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CTBTO
RESEARCH FELLOWSHIP

A Collection of Fellowship Research Papers

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RESEARCH FELLOWSHIP

A Collection of
Fellowship Research Papers

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About the CTBTO Research Fellowship

CTBTO Research Fellowship was launched in 2021 and organized in cooperation with the Center for Energy and Security Studies (CENESS) to help promising young scholars to build their professional network by giving them access to top professionals and experts in the field of nuclear disarmament and nonproliferation. The Fellows were invited to attend webinar series lectured by prominent experts and diplomats, to conduct research on CTBT, nonproliferation and disarmament issues, and to engage with distinguished scholars and practitioners.

About the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) was established in 1996 with its seat in Vienna. Its main tasks are the promotion of the Comprehensive Nuclear-Test-Ban Treaty and the build-up of the verification regime so that it is operational when the Treaty enters into force. It is headed by the Executive Secretary, Dr. Robert Floyd. CTBTO Youth Group (CYG), launched in January 2016, is open to students and young professionals dedicated to achieving the entry into force and universalization of the CTBT. By 2024, the Group had grown to over 1500 members coming from over 125 countries.

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The Center for Energy and Security Studies (CENESS) is an independent, non-governmental think-tank established in 2009. Headquartered in Moscow, the main goal of CENESS is to promote independent, unbiased, systematic, and professional analyses related to nuclear nonproliferation, arms control and atomic energy. The flagship project of CENESS is the Moscow Nonproliferation Conference and its New Generation Experts Segment organized averagely every 30 months. The Director of the Center is Anton Khlopkov.

NOTE

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ARTICLE XIV CONFERENCE OF THE CTBT: HISTORY, ACCOMPLISHMENTS, AND FUTURE GOALS

■ Dariya Pavlova ■ Jennet Charyyeva ■ Mahad Mohamud Muhamed

ABSTRACT

This article explores the significance and evolution of the CTBT Article XIV Conferences, designed to facilitate the Comprehensive Nuclear-Test-Ban Treaty's (CTBT) entry into force. Examining the timeline, agenda, and outcomes of these conferences spanning from 1999 to 2023, the article highlights their essential role in addressing nuclear testing and promoting Treaty ratification. The role of high-level participation, decision-making processes, and statements made by the presidency of the conference (Co-presidents of the Conference) are analyzed, revealing their influence on shaping discussions and outcomes. It further outlines the patterns in conference attendance, statements made, and the evolving nature of final declarations. Despite challenges, the article acknowledges the achievements of these conferences in advancing the CTBT's universalization, evidenced by increased ratifications and signatures. It notes the significance of commemorating the Treaty's achievements, particularly with the 30th anniversary approaching, and suggests strategies for encouraging decisions to sign and/or ratify the Treaty by states that have not yet done so.

INTRODUCTION

The CTBT Article XIV Conference, officially known as the Conference on Facilitating Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), is a special mechanism to promote the entry into force of the CTBT. Article XIV Conferences are convened by the depository of the CTBT – the United Nations Secretary-General, and take place once every two years either in New York or in Vienna in the late summer/autumn period. The first CTBT Article XIV Conference was held in 1999, since then thirteen such conferences have taken place altogether.

Table 1 . Timeline of Article XIV Conferences

1999	2001	2003	2005	2007	2009	2011	2013	2015	2017	2019	2021	2023
Vienna 6-8.10	New York 25-27.09	Vienna 3-5.09	New York 21-23.09	Vienna 17-18.09	New York 24-25.09	New York 23.09	New York 27.09	New York 29.09	New York 20.09	New York 25.09	Online 23-24.09	New York 22.09

Source: Official final reports from Article XIV Conferences and press-releases published on CTBTO website

CTBT Article XIV Conferences last from one to three days. Traditionally, the central place in their agenda is the general exchange of views by representatives of ratifying and signatory states on facilitating the entry into force of the CTBT, followed by a consideration of specific measures to that end. A progress report on the cooperation to facilitate the entry-into-force of the Treaty is usually presented. In addition, individual items on the agenda are dedicated to statements by non-signatory states, as well as statements on behalf of NGOs.

Article XIV Conferences are opportunities for measuring the progress towards Treaty's entry-into-force by announcing new ratifications and signatures, for examining challenges which delay entry-into-force, as well as for discussing and agreeing on specific measures to address these challenges in order to accelerate entry into force and universalization process. Mainly, Article XIV Conferences are a place for amplifying calls upon those states that have not yet signed or ratified the CTBT to join the international consensus to end nuclear testing.

NEGOTIATION OF CTBT ARTICLE XIV

The idea of establishing a discussion body, proposed by Canada, emerged as a political compromise in the process of negotiating the CTBT and in particular in the context of detailing its entry-into-force mechanism. It was at a time when negotiations on the Treaty was facing a potentially fatal deadlock, as states had a difficult time reaching a consensus on making its entry into force conditional on ratification by certain specified states. Since that approach ultimately prevailed, the negotiators felt the need for some counter-balancing mechanism. Thus, the provisions referring to such conferences (points 2, 3 and 4 of Art. XIV) were linked to the primary requisite of the article (point 1), which stipulates that the Treaty can enter into force only after it has been ratified by a specific cohort of states, listed in an annex to the Treaty (Annex 2). In this sense, Article XIV Conferences were supposed to mitigate the effect of that conditionality, which, as early as that time, has been suspected of rendering the Treaty "vulnerable to blocking tactics and hostage taking".[1]

As records reveal, although being itself a compromise proposal, the idea of a state-level conference to be held until the conditions for its entry into force have been satisfied, was somewhat controversial. Certain states expressed reservations about creating such a forum and needed to be explicitly reassured that the conference proposed in Article XIV was not a waiver conference and could not impose sanctions.[2] To this end, the text of the Treaty, negotiated in the Conference on Disarmament, did not empower these conferences to waive the entry-into-force requirements or to amend the list of states in Annex 2. It only assured that they would pave the way for participating states to agree on further measures for facilitating its entry into force.

ATTENDANCE AND LEVEL OF PARTICIPATION

Traditionally, CTBT Article XIV Conferences enjoy a noticeable number of attendees. An average of 90-100 states (around half of CTBT state-signatories, amounting to 187 as of July 2024) take part in each conference cycle. Even during the Covid-19 global pandemic, when the on-site forum forcefully switched to a less convenient virtual format (2021), 87 state delegations took part in the Conference.[3] Other attendees include representatives of several international organizations – notably the International Atomic Energy Agency, the Organization for the Prohibition of Chemical Weapons and the Inter-Parliamentary Union, together with regional organizations – the European Union, African Union, the Commonwealth Secretariat, the League of Arab States, as well as representatives of the civil sector.

There are no serious dynamics in CTBT Article XIV Conference participation as number of states attendees throughout the years has not changed considerably (see Table 2). However, a negative mark has been left by the fact that for eight consecutive years (2001–2009) the US boycotted political meetings of CTBT signatories, among which Article XIV Conferences of the Treaty.[4] In addition, although Article XIV Conferences do not specifically exclude the

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1 Johnson. R., "Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing", UNIDIR, 2009.
2 Ibid.
3 Report of the 2021 Conference on Facilitating the Entry into Force of the Comprehensive Nuclear Test Ban Treaty, 24 September 2021.
4 Johnson. R., "Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing", UNIDIR, 2009.

presence of states who have not signed the CTBT, they usually fail to take part in these fora, despite being invited. An exception among Annex 2 states is Pakistan, an active observer of the CTBTO meetings, which has attended several Article XIV Conferences in the past.

Table 2. CTBT Article XIV Conference States Attendees 1999-2023

1999	2001	2003	2005	2007	2009	2011	2013	2015	2017	2019	2021	2023
92	109	102	117	106	103	100	88	92	88	81	87	88

Source: Official final reports from Article XIV Conferences, published on CTBTO website

A more disconcerting trend can be found with regard to the level of participation in the Conference. According to the press release, issued for the first Article XIV Conference (1999) attendance at the Conference had been expected to be at the ministerial level.[5] Indeed, records from the initial years of Article XIV Conferences signal high-level political commitment with the delegations being headed by state secretaries/foreign ministers. This level has been gradually reduced through the years to heads of missions or even lower-level UN-accredited diplomats from states' permanent missions. It is due to this negative trend that since 2011 Article XIV Conference final declarations, in their first paragraph, make a reference towards the level of participation by urging all states "to remain seized of the issue at the highest political level".

