, in reality, conflicts and divisions among countries are constant problems that must be overcome. There are no concrete proposals on how these problems can be resolved and how solidarity and cooperation can be achieved.

When we wonder where the nature of the problem lies, Christian Felber’s idea of an “Economy for the Common Good” provides important insight. In his book *Change Everything: Creating an Economy for the Common Good*,[8] Felber writes;

> “In regard to our friendships and everyday relationships, we thrive when we live in accordance with human values: the building trust, honesty, esteem, respect, empathy, cooperation, mutual help, and sharing. The ‘free’ market economy is based on the rules of the systematic pursuit of profit and competition. These pursuits promote egoism, greed, avarice, envy, ruthlessness, and irresponsibility.”[9]

The passage describes the difference between human relationships and the rules of an economic system, but the same can be said if international relations replaced human relationships. The

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[6] *Ibid*. (b).
[7] *Pact for the Future: Rev1,* https://www.un.org/sites/un2.un.org/files/sotf-pact-for-the-future-rev.1.pdf.
[8] Christian Felber, *Change Everything Creating an Economy for the Common Good,* Zed Books, 2019.
[9] *Ibid*., p. 1.

United Nations does not encourage the pursuit of profits or competition. Rather, it endorses all human values mentioned here as being valued also in international relations.
Felber ensues;

> "This contradiction is not merely a blemish in a complex or multivalent world; rather, it is a cultural catastrophe; it divides us inwardly—as individuals and as a society."[10]

Felber also argues that this great contradiction is not because man is innately evil but because the rules of the economic world have become conducive to weakness rather than human virtue. As he states, nothing in the UN Charter, or perhaps in any country's constitution or laws, says we should act selfishly and show desire. However, when it comes to business based on the market economy, the maximum pursuit of profit and competition (i.e., the exclusion of others) is recommended, and the rules based on such an economic system divide not only the individual but also society.[11] It is a fact that the economic system on which we depend, with its basic rules of profit-seeking and competition that are inconsistent with human values, does hide the nature of the various problems we face today.

4 Economy for the Common Good (ECG)

Felber's proposal for an Economy for the Common Good (ECG) can be summarized as follows. First, the most basic idea of the proposal is that, as mentioned above, the economic system on which we depend is inherently problematic, and this creates and encourages problems such as social division, inequality, environmental destruction, aggression, and human rights abuses. If we want to solve these problems and change society, we must first change the economic system.

So, what is wrong with our economic system? According to Felber, the market economy presents values such as the pursuit of profit, competition, ego, and desire as guidelines for action that contradict the values that we cherish as human beings. The theory that these market economy values make people happy is only a myth, and the claim that competition is the most effective method recommended by the market economy has no basis in empirical research. Rather, in 369 papers on how competition motivates people, Felber points out that the majority (87%) of the 369 papers show that competition is not the most effective method.[12] He argued that cooperation based on human values, rather than competition, is the most effective means.

He then describes ten crises brought about by capitalism as a result of the pursuit of profit and competition[13]: (1) concentration and misuse of power, (2) suppression of competition and the

[10] *Ibid*., p. 1.
[11] *Ibid*., p.1.
[12] *Ibid*., p. 8.
[13] *Ibid*., pp. 10-14.

building of cartels, (3) competition between locations, (4) inefficient pricing, (5) social polarization and fear, (6) failure to satisfy basic needs and hunger, (7) ecological destruction, (8) loss of meaning, (9) erosion of values, and (10) shutdown of democracy. These results are consistent with the problems we are currently facing.

What kind of economic system would solve this problem? In response to this question, Felber argues that the goal of economic activity should be set not in the pursuit of profit but in the Common Good. He then suggests practical ways to shift the system points. He proposes that economic actors should set four values that constitute the Common Good: (1) human dignity, (2) solidarity and social justice, (3) ecological sustainability, and (4) democratic co-determination and transparency. He also identifies five stakeholder groups for which we need to be sure that we apply the four values: (a) suppliers, (b) investors, (c) employees, including business owners, (d) customers and other companies, and (e) the social environment. The "Common Good Economy" is a practical model plan to change not only the concept of economic activities but also the implementation of those activities to the goal of the Common Good by introducing a "Common Good Balance Sheet" for the relationship between the four values and five stakeholder groups.[14] The fact that the ECG not only proposes theories and concepts but also provides a practical model plan can be considered a unique feature of the ECG. Another feature is that the model takes a holistic view of social issues, as can be seen from the four values and five stakeholder groups mentioned above.

The term "common good" is also used in UN Secretary-General Guterres' "Our Common Agenda."[15] Although a clear definition of the term is not certain, Felber lists the four values mentioned above as components of a value frequently used in the constitutions of many countries. At the same time, he states that the highest value is human dignity.[16] The Common Good Economy is not only a word but also an opportunity for us to think about and put into practice the essential issues of what the common is and what human dignity is.