ROLE OF THE PRESIDENCY AND DECISION-MAKING PROCESS

The role of the Article XIV Conference President deserves special attention, as certain part of the conference success can be attributed to it. Each time the Conference is presided over by the representatives of one (initially) or two (from 2007 onwards) states. A quick look at the latest available official records shows a vast diversity in country representation at this position. Presidents have been the representatives of Finland (2003), Australia (2005), Austria and Costa Rica (2007), France and Morocco (2009), Japan and Kazakhstan (2015), Belgium and Iraq (2017), Algeria and Germany (2019), Italy and South Africa (2021), and Norway and Panama (2023). This diversity certainly provides an opportunity for incorporation of different perspectives and styles in shaping discussions, as well as a demonstration by certain states of a more in-depth commitment to the CTBT.

It is also worth pointing out that presidents can have their particular footprint over the course of Conference deliberations. The Final Report of the 2003 Article XIV Conference for example included in an annex a Report from the President of the Conference (so-called Report of the Chairman of the Committee of the Whole), which outlined the different proposals for amendments of the conference Final Declaration and reflected the dynamics in the process of its drafting.

In terms of decision-making rights, Article XIV Conference participants can be divided in two groups: 1) states who have signed and ratified the Treaty and 2) states who have signed but not ratified the Treaty (as of July 2024 China, Egypt, Israel, Iran, Russia[6] and the USA – although Russia had been participating in all Art. XIV conferences during 2001-2023 as a ratifying state). The second group participate as observers during Article XIV Conferences, since they are not granted the right to engage in the decision-making process.[7] In the context of the CTBT, this restrictioncan be regarded as a positive practice, potentially

[5] Press Release DC/2661, UN Website, Meetings Coverage and Press Releases, 27 September 1999.
[6] Russia ratified the CTBT in 2000, but consequently revoked its ratification in November 2023.
[7] Draft Rules of Procedure of the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty, New York, 22 September 2023, part VIII. Decision-Taking, Rule 30. Adoption of Decisions.

having the power to incentivize the holdout states to proceed towards ratification in order to acquire decision-making rights. Furthermore, this limitation is not absolute, since the final documents of the conference are open for signature to all attendees. In addition, all attendees can request the floor and speak during conference sessions.

Another principle of decision-making is that the rules of procedure for Article XIV Conferences require consensus in order to adopt decisions – a practice, which is beginning to attract some criticism. Although most states naturally favor it, from the point of view of conference's aims, this practice highlights the lack of flexibility in the decision-making process, which can hinder a greater ambition when adopting measures to convince the last holdout states to join the CTBT.

STATEMENTS AND FINAL DECLARATIONS

Unlike the number of attendees, the number of statements made during Article XIV Conferences has evolved significantly throughout the years (see Table 3). Between 2013 and 2019, a sharp and steady decline in conference activity can be observed. An argument can be made that this testifies to a diminishing commitment of states towards the aim of the Conference and the Treaty itself for that particular period. Nevertheless, this trend has been reversed in 2021 when the number of statements made during the Conference rallied back to over 50.

Table 3. CTBT Article XIV Conference Statements 1999-2023

1999	2001	2003	2005	2007	2009	2011	2013	2015	2017	2019	2021	2023
50	79	72	64	47	63	61	65	20	22	21	59	59

Source: Official documentation for Article XIV Conferences, published on CTBTO website

Activity by non-signatory states is in general highly limited. The only two times when non-signatory states took the floor during an Article XIV Conference were in 2003 (Afghanistan) and in 2007 (Barbados and Pakistan).[8] This can be explained with the natural lack of interest in states who have not signed the CTBT to engage in these fora. Pakistan however uses the floor to present its national position and even to suggest measures on enhancing the Treaty's entry into force.

It is of significance to note that CTBT Article XIV Conferences are provided to take place until their objective has been reached, i.e. the CTBT enters into force. Each conference is succeeded by a Final Declaration. It is a 5 to 7-page conclusive document (its volume has been gradually growing through the years).

A closer look on the language of final declarations reveals that not much of the substance and wording has changed throughout the years. Usually, states with active nuclear weapon research programs and test sites are urged to take actions that would reinforce the CTBT and support its goals, such as refraining from activities at test sites that might be construed as CTBT violations, halting research, development and production of nuclear warheads based on modifications of existing designs that give them new military capabilities. In parallel to that, calls are voiced for condemning any future testing as well as for taking decisive action in reaction to any future testing. On a positive note, states express support for the CTBTO Preparatory Commission in Vienna and its progress in setting up the International

[8] Afghanistan used the floor to announce its upcoming signature of the Treaty and Barbados - to outline the technical difficulties, hindering its signature. The two countries later signed the CTBT in late September 2003 and in early 2008, respectably.

Monitoring System (IMS) and International Data Center (IDC), so that the CTBT's verification system is ready by the time the Treaty enters into force.

It is worth bearing in mind that there has been no case in history where the text of such declaration could not be agreed upon. On the other side, final declarations are carefully drafted documents that would typically exclude any reference towards a certain matter, which is sensitive to states who sign it. It is also important to note that the Final Declaration is open for signature to all attendees (no matter their status vis-à-vis the CTBT), which speaks of the inclusiveness of Article XIV Conferences and their openness towards all parties involved in the CTBT promotion and committed to its entry-into-force.

ACHIEVEMENTS OF ARTICLE XIV CONFERENCE

The positive role of Article XIV Conferences can hardly be ignored. In 1999, at the time of the first Article XIV Conference and three years after the opening for signature of the CTBT (1996), only 45 states had ratified the Treaty. This fact demonstrated a very slow initial pace in its universalization and reiterated the relevance of Article XIV Conferences. In addition, at the time of the first Article XIV Conference, signatures and ratifications from twenty-three states were missing to enable the entry-into-force of the Treaty. This number has been reduced to eight by the time of holding of the most recent Article XIV Conference (September 2023). Furthermore, since 1999 the overall number of CTBT signatures has grown with thirty-three, whereas ratifications have more than tripled. Only between the 2021 Article XIV Conference and the 2023 Article XIV Conference, eight more countries (Dominica, Equatorial Guinea, Gambia, Timor-Leste, Tuvalu, São Tomé and Príncipe, Solomon Islands and Sri Lanka) had completed their ratification procedures[9]. All of that is a clear testimony of the significant progress that has been made towards the goal of entry-into-force and universalization of the Treaty. While it would be an overstatement to give all the credit for additional signatures and ratifications to the Article XIV Conferences, their role in advancing the entry into force is not negligible. The Treaty stands as a cornerstone in establishing a worldwide norm opposing nuclear testing. Since its inception in 1996, there have been merely 10 instances of tests conducted, a remarkable decline compared to the staggering 2,000 tests carried out in the five decades before the Treaty was open for signature.[10] This substantial reduction underscores its profound impact in curbing nuclear testing worldwide.

CHALLENGES

The primary challenge facing the Conference pertains to the slow ratification process, as certain states' reluctance to ratify the Treaty poses a significant obstacle to progress. Initially opened for signatures in 1996, the Treaty has seen 187 states sign it, with 178 having ratified it as of July 2024.[11] However, for the Treaty to take effect, it requires ratification from 44 Annex states, with only 9 remaining. Notably, key Annex states such as the United States, China, and Russia are among those yet to ratify.

The attention is particularly focused on the United States, as its leadership in ratifying the Treaty could potentially influence other nations to follow suit. Some analysts suggest that several countries anticipate the US to honor its previous commitments, setting an example for other states to sign and ratify the Treaty.[12] Consequently, the US assuming this leadership role and ratifying the Treaty holds immense importance.