Having introduced the concept and practical model of an "Economy for the Common" proposed by Felber to solve the essential problems of society, I would now like to discuss the sustainability of nuclear deterrence policy from the perspective of planetary health, with this concept as the axis.

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[14] Details of the four values and five stakeholders, as well as the Economy for the Common Good are detailed on the ECG website (https://www.ecogood.org/what-is-ecg/).

[15] "That is why **Our Common Agenda** is, above all, an agenda of action designed to accelerate the implementation of existing agreements, including the Sustainable Development Goals. First, **now is the time to re-embrace global solidarity** and find new ways to work together for the common good. This must include a global vaccination plan to deliver vaccines against COVID-19 into the arms of the millions of people who are still denied this basic lifesaving measure. Moreover, it must include urgent and bold steps to address the triple crisis of climate disruption, biodiversity loss and pollution destroying our planet." (OUR COMMON AGENDA, Report of the Secretary-General, p. 3).

[16] Economy for the Common Good, p. 4.

5 Economy for the Common Good and nuclear deterrence policy—a planetary health perspective

Earth's vital signs are failing

At the opening of the Global Climate Action Summit in Dubai on December 1, 2023, UN Secretary-General Antonio Guterres warned that "Earth's vital signs are failing," referring to rising CO2 emissions and record temperatures.[17] While many studies have already pointed out that unless appropriate measures are taken, the global environment could become intolerable for human survival, Secretary-General Guterres made an even more important point in the same speech by saying that developing countries are being devastated by disasters they did not cause. I agree; yes, the developed countries, not the developing countries, have caused this situation. The excessive development and consumption-oriented economic systems in developed countries have caused environmental destruction, placing a burden on developing countries.

To illustrate the point that the destruction of the global environment is the result of the activities of some humans, let us take the Ecological Footprint as an example. In collaboration with the Global Footprint Network, WWF Japan, and the University of Tokyo, the Research Institute for Humanity and Nature in Japan calculated the Ecological Footprint for each prefecture of Japan, which measures the impact of human activities on the global environment. The Global Footprint Network estimates the current biocapacity of the earth to be 1.68 global hectares per person. Based on this figure, it is estimated that if people around the world live the same lifestyle as Tokyo, it would require the resource of 3.1 Earths. Even Yamanashi Prefecture, which has the lowest ecological footprint in Japan, would require 2.4 Earths if people around the world lived in the same way as in Yamanashi Prefecture.[18]

The lives of people in developed countries are based on "shifting the load" to the earth. At the same time, this means that if all people in the world live the same life as in Japan, one planet is not enough, which means an unequal situation where only some people are allowed to enjoy a convenient and comfortable life, and the same cannot be enjoyed by all people in the world.
Kohei Saito explains this inequality in his book by using the term "external diseconomies," or "burden shifting," brought about by capitalism. In other words, in capitalism, where capitalists lead the economy, there are always those who suffer disadvantages for capitalists to make profits.

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[17] Secretary-General's remarks at the opening of the World Climate Action Summit [as delivered]. https://www.un.org/sg/en/content/sg/statement/2023-12-01/secretary-generals-remarks-opening-of-world-climate-action-summit-delivered?_gl=1%2Aidaeg8%2A_ga%2AMTE4NDkyMDk1OC4xNzEzMTY1NTgy%2A_ga_TK9BQL5X7Z%2AMTcxMzE2NTU4MS4xLjEuMTcxMzE2NjExNy4wLjAuMA. %2A_ga_S5EKZKSB78%2AMTcxMzE2NTU4MS4xLjEuMTcxMzE2NjE2Mi4xNS4wLjA.

[18] Research Institute for Humanity and Nature, *How Many Earths Does Your Prefecture Have to Live on?—Uncovering the Relationship between Ecological Footprint by Region and Urbanization and Aging of the Population—,* https://www.chikyu.ac.jp/publicity/news/2021/0303.html.

The inevitability of capitalism is that “burden shifting” takes place, which creates disparities worldwide and leads to environmental destruction. Saito explained this argument using several examples.[19]

Saito argues that because capitalism is an economic system based on the transfer of burdens and costs to the periphery, the burdens on the earth will not stop as long as economic activities based on capitalism continue, and disparities will not disappear; therefore, we should convert to an economic system based on Marxism.[20] Many scholars and commentators have already pointed out the problems of capitalism causing environmental destruction and inequality; what all of them have in common is that they all develop a very clear theory but do not offer practical suggestions on how such a new economic system can be realized.