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[9] Background Document by the Provisional Technical Secretariat of the CTBTO Preparatory Commission for the latest Conference on Facilitating Entry into Force of the CTBT (New York, 22 September 2023).
[10] "Ending Nuclear Tests", CTBTO, <https://www.ctbto.org/our-mission/ending-nuclear-tests, accessed 1 July 2024>.
[11] "Status of Signature and Ratification", CTBTO, September 8, 2023, <https://www.ctbto.org/our-mission/states-signatories, accessed 1 July 2024>.
[12] Alicia Godsberg, "CTBT Article XIV Conference", Federation of American Scientists, September 9, 2009, <https://fas.org/publication/ctbt-article-xiv-conference/, accessed 1 July 2024>.

Recently, Russia's decision to withdraw its ratificationhas highlighted the problems with bringing the Treaty into force. This is widely perceived as a response to continuous inability or unwillingness by the United States to go ahead with its ratification. It emphasizes the potential consequences of delay or non-ratification by the US, as it could further hinder the global ratification process and potentially lead to additional set-backs for the Treaty.

It is obvious that US ratification could offer a powerful impetus to ratification efforts by other nations, positively influencing trust-building initiatives among countries. Serious actions taken by the US towards the ratification of the Treaty would significantly bolster global confidence, serving as a testament to genuine commitment rather than mere rhetoric.

FUTURE GOALS AND PROSPECTS

The main role of Article XIV Conferences is to uphold the importance of the entry into force of the CTBT high on the international agenda. They are also significant in the aspect of safeguarding and promoting the norm against nuclear testing worldwide. In this context, the added value of Article XIV Conferences as an instrument of the CTBT is undeniable.

For the time being, given the format of Article XIV Conferences, an argument can be made that they optimally fulfill their role and cannot be expected to produce magical results in terms of gathering the necessary signatures and ratifications of the Treaty. The fact that at the 2023 Article XIV Conference none of the “holdout” countries announced new positions is indicative of this inference. In general, the deteriorating global security environment does not imply positive near-term developments towards the entry into force of the CTBT. On the contrary, negative repercussions can be expected for the atmosphere and dynamics at Article XIV Conferences, considering the recent withdrawal of the Russian Federation of its ratification of the Treaty. Criticism of its potential intentions to do so was already a fact at the 64th session of Working Group "A" of the Preparatory Commission of the CTBTO in October 2023. Another challenging tendency is the spreading indications of increased activity at some of the nuclear test sites.

Nevertheless, the contribution of these conferences as a much needed and valuable forum towards facilitation of entry into force of the Treaty has been repeatedly reaffirmed. Article XIV Conferences pave the way for participating states to agree on procedures for further measures towards CTBT entry into force. One possible such measure might be an agreement on provisional application of the CTBT, which, if achieved, will constitute a significant success of Article XIV Conferences. On the other hand, such kind of a waver would entail numerous legal, technical, financial and administrative problems and may be criticized as a diversion from the main goal. In addition, there is some room for actions to enhance the real and practical implications of Article XIV Conference deliberations. In this context, the question of what can be done beyond the messages that are broadcast within these forums emerges as a fundamental standpoint. Lack of participation of non-signatory states, with the occasional exception of Pakistan, can be assessed as a negative feature of Article XIV Conferences. Efforts should be made to incentivize the attendance of India and DPRK in these fora.

Given that the next conference is scheduled for 2025, just one year before the 30th anniversary of the Treaty, there exists an opportunity to commemorate the achievements of the Treaty through various impactful actions. This milestone anniversary could serve as a momentous occasion to highlight the Treaty's successes and contributions to global peace and security. Utilizing this anniversary as a platform, efforts can be intensified to encourage and urge the remaining states, especially the three key Annex 2 states like China, Russia, and the United States, to ratify the Treaty. This could involve diplomatic initiatives, campaigns, and increased dialogue to emphasize the importance of their participation in solidifying the Treaty's effectiveness and fostering a world free from nuclear testing. Additionally,

leveraging advancements in technology and communication, a multimedia campaign can be launched to raise public awareness about the Treaty's significance, its impact on global security, and the necessity for collective support and commitment towards its objectives. Ultimately, the 30th anniversary of the Treaty presents a valuable opportunity to celebrate its achievements, reaffirm its importance, and galvanize global efforts towards a world where nuclear testing is eradicated, emphasizing the imperative for global peace and stability.

RECOMMENDATIONS

In order to reinvigorate and propel the CTBT agenda towards tangible advancements, a multifaceted approach incorporating innovative strategies is paramount. To initiate this transformative process, it is strongly advocated for the engagement of a respected mediator, potentially a confidant of the Chair, to orchestrate purposeful consultations with various pivotal nations. This individual, well-versed in diplomatic dialogue as well as in nuclear arms control, would be instrumental in fostering inclusive discussions aimed at identifying common ground and fostering consensus.

Simultaneously, it may be useful to task the Executive Secretary of the Comprehensive Nuclear-Test-Ban Treaty Organizationwith a specialized diplomatic mission. This mission would involve proactive engagement with pertinent stakeholders to encourage collaborative efforts and brainstorm innovative pathways to surmount existing impasses. This engagement should not only focus on consensus-building but also emphasize the benefits and significance of collective action towards CTBT's comprehensive implementation.

Furthermore, recognizing the influential role of the United Nations Secretary-General as the Depositary of the CTBT, a discreet yet strategic initiative could involve convening systematic but informal and closed-door discussions among key diplomats. These discussions would serve as an avenue for candid exchanges, facilitating the exploration of unconventional approaches and fostering an atmosphere conducive to breakthrough solutions. Leveraging the UNSG's convening power in this manner could potentially pave the way for unexplored avenues towards achieving CTBT's universal adherence.

Lastly, it is prudent to explore the possibility of a coordinated and collective appeal directed at influential nations, specifically China, Russia, and the United States. Encouraging simultaneous or closely coordinated ratification efforts from these nations could significantly bolster the Treaty's credibility and set a precedent for global cooperation in nuclear disarmament.

The focus should be on adopting fresh perspectives and innovative methods to drive progress and overcome stagnation. This means steering clear of traditional ways of thinking and operating to bring about meaningful change and advancement.

CONCLUSION

The CTBT Article XIV Conferences have stood as instrumental forum, dedicated to promoting the entry into force of the Treaty. Examining their evolution from 1999 to 2023, this article reveals the conferences' pivotal role in fostering global dialogue, encouraging ratification, and addressing challenges impeding the Treaty's effectiveness. Despite facing obstacles such as slow ratification and the reluctance of some key Annex 2 states to fully commit themselves, these conferences have witnessed substantial achievements. The steady increase in ratifications and signatures since the inception of the conferences attests to their significance in advancing the CTBT's universalization. Looking ahead, the upcoming 30th anniversary of the Treaty offers an opportune moment to commemorate achievements and rally global support for its objectives. Leveraging this milestone, concerted efforts can

be made to galvanize remaining states, especially key Annex 2 states, toward ratification. Diplomatic initiatives, multimedia campaigns, and increased dialogue must underscore the urgency of achieving a world free from nuclear testing.

In conclusion, while the CTBT Article XIV Conferences continue to face hurdles, their importance in promoting nuclear disarmament and global security remains undisputed. The forthcoming anniversary serves as a reminder of the progress made and the collective responsibility to reinforce commitments toward a world without nuclear testing, emphasizing the imperative for global peace and stability.

RESPONSIBILITIES OF P5 STATES IN THE RUN-UP TO THE CTBT ENTRY INTO FORCE

■ Xuxu Chen ■ Lauren Cho ■ Ines Grange ■ Galina Salnikova

ABSTRACT

The entry into force (EIF) of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) has been a proceeding for over 25 years following its opening for signature in 1996. During negotiations on the Treaty in Geneva, states, in their wisdom, designed a strict entry into force provision – submission of instruments of ratification by all 44 states listed in Annex 2. That list includes, inter alia, all 5 permanent members of the UN Security Council (China, France, Russia, the UK and the USA). Until recently the majority of the P5 had been among the ratifying states – France, Russia and the UK, with only two – China and the US still unable to do so. Russia's decision in November 2023 to withdraw its ratification changed that proportion to a minority. There are six states in Annex 2 that have not ratified (and three more that have not even signed) the Treaty. Yet, the status vis-a-vis the Treaty of the P5 nations is of particular importance, given their role in global security affairs, possession of nuclear weapons and the crucial role in the process of Treaty elaboration. The present article explores not only the core responsibilities of the P5 States to facilitate the entry into force of the CTBT but also the benefits that they may gain if the CTBT takes effect. The article also investigates possible short-term and long-term measures that could be implemented by the P5 to advance the CTBT entry into force.

INTRODUCTION

In an interconnected world grappling with numerous challenges, the existence of nuclear weapons stands as a persistent threat that transcends borders, ideologies, and time. Despite the existential risk posed by nuclear weapons, geopolitical challenges and strategic considerations have impeded significant progress in achieving nuclear disarmament. However, the EIF of the CTBT is long overdue and only creates a "sense of unfinished business" to solidify the de-facto global moratorium on nuclear testing. While the majority of States have signed and ratified the CTBT, nine states — including three permanent members of the United Nations Security Council (China, Russia, and the USA) – have yet to ratify the CTBT, further preventing the Treaty's entry into force.

Almost all nuclear tests in history were conducted by the P5 States: China, France, Russia (former Union of Soviet Socialistic Republics or USSR), the United Kingdom (UK), and the United States (US). By the end of the 20th century, the P5 States had recognized the lowered added value of nuclear testing and the importance of the moratorium on nuclear testing, which led to the finalization of CTBT negotiations in the 1990s. As permanent members of the UNSC, bearing the primary responsibility of maintaining international peace and security, as well as "recognized" nuclear-weapons states (NWS) under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), they supported a global ban on nuclear testing in the "spirit of urgent and responsible teamwork"[1].

[1] Floyd, Robert. "Article XIV Conference Speech: Unfinished Business." CTBTO, September 22, 2023. <https://www.ctbto.org/sites/default/files/2023-09/230922_CTBT-Article%20XIV%2023-ESFloyd-FINAL%20WEBSITE.pdf, accessed 1 July 2024>.

THE NEED FOR THE CTBT ENTRY IN FORCE AND THE P5 RESPONSIBILITY

The CTBT is a unique Treaty and was widely considered a successful international agreement. The norm against nuclear testing is among the strongest norms in the international security domain. However, alleged growing activity at nuclear test sites in China, Russia, and the US might signify the initial preparations for resuming nuclear testing by these states.[2] In the current deteriorating geopolitical situation and growing tensions, it becomes imperative to build confidence by legally reinforcing this norm, both for non-nuclear-weapon states (NNWS) and NWS. The EIF of the CTBT would further reinforce the international norm against nuclear testing, signaling a shift away from the growing reliance on nuclear weapons in national security doctrines.

The CTBT entry into force also holds particular significance in upholding commitment to and stability of the NPT. The NPT was extended indefinitely partly due to commitments made by the Nuclear Five to cease nuclear testing and finalize negotiation for the CTBT. The lack of ratification of the CTBT therefore weakens the stability of the NPT. While the CTBT may not induce global denuclearization, its EIF would therefore not only support the NPT but also prove that NWS take their responsibilities of disarmament seriously.

Aside from the geopolitical reasoning, the P5 bear responsibility for the negative consequences of over 2,000 nuclear tests conducted across the globe: environmental damage, decreased human health, displacement, and other forms of injustice brought upon to the communities in the areas of nuclear test sites. On December 22, 2023, the UN General Assembly adopted a resolution entitled: “Addressing the Legacy of Nuclear Weapons: Providing Victim Assistance and Environmental Remediation to Member States Affected by the Use or Testing of Nuclear Weapons”.[3] The Resolution explicitly recognizes the responsibility for the harm caused by nuclear testing and use lies on Member States who have done so, meaning, primarily on the P5. Although none of the P5 States voted in favour of the Resolution (France, Russia, and the UK voted against; China and US abstained), the growing international recognition of such responsibility (171 votes in favour) signifies that more attention to this issue is to be drawn by the P5 as well.

P5 are both directly and indirectly involved in all major regional conflicts, including with participation of the remaining Annex 2 States that are yet to ratify the CTBT. For instance, following India and Pakistan’s nuclear tests in 1998, the P5 criticised that. Subsequently, both India and Pakistan unilaterally declared moratoriums on nuclear testing. While it remains uncertain whether there is a direct cause-and-effect relationship, it does appear that global condemnation can play a role in influencing these countries to discontinue nuclear testing.

It is important to keep in mind that there is not only responsibility for the P5 to ensure the CTBT EIF, but it is also in line with some of their interests and within their abilities. The following sections look deeper into each of the P5’s incentives and abilities separately.

People's Republic of China

For China, the main reasons for its caution concerning a nuclear test ban are geopolitical, Treaty signing status, and nuclear weapons technology considerations. Considering such factors as economic and trade competition with the US, Washington arms sales to Taiwan,

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[2] Exclusive: Satellite images show increased activity at nuclear test sites in Russia, China and US. CNN. September 23, 2023. <https://edition.cnn.com/2023/09/22/asia/nuclear-testing-china-russia-us-exclusive-intl-hnk-ml/index.html, accessed 1 July 2024>.

[3] Addressing the Legacy of Nuclear Weapons: Providing Victim Assistance and Environmental Remediation to Member States Affected by the Use or Testing of Nuclear Weapons. United Nations General Assembly. <https://digitallibrary.un.org/record/4033026/files/A_RES_78_240-EN.pdf?ln=en, accessed 1 July 2024>.

and its strategic blueprint of East Asia, the US-China relationship is in troubled waters.[4] There is little hope that China will reach a consensus with the US on the nuclear issue. Moreover, with the continuing volatility in bilateral relations between China and India, India hopes to improve its negotiating position with China through nuclear weapons development.[5]

Beijing has always had a positive attitude towards CTBT, which has been reiterated with CTBTO Executive Secretary Robert Floyd's visit to Beijing in November 2023, where China expressed readiness to "make new contributions to upholding the purposes and objectives of the CTBT and advancing the preparatory work for the implementation of the CTBT".[6] Despite this fact, China will unlikely be the next P5 State that ratifies the CTBT in the situation, when neither US nor India do so. Also, since China has conducted the fewest number of nuclear tests among the P5 countries, the military believes that nuclear modernisation is still deficient, and ratifying the CTBT could bring about an unequal fixation on disarmament responsibilities.[7] That has until today prevented China from taking the final step.

There may still be many challenges before China formally ratifies the CTBT, but the endeavour can still move forward on several fronts. The first is greater involvement of the International Monitoring System (IMS) and greater transparency. As a positive sign, China currently has five installed and five certified monitoring facilities undergoing testing, as well as one under construction.[8] China has been cautious about making more progress in increasing transparency for the sake of protecting its nuclear counterforce, but growing transparency would also mean better reputation and fewer accusations from non-nuclear States.[9] Secondly, China could support the resumption of some regional bilateral and multilateral dialogues and reach an understanding on the nuclear issue with other countries such as the DPRK, India, and the United States. That can be achieved with more involvement of international organisations and institutions, as well as civil society, which has long been lacking.[10]

France

Along with the United Kingdom, France was among the first nuclear-armed states to sign the CTBT in 1996 and jointly ratify it in 1998.[11] Since then, France has taken steps to fully commit to the Treaty. France's contribution to the International Monitoring System has been important, with the establishment on its territoryof sixteen monitoring stations, and one certified radionuclide laboratory.[12] In addition to this, the country is now giving political, technical and financial support to the CTBT Preparatory Commission.

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4 Sagan, Scott D., and Jane Vaynman. "Conclusion: Lessons learned from the 2010 nuclear posture review", Nonproliferation Review, 18.1 (2011): 237-262. <https://www.tandfonline.com/doi/abs/10.1080/10736700.2011.549183, accessed 1 July 2024>.

5 Arfan Mahmood, Zaheer Abbas and Wei Hong. China's strategic choice: opportunities and challenges, International Journal of Political Science, Law and International Relations, 2017, <https://www.academia.edu/download/54909472/5.IJPSLIRAUG20175.pdf, accessed 1 July 2024>.