The Potential of an Economy for the Common Good

Felber’s “Economy for the Common Good,” introduced in Section 4, not only provides a practical model but also suggests a practical means to deal with problems in a more holistic manner. As mentioned at the beginning of this paper, the various problems we face are interrelated and interdependent, which is why it is highly significant that a holistic proposal is being made.[21]
Let us recall the quote from Felber's work introduced at the beginning of Section 3.

When human values, such as trust, honesty, respect, listening, caring, cooperation, mutual assistance, and sharing, are valued and practiced in friendships and daily human interactions, we feel a sense of well-being. However, the "free" market economy operates based on systemic rules of profit-seeking and competition. This stimulates and promotes ego, lust, greed, envy, selfishness, and irresponsibility.[22]

As noted in Section 4, Felber pointed out that the current market-based economic system is based on the principles of profit-seeking and competition, which are in great contradiction with the original human values. This is also true for a security policy that depends on nuclear deterrence.

The first thing to point out here is that the purpose of nuclear deterrence is to deter the use of nuclear weapons by suggesting the possibility of their counter-use; that is, it is a policy to prevent the use of nuclear weapons in a world where nuclear weapons exist. The problem is that people

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[19] Kohei Saito, *Hitoshinse no Shihonron (Capital in the Anthropocene),* Shueisha Shinsho, September 2020.
[20] *Ibid*.
[21] Even if such a model is proposed, it may be criticized that it will not be accepted by many people, and even if many people accept it, vested interests may stubbornly refuse to accept such an economic system. The beauty of the “Economy for the Common Good” is that it does not force anyone to do anything with a “don’t do this or don’t do that” approach. Rather, it places emphasis on the human nature that seeks human values, and by using the tool of "Common Good Economy Balance Sheet" to maximize the flowering of such values, and it aims to gradually change the current system.
[22] Felber, *Change Everything Creating an Economy for the Common Good.*

think that security that depends on such a nuclear deterrence policy is sustainable, and they stop thinking about security that does not depend on nuclear weapons. The final document of the G7 Hiroshima Summit also lacks specifics on what should be done to achieve a world without nuclear weapons with undiminished security for all.[23]

A competition-based, profit-seeking world based on a market economy has created a world that is dependent on nuclear weapons. According to Felber's theory, this world cannot be sustainable. This is because a competition-based, profit-driven world that requires nuclear weapons for its own security, a self-serving world, is inconsistent with the values that humans inherently value and will lead to the concentration and abuse of power, further competition, social polarization and unrest, environmental destruction, loss of meaning, collapse of values, weakening of democracy, and many other problems we currently face.

6 Transformation and a Just Transition toward a World without Nuclear Weapons

Felber's proposal for the Economy for the Common Good provides an answer to how we can change our profit-driven world. Each of us must be trained to think and act for human values, not profit, through economic activities using the tool of the "Common Good Balance Sheet." The point is to change not only how individuals think but also how they act and to put sovereignty back in the hands of citizens who think and act for the purpose of human values through the development of democracy.[24]

This means that to achieve a world that does not depend on nuclear weapons, the discussion should not be limited to the issue of nuclear weapons but rather aim to change the entire social system more holistically, resulting in an environment that does not require nuclear weapons. This is precisely the best way to solve interconnected and interrelated problems lacking in the United Nations' efforts.

The Economy for the Common Good approach is also almost perfectly aligned with "the Global Alliance 'Sustainable Peace and Prosperity for All'" established by the Hiroshima Organization for Global Peace (HOPe) in April 2022.[25] In particular, the document "Exiting to a 'Post-Nuclear Weapon World' and a Sustainable Future: Visions and Challenges for Transformation and a Just Transition towards the Post-SDGs World,"[26] published under this initiative, recognizes that a

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[23] Mitsuru Kurosawa, *"G7 Hiroshima Samitto to Kakugunshuku no Konngo no Kadai（G7 Hiroshima Summit and Future Challenges for Nuclear Disarmament）,"* Bulletin of Osaka Jogakuin University, No. 20 (2023), pp. 33-50 http://ir-lib.wilmina.ac.jp/dspace/bitstream/10775/3830/1/06_U03%20Kurosawa.pdf

[24] Felber also uses a chapter in "Change Everything Creating an Economy for the Common Good" to make specific suggestions about the state of democracy.

[25] Hiroshima Prefecture / The Hiroshima Organization for Global Peace (HOPe), "Global Alliance for Sustainable Peace and Prosperity for All," https://hiroshimaforpeace.com/global-alliance/.

[26] The Hiroshima Organization for Global Peace (HOPe), *Exiting to a 'Post-Nuclear Weapon World' and a Sustainable Future: Visions and Challenges for Transformation and a Just Transition towards the Post-SDGs World,*

sustainable world is not possible without a world free of nuclear weapons, and calls for a shift in issues related to nuclear weapons to realize such a world. In addition to the need for a transformation toward the abolition of nuclear weapons, it also emphasizes the need for a transformation in society, a world where no nuclear weapons are needed, and that such a transformation should be achieved through a "just transition," which reduces the negative impact of the transformation as much as possible (see Figure. 1).