6 Vice Foreign Minister Ma Zhaoxu Meets with Executive Secretary of the Comprehensive Nuclear-Test-Ban Treaty Organization Robert Floyd, Ministry of Foreign Affairs of the People's Republic of China, 1 November 2024, <https://www.fmprc.gov.cn/eng/wjb_663304/zygy_663314/gyhd_663338/202311/t20231102_11172323.html, accessed 1 July 2024>.

7 Johnston, Alastair Iain. "Learning versus adaptation: Explaining change in Chinese arms control policy in the 1980s and 1990s." The China Journal 35 (1996): 27-61. <https://www.journals.uchicago.edu/doi/pdf/10.2307/2950275, accessed 1 July 2024>.

8 Country Profiles, CTBTO, <https://www.ctbto.org/our-work/country-profile?name=China, accessed 1 July 2024>.

9 Perfilyev, Nikita. "The CTBT and Strategic Relations Between Russia, China, and the United States." Security Index: A Russian Journal on International Security 20.2 (2014): 103-110.

10 Floyd, Robert. "Confronting the Comprehensive Test Ban Treaty Challenge." Arms Control Today, 51.8 (2021): 20-24, <https://www.jstor.org/stable/27088645, accessed 1 July 2024>.

11 "25 years of the Comprehensive Nuclear Test Ban Treaty", French Ministry for Europe and Foreign Affairs. <https://www.diplomatie.gouv.fr/en/french-foreign-policy/security-disarmament-and-non-proliferation/news/2021/article/25-years-of-the-comprehensive-nuclear-test-ban-treaty, accessed 1 July 2024>.

12 Ibid.

This is in line with the European Union's (EU) support to the CTBTO and its objectives, from which the French position cannot be considered in isolation. The EIF of the Treaty, already considered in 2017 "France's top priority for nuclear disarmament and non-proliferation",[13] was equally labelled by the EU High Representative for Foreign Affairs and Security Policy Josep Borrell in 2021.[14] Aligned with these goals, financial support has been given to the CTBTO to promote the Treaty's entry into force.[15]

France does have influence to further the ratification of the Treaty by certain Annex 2 countries and thus support its EIF. Former CTBTO PrepCom Executive Secretary Lassina Zerbo recognised this position as he encouraged the country to exercise its leadership at the EU level and beyond.[16] French influence can thus follow a two-fold approach: focusing on gathering support among the EU to sustain momentum, while encouraging other countries to ratify the Treaty.

Of all the countries, it seems that France might want to focus on working towards a ratification of the Treaty by the United States in the immediate future. Some sources point to the alliance between France and the US to indicate that this is where talks would be the most efficient. As a result of US[17] ratification of the document, remaining countries may see an incentive to engage in a similar process, and France could then play a consolidating role. In doing so, France would participate to legally enshrine a norm that has yet to be so, and ultimately, promote a safer and more peaceful world.

Russian Federation

Despite the fact that the Russian Federation has been for decades a great supporter for the nuclear test ban and ratified the CTBT in 2000, the lack of progress towards the ratification by the US has led to Russia's withdrawing its CTBT ratification effective as of November 2023.[18] The "de-ratification" is justified as a political step to mirror the scale of US commitments to the CTBT. Russia reiterates its commitment to the nuclear test moratorium unless the US conducts a nuclear test first. Russia is also reiterating that de-ratification does not affect its status as a signatory state or support for and cooperation with the CTBTO, including the finalisation of Russian segment of the IMS. The final 32nd station, located in Yuzhno-Sakhalinsk, started transmitting data to the International Data Centre (IDC) of the CTBTO in December 2023. As of 2024 Russia hosts the second highest number of IMS facilities of any Member States. Russian discourse in its majority considers the de-ratification as not bearing any consequences aside from the political signalling to the US in the changed geopolitical situation compared to 2000, while some experts believe that Russia lost a very important symbol of its commitment to nuclear disarmament and a major bargaining chip to pressure the US.[19]

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[13] "France Reaffirms Strong Support for the CTBT", CTBTO Preparatory Commission, <https://www.ctbto.org/news-and-events/news/france-reaffirms-strong-support-ctbt, accessed 1 July 2024>.

[14] Statement delivered on behalf of the European Union at the Twelfth Article XIV Conference in support of the Entry-into-Force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), 23 September 2021. <https://www.eeas.europa.eu/sites/default/files/eu_statement_article_xiv_conference_23_september_2021_ny_unga_full_version_final_0.pdf, accessed 1 July 2024>.

[15] European Union Council Decision (CFSP) 2023/2064, 25 September 2023. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023D2064, accessed 1 July 2024>.

[16] "France Reaffirms Strong Support for the CTBT", CTBTO Preparatory Commission.

[17] Emmanuelle Maitre, "Observatoire de la Dissuasion: Bulletin mensuel", Bulletin n. 105, January 2023. <https://www.frstrategie.org/sites/default/files/documents/programmes/observatoire-de-la-dissuasion/bulletins/2023/105.pdf, accessed 1 July 2024>.

[18] Natalia Vassilieva, "Putin signed the law on withdrawal of CTBT ratification", Parlamentskaya Gazeta, November 2, 2023 <https://www.pnp.ru/politics/putin-podpisal-zakon-ob-otzyve-ratifikacii-dvzyai.html, accessed 1 July 2024>.

[19] "Arbatov: CTBT ratification was Russia's trump card", Publico, October 17, 2023. <https://publico.ru/news/arbatov-ratifikaciya-dvzyai-byla-kozyrem-rossii, accessed 1 July 2024>.

Since Russia has already ratified the CTBT before and kept its ratification status for 23 years, there is no technical hindrance to the re-ratification. Geopolitical tensions with the USA and the "collective West", which Russia spotlights a lot in its foreign policy, are the only explicit reason to refrain from the ratification.[20] However, the growing activity at the Novaya Zemlya test site might hint on Russia's initial preparations for resuming nuclear testing, but Moscow denies any intention to break the testing moratorium first.[21] Now, though, there is no direct benefit for Russia to come back to the CTBT unless the US makes meaningful progress towards ratification.

Nevertheless, as the Nuclear Five chair for 2023-2024, Russia has special responsibility to maintain communication among all the P5 States and an interest to ensure that the withdrawal of its CTBT ratification does not hinder any possible negotiation progress in the grouping. Russia's main ally in the group is China, but it cannot rely on this alliance too much in nuclear-related matters if it is not beneficial for China as well. Also, Russia has influence on some of the rest of the Annex 2 States that are yet to ratify the Treaty. The rapidly developing relations with the Democratic People's Republic of Korea (DPRK) and plans to improve collaboration in various fields, including military,[22] as well as close political and military ties with Iran, might give Russia a chance in the future to lean on the two Annex 2 States towards the ratification of the CTBT. Russia also has more venues for collaboration with India and Pakistan as a core member of the growing BRICS group and the Shanghai Cooperation Organization. However, it is difficult to expect Russia to become pro-active on the range of issues regarding the EIF unless it sees a change of attitude on the part of the US.

United Kingdom

Comparing to other P5 States, the United Kingdom does not have domestic nuclear test sites for its nuclear program, which means that its nuclear testing actions are not independent and rely heavily on cooperation with other countries (mainly the United States at the Nevada Test Site). Throughout the Cold War, the UK was facing a long-lasting solid nuclear threat from Russia and was naturally involved in the security alliance led by the US. Therefore, a greater willingness was maintained to adjust its nuclear policy to keep pace with the prior leadership of the US. Much of the UK's responsibility for nuclear testing has been shared by the US, which led in the past to a consistently positive attitude towards CTBT. The UK was one of the first States to sign and ratify the CTBT.
Currently, as one of the countries that has signed and ratified the CTBT, the UK's efforts are focused on political dialogue, material and technical support, and appeals. According to UK Deputy Permanent Representative to the UN James Kariuki, speaking at the Security Council briefing on CTBT, the UK will actively engage both publicly and privately with the remaining Annex 2 States and put pressure on those that are still conducting nuclear tests.[23] The IMS is the most important of all UK's responsibilities, and if the UK can continue to provide extensive technical support and adequate funding to the verification regime in the future, it can do as much as possible to ensure that the regime is fit for purpose when the Treaty comes into force. In addition, the UK is well experienced in promoting the understanding

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[20] Leonid Slutsky, "Those Russians Again", Russian International Affairs Council, October 19, 2023 <https://russiancouncil.ru/analytics-and-comments/comments/opyat-eti-russkie/?sphrase_id=124189561, accessed 1 July 2024>.

[21] "Russian Duma moves to revoke ratification of nuclear test ban treaty", Euronews, October 17, 2023. <https://www.euronews.com/2023/10/17/russian-duma-moves-to-revoke-ratification-of-nuclear-test-ban-treaty, accessed 1 July 2024>.

[22] Roman Romanov, Alexei Nikolsky, "Russia and the DPRK plan to develop relations in all spheres, including military relations", Vedomosti, September 14, 2023. <https://www.vedomosti.ru/politics/articles/2023/09/14/995086-rossiya-i-kndr-planiruyut-razvivat-otnosheniya-vo-vseh-sferah, accessed 1 July 2024>.

[23] Foreign, Commonwealth & Development Office, Government UK, "Comprehensive Nuclear Test Ban Treaty 25th anniversary: UK and France statement", April 6, 2023. <https://www.gov.uk/government news/uk-france-statement-on-25th-anniversary-of-the-comprehensive-nuclear-test-ban-treaty>

and involvement of civil society and youth groups in disarmament affairs, and closer links with civil society in the call for and promotion of the CTBT would be more conducive to facilitating the process of bringing the CTBT into force.

United States of America

The United States signed the CTBT in 1996 but has yet to gain advice and consent for ratification by the Senate after the decision by the Senate to vote against ratification in 1999. Subsequent administrations have been unwilling to devote the necessary political capital to change this status quo. While there have been shifts in the US approach to the CTBT over time, members of certain parties still strongly oppose ratification, even advocating for "unsigning" or withdrawing from the CTBT.[24] The main concern about ratifying the CTBT in the US has largely been related to national security and other nations' compliance with the zero-yield standard, as well as the potential compromise of its nuclear deterrent capability. Ratifying the CTBT, however, would allow the country to maintain a strong position in global nuclear diplomacy.[25] More concretely, pushing forward the EIF of the CTBT would rather prevent other nations from enhancing their nuclear arsenals, further locking in US nuclear dominance.

There have been reports about increased activity at the Nevada nuclear test site through expansion, ultimately acting contrary to its responsibilities under the CTBT.[26] To uphold credibility and consistently meet its responsibilities under the Treaty, the US has a responsibility to refrain from engaging in actions perceived as contradicting the main goals of the CTBT. This will be critical to ultimately foster an environment conducive to encouraging other Annex 2 states to follow suit. The US, with its diplomatic ties and alliances with a number of Annex 2 states, can in theory further increase the likelihood of CTBT ratification through bilateral discussions that address reservations and concerns specific to non-ratifying states, while working towards finding solutions or providing reassurances related to verification mechanisms or other Treaty provisions. But for that to happen, the US needs to send clear signals showing that the CTBT ratification is among its important priorities. At the moment, though, the signals are rather mixed. US ratification of the CTBT could change the political calculus for Annex 2 states as well. By demonstrating its commitment to the Treaty, the US could create momentum and encourage these states to reconsider their own positions on ratification. Since individual states fear that unilateral ratification could limit their strategic flexibility, the US, according to some experts, could propose a simultaneous ratifications of the CTBT with China, India, and Pakistan — three states that have demonstrated a certain level of engagement and recognition of the importance of the CTBT architecture — to create a "de facto negotiation bloc" capable of applying pressure on remaining Annex 2 states like Iran and DPRK to join the Treaty. All remaining Annex 2 States have repeatedly stated that they would not consider CTBT ratification unless the US fully joins the Treaty.[27] As a major global nuclear power, therefore, US ratification would set a precedent for others, signifying a shift towards disarmament and non-proliferation.

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[24] "U.S. Questions Russian CTBT Compliance," Arms Control Association, <https://www.armscontrol.org/act/2019-07/news/us-questions-russian-ctbt-compliance, accessed 1 July 2024>.

[25] U.S. Department of State, "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments," June 2020, https://www.state.gov/wp-content/ uploads/2020/06/2020-Adherence-to-and-Compliance-with-Arms-Control-Nonproliferation-andDisarmament-Agreements-and-Commitments-Compliance-Report.pdf, 49-51.

[26] Cheung, Eric, Brad Lendon, and Ivan Watson, "Exclusive: Satellite Images Show Increased Activity at Nuclear Test Sites in Russia, China and US," CNN, < https://edition.cnn.com/2023/09/22/asia/nuclear-testing-china-russia-us-exclusive-intl-hnk-ml/index.html, accessed 1 July 2024>.

[27] Matsick, Rob. "Shaking the Rust Off the Comprehensive NuclearTest-Ban Treaty Ratification Process". Journal of National Security Law & Policy (February 13, 2020).

Policy Recommendations

The ultimate policy recommendation on how the P5 could fulfil their responsibility towards the CTBT entry into force is to **give up their nuclear modernisation and build-up programs** that would require such testing, exercise diplomacy, and ratify the Treaty themselves. To overcome the arguments that one state would not ratify the CTBT until another one does so, the ratification can be a joint action. However, since the authors realize the complexity of the situation, there are three key more implementable recommendations they would like to make.

First, the P5 could issue a **joint declaration with their commitment to the letter of the CTBT.** Such a statement would not have legally binding nature, it would serve multiple purposes. However, it would serve as a confidence building and reassurance measure for both within and outside the group as it will demonstrate the recommitment of all the nuclear five to the nuclear test moratorium and, importantly, the agreement within the group on this matter. For this to happen, it would be useful if the CTBT is put on the agenda of N5 meetings, which are being chaired until August 2024 by Russia, and then by China for the next 12 months.

Second, the P5 need to **exercise their geopolitical influence to lean the remaining Annex 2 States to ratify the Treaty**. Each of the P5 members have direct or indirect influence on regional security architectures around the globe and, subsequently, on the Annex 2 States in those regions. Such influence may be exercised through economic ties, direct negotiations, or the contribution to strengthening those regional security architectures.

Third, the P5 need to **maintain the highest level of support to the CTBTO** both on completing the setting up and supporting the use of the IMS, but also supporting training and capacity building efforts as well as conferences and initiatives to promote the EIF. Youth empowerment and the support to the CTBTO Youth Group is also an important aspect of strengthening the role of the CTBT and supporting the CTBTO in the long run.

APPENDIX

Table 1. Monitoring facilities in P5 countries

International Monitoring System Facilities located in P5 countries, as of March 2024		
Country responsible	**Type of facility**	**Location**
China	Primary Seismological Station	Hailar
		Lanzhou
	Auxiliary Seismological Station	Baijiatuan
		Kunming
		Sheshan
		Xi'an
	Radionuclide Station	Beijing
		Lanzhou
		Guangzhou
	Radionuclide Laboratory	Beijing *(planned)*
	Hydroacoustic Station	N/A
	Infrasound Station	Beijing *(under construction)*
		Kunming
France	Primary Seismological Station	Tahiti
	Auxiliary Seismological Station	Mont Dzumac, New Caledonia
		Montagne des Pères, GF
	Radionuclide Station	Papeete, Tahiti
		Pointe-à-Pitre, Guadeloupe
		Réunion
		Port-aux-Français, Kerguelen
		Kourou, French Guiana
		Dumont d'Urville, Antarctica
	Radionuclide Laboratory	Bruyères-le-Chatel
	Hydroacoustic Station	Crozet Islands
		Guadeloupe
	Infrasound Station	Marquesas Islands
		Port Laguerre, New Caledonia
		Kerguelen
		Tahiti
		Guadeloupe