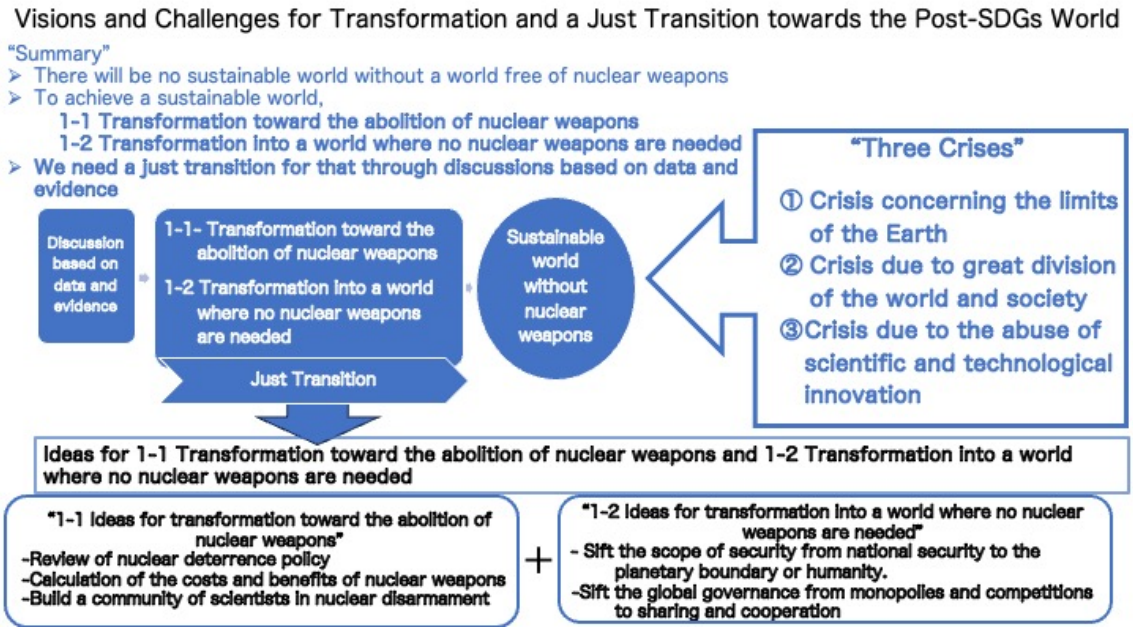

Figure 1: Overview of "Exiting to a 'Post-Nuclear Weapon World' and a Sustainable Future: Visions and Challenges for Transformation and a Just Transition towards the Post-SDGs World" (prepared by the author).

The discussion in this paper corresponds to the ideas in Figure 1 for "1-2: Transformation toward a world where no weapons are needed." The discussion on the nuclear policy itself, such as what norms should be established to abolish nuclear weapons and what specifics should be included in nuclear deterrence policy (Figure 1, "1-1: Transformation toward the abolition of nuclear weapons"), can be said to correspond to the discussions in other chapters of this paper.

7 Conclusion

A fellow researcher pointed out to me that my theory on the issue of planetary health and nuclear weapons seems like James Lovelock's Gaia theory. Indeed, there may be some common ground in the idea that humanity is one component of the entire planet and that the earth must be allowed to survive for humanity to survive. Although this paper did not focus sufficiently on this issue,

https://hiroshimaforpeace.com/en/wp-content/uploads/sites/2/2024/02/Visions-and-Challenges-for-Transformation-and-Just-Transition-towards-the-Posd-SDGs-World.pdf.

the Earth is a prerequisite for human survival, and awareness of this issue underlies the content of the writing of this paper.

Humans have a competitive nature and ego. If Einstein and Freud's analysis is correct, humans may even have a latent instinctive desire to exterminate others driven by hatred.[27] In any event, humans have indeed not only a good side but also an evil side, as evidenced by the fact that, historically speaking and even now, killings and murders are taking place in Palestine, Ukraine, and many other parts of the world.

The problem is that the current social system promotes the evil side of human beings rather than their virtues. Ferber argued that an economic system based on competition created the whole system.

It is not an easy task to transform a profit-seeking social system based on competition. Still, by using the practical model and tools of the "Economy for the Common Good," the transition to a world without nuclear weapons and ultimately to a sustainable world could be achieved by instilling in society a mechanism that promotes virtues rather than human weakness.

[27] A. Einstein, S. Freud, translated by Shogo Asami, *Hito wa naze sensou wo surunoka* (Why do people make war?), Kodansha Academic Library, June 2016.

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*Listed in alphabetical order.

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