International Monitoring System Facilities located in P5 countries, as of March 2024		
Country responsible	**Type of facility**	**Location**
Russian Federation	Primary Seismological Station	Khabaz
		Zalesovo
		Norilsk
		Peleduy
		Petropavlovsk-Kamchatskiy
		Ussuriysk
	Auxiliary Seismological Station	Kirov
		Kislovodsk
		Obninsk
		Arti
		Seymchan
		Talaya
		Yakutsk
		Kuldur
		Bilibino
		Tiksi
		Yuzhno-Sakhalinsk
		Magadan
		Belogornoe
	Radionuclide Station	Kirov
		Norilsk
		Peleduy
		Bilibino
		Ussuriysk
		Zalesovo
		Petropavlovsk-Kamchatskiy
		Dubna
	Radionuclide Laboratory	Moscow
	Hydroacoustic Station	N/A
	Infrasound Station	Dubna
		Petropavlovsk-Kamchatskiy
		Ussuriysk
		Zalesovo

International Monitoring System Facilities located in P5 countries, as of March 2024		
Country responsible	**Type of facility**	**Location**
United Kingdom	Primary Seismological Station	N/A
	Auxiliary Seismological Station	Eskdalemuir
	Radionuclide Station	BIOT/Chagos Archipelago
		St. Helena
		Tristan da Cunha
		Halley, Antarctica
	Radionuclide Laboratory	Aldermaston, Reading Berkshire
	Hydroacoustic Station	BIOT/Chagos Archipelago
		Tristan da Cunha
		Ascension
	Infrasound Station	Tristan da Cunha
		Ascension
		Bermuda
		BIOT/Chagos Archipelago
United States	Primary Seismological Station	Lajitas, TX
		Mina, NV
		Pinedale, WY
		Eielson, AK
		Vanda, Antarctica
	Auxiliary Seismological Station	Guam, Marianas Islands
		Palmer Station, Antarctica
		Tuckaleechee Caverns
		Piñon Flat, CA
		Yreka, CA
		Kodiak Island, AK
		Albuquerque, NM
		Shemya Island, AK
		Elko, NV
		South Pole, Antarctica
		Newport, WA
		San Juan, PR

International Monitoring System Facilities located in P5 countries, as of March 2024		
Country responsible	**Type of facility**	**Location**
United States	Radionuclide Station	Sacramento, CA
		Sand Point, AK
		Melbourne, FL
		Palmer Station, Antarctica
		Ashland, KS
		Charlottesville, VA
		Salchaket, AK
		Wake Island
		Midway Islands
		Oahu, HI
		Upi, Guam
	Radionuclide Laboratory	Richland, WA
	Hydroacoustic Station	Wake Island
	Infrasound Station	Fairbanks, AK
		Palmer Station, Antarctica
		Windless Bight, Antarctica
		Newport, WA
		Piñon Flat, CA
		Midway Islands
		Hawaii, HI
		Wake Island

THE CTBT AND NON-SIGNATORY STATES: OPPORTUNITIES FOR ENGAGEMENT

Sanaa Alvira ■ Puot Nyang Both ■ Maheen Shafeeq

ABSTRACT

Adopted in 1996, the Comprehensive Nuclear-Test-Ban Treaty (CTBT) is a major milestone in nuclear disarmament. Yet it remains unenforced as it requires ratification by all 44 Annex 2 states, including holdouts such as China, DPRK, Egypt, India, Iran, Israel, Pakistan, Russia and the United States. Despite broad international support, complex geopolitical considerations have hampered the Treaty's progress. The CTBT has established a strong global norm against nuclear testing, with only 10 tests conducted since it was opened for signature. Russia's recent de-ratification in November 2023 highlights the ongoing challenges. Recognizing that a unique and tailored approach to engagement would be required for Annex 2 non-signatories, this paper examines the profiles and motivations of the remaining Annex 2 non-signatories to the CTBT – India, Pakistan and the Democratic People's Republic of Korea (DPRK). It also explores potential avenues for engagement with these states, highlighting the need for renewed efforts, from high-level diplomatic engagement to grassroots advocacy.

INTRODUCTION

Banning nuclear tests has been one of the oldest agenda items in the field of nuclear arms control.[1] The Comprehensive Nuclear-Test-Ban Treaty (CTBT), adopted in 1996, represents a major milestone in the pursuit of nuclear disarmament, signaling a global commitment to banning all nuclear explosions. Despite garnering signatures from 187 countries and ratification by 178 nations as of July 2024,[2] the CTBT faces a significant impediment to entering into force. It has a complex entry into force mechanism – the CTBT requires the ratification by all the 44 states named in Annex 2 of the Treaty.[3] Of these 44 Annex 2 states, China, Egypt, Iran, Israel, Russiaand the United States, have signed (but not ratified) the Treaty, and DPRK, India, and Pakistan, have not signed.

The achievements in arms control during and the post-Cold War era initially fostered optimism for the cessation of nuclear testing. The CTBT has created a firm and virtually unchallenged global norm against nuclear testing. Only ten tests have been conducted since it opened for signature in 1996, compared with more than 2,000 over the five previous decades. In this century, only one country – the DPRK – has breached the norm and tested nuclear weapons. More recently, Russia de-ratified from the CTBT in November 2023, to "mirror US actions," which has also signed, but not ratified the Treaty.[4] Given these evolving circumstances, many observers see the CTBT as an "elusive goal"[5] due to several reasons.

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1 "Comprehensive Nuclear-Test-Ban Treaty: Background and Current Developments," Congressional Research Service, September 1, 2016, <https://crsreports.congress.gov/product/pdf/RL/RL33548, accessed 1 July 2024>.

2 "Status of Signature and Ratification," CTBTO, <https://www.ctbto.org/our-mission/states-signatories, accessed 1 July 2024>.

3 Annex 2 States are the 44 States that formally participated in the 1996 session of the Conference on Disarmament and possessed nuclear power or research reactors at the time.

4 Shizuka Kuramitsu, "Russia 'Deratifies' Nuclear Test Ban Treaty," Arms Control Association, November 2023, <https://www.armscontrol.org/act/2023-11/news/russia-deratifies-nuclear-test-ban-treaty, accessed 1 July 2024>.

5 Rakesh Sood, "Why the CTBT remains an elusive goal," ORF Issue Brief, No. 161 (October 2016), <https://www.orfonline.org/wp-content/uploads/2016/10/ORF_Issue_Brief_161_on_CTBT.pdf, accessed 1 July 2024>.

Policy and doctrine shifts: Under the current geopolitical environment, the policies and doctrines of most countries are shifting towards rearming, which makes a halt on nuclear testing more challenging. As policies and doctrines are evolving, they are having a trickle-down effect. In case the U.S. reverts to nuclear testing, Russia would follow, this will open doors for China and India, and ultimately, Pakistan and other states will follow suit. Eventually impeding the objective of CTBT.

Impact of emerging technologies: The second reason highlights the impact of emerging technologies on nuclear weapons. Rapid advancement in emerging technology such as more precise and more powerful weapons, stimulation of nuclear testing, and more extensive and advanced delivery systems such as hypersonic and so on, renders the efforts towards arresting nuclear testing ineffective. Emerging nuclear technologies, therefore, complicates deterrence and ultimately reduces strategic stability. It also introduces conventional and non-conventional (nuclear) conundrums. This raises the risk of going back to nuclear testing.

In total, there are currently nine states that have not signed the Treaty – Bhutan, DPRK, India, Mauritius, Pakistan, Saudi Arabia, South Sudan, Syrian Arab Republic and Tonga. This paper, however, focuses specifically on the remaining Annex 2 non-signatory states – namely, the DPRK, India, and Pakistan– and explores the potential opportunities and avenues for their constructive engagement with the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), especially given the current international security environment. Annex 2 states play a pivotal role in ensuring the CTBT's entry into force, as their ratification is explicitly required for the Treaty to become operational. These states, which possess nuclear capabilities or have significant nuclear expertise, hold a distinctive responsibility in upholding the global non-proliferation and disarmament regime. While acknowledging that non-Annex 2 non-signatory states are also important, this paper recognizes that a unique and tailored approach for engagement would be required for Annex 2 non-signatory states, which presents a different set of challenges by itself.

The paper is structured as follows – first, the three countries' profiles in relation to the CTBT are examined. Following an understanding of their security, political and legal considerations, a series of "opportunities for engagement" at various levels is explored in the next section. Finally, some challenges in exploring these opportunities are highlighted.

COUNTRY PROFILES

India

In 1996, as the CTBT negotiations reached their successful conclusion and the Treaty was opened for signature, India faced a difficult dilemma. At that moment the prevailing consensus within the nation was unequivocally against joining the Treaty – primarily because India was at the delicate stage of its nuclear weapons program. But to reject the Treaty, which India itself was the first to propose some 40 years earlier, could be perceived as being unusual. This may explain why India decided to substantiate its position by citing its perceived lack of linkage with nuclear disarmament and a seeming misalignment with India's security concerns.[6] India's reluctance to endorse the CTBT was a result of a delicate interplay between domestic and international factors. While the inevitability of nuclear tests in 1998 was driven by a desire to maintain political and technical flexibility, India's participation in the CTBT negotiations showcased a willingness to curtail its nuclear testing capabilities. Indeed, the tests marked a significant policy shift for India, which had initially shown enthusiasm for the CTBT when negotiations began in 1994. On 11 May 1998, immediately after the tests,

[6] Manpreet Sethi, "CTBT and India's Options",Strategic Analysis, Vol. 24, No. 6 (September 2000), <https://ciaotest.cc.columbia.edu/olj/sa/sa_sep00sem01.html, accessed 1 July 2024>.

the Indian government stated that "India would be prepared to consider being an adherent to some of the undertakings in the CTBT. But this cannot obviously be done ina vacuum. It would necessarily be an evolutionary process from concept to commitment and would depend on a number of reciprocal activities."[7]

However, India's strongest public objection to the Treaty was related to Article XIV, the Entry into Force (EIF) clause – to address India's unwillingness to accept the emerging Treaty, an innovative EIF clause was included into in the final draft of the CTBT. This clause conditioned the EIF by the Treaty's ratification by 44 countries listed in Annex 2. India objected to this clause on legal grounds, asserting a violation of the Vienna Convention Law of Treaties. The objection stemmed from a perception that the clause compelled India to sign without allowing voluntary consent, a departure from established principles of international law.[8] Although a certain number of Non-Aligned Movement (NAM) and Nuclear Weapon States (NWS) shared similar objections to the CTBT as India, it raises the question of why India almost singularly opposed the Treaty in response to these identified shortcomings. Some experts highlighted that the domestic political factors need to be considered, especially following the 1995 NPT Review and Extension Conference – "In general, mobilization of Indian politics against nuclear arms control involves a pattern of interaction among four key domestic groups – the foreign policy bureaucracy, a defense lobby or security community, the press, and political parties". [9]

Additionally, India realized the need to assess the implications of the NPT for CTBT negotiations during the NPT Review and Extension Conference in April/May 1995. It washighlighted that India found concern not only in the indefinite extension of what it considered an unequal Treaty, but also in the lack of a balanced framework to bind NWS, as opposed to NNWS. The ambiguity surrounding nuclear disarmament in the Principles and Objectives section, coupled with the acceptance of vague wording such as the "ultimate" goal of eliminating nuclear weapons, highlighted the dominance of NWS in the review process.[10] Despite not participating in the NPT Review and Extension Conference of 1995, India observed with growing concern a perceived lack of intent among NWS to progress from CTBT negotiations toward meaningful nuclear disarmament. Instead, it appeared that these states aimed to use the test ban treaty as a mechanism to draw non-signatories, including India, into the NPT fold. This strategic move raised apprehensions in India, particularly as China and later France resumed nuclear testing shortly after the conclusion of the 1995 NPT Review Conference, seemingly justifying India's initial concerns.

India's stance on the CTBT between 1994 and 1996 was thus a complex interplay of domestic considerations, security perceptions, and legal objections – such as the NPT Extension Conference and pressure from the EIF clause. Balancing its sovereign rights with recognition of global non-proliferation efforts, India navigated a delicate path, ultimately shaping its stance on the CTBT as a product of both internal dynamics and external pressures. And, yet, after a series of nuclear weapon tests in 1998, India has been observing a global moratorium on testing. Understanding this intricate interplay is essential for comprehending India's evolving role in the global nuclear order.

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7 Bharath Gopalaswamy, "India and Comprehensive Nuclear Test-Ban Treaty: To Sign or Not to Sign?" SIPRI Policy Brief (January 2010), <https://www.sipri.org/sites/default/files/SIPRIPB1001.pdf, accessed 1 July 2024>.

8 Sethi, "CTBT and India's Options."

9 Mistry, "Domestic- International Linkages".

10 Arundhati Ghose, "India's Security Concerns and Nuclear Disarmament," Journal of International Affairs, Vol. 51, No. 1 (Summer 1997), pp. 239-261, <https://www.jstor.org/stable/24357482, accessed 1 July 2024>.

Pakistan

Pakistan had been an enthusiastic supporter of a comprehensive nuclear test ban and has actively participated in the negotiations that led to the finalization of the CTBT in the Conference on Disarmament (CD).[11] Despite being a non-signatory state, Pakistan holds an accredited Observer Status at the Preparatory Commission of CTBTO and participates in Article XIV Conferences, CTBT Ministerial Meetings, CTBT Science and Technology Conferences and CTBT Science Diplomacy Symposiums. The CTBTO has also engaged with Pakistan on several occasions. Most recently, the CTBTO team travelled to Pakistan in May 2018. While Pakistan is one of the Annex 2 non-signatory states, it is a strong proponent of a nuclear test ban and has taken initiatives for a regional test ban.

In the 1970s, Pakistan proposed to India several bilateral measures and multilateral initiatives designed to keep South Asia from becoming a nuclear weapons area. The initial proposals were pledges of denuclearizing South Asia and not opting for weapons, such as the 1972 proposal for a Nuclear Weapons Free Zone and the 1978 proposal to renounce the acquisition and manufacturing of nuclear weapons.[12] In light of India's progress in the nuclear domain, in 1979, Pakistan proposed to India an inspection of nuclear facilities, joining together the NPT and acceptance of the full-scope IAEA safeguards. However, these proposals were rejected by India. From 1984 to 1986, Pakistan initiated ten UNGA resolutions as well as proposed a bilateral regional test ban treaty. Another effort for denuclearizing South Asia was in 1993 with a proposal for the creation of a missile-free zone in South Asia. Thereafter, the CTBT opened for signatures in 1996. However, disregarding all the proposals, in May 1998, India conducted a nuclear test. Pakistan followed suit to test its defensive nuclear weapons to maintain strategic balance.

Though Pakistan maintains a unilateral moratorium on nuclear testing and has repeatedly called for formalization of its proposal for a bilateral arrangement on non-testing with India,[13] it has not signed the CTBT primarily because it is cautious of the probability of India reverting to nuclear testing as soon as the doors on nuclear testing open. Given India's future ambitions, it is rapidly modernizing its nuclear arsenal. This is also evident from the increase in its stockpile to 172 as of July 2024.[14] According to the Nuclear Notebook by Hans M. Kristensen and Matt Korda, India is modernizing its nuclear arsenal with at least four new weapon systems either to complement or replace existing nuclear-capable aircraft, land-based delivery systems and sea-based systems.[15] They also estimated that India has produced enough military-grade plutonium for 140-210 nuclear warheads and has developed several new plutonium production facilities. In addition to qualitative and quantitative upgrades of delivery systems, India has a bulging fissile material stock.

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11 "Statement by Yasar Ammar, Second Secretary of Pakistan Mission to the United Nations, at the Informal meeting to mark the observance of the International Day against Nuclear Tests," Pakistan Mission to United Nations, August 31, 2016, <https://pakun.org/statements/First_Committee/2016/08312016-01.php, accessed 1 July 2024>.

12 Malik, Qasim Mustafa, "CTBT: A critical evaluation from a Pakistani perspective," Strategic Studies 33, no. 3-4 (2013), <https://issi.org.pk/wp-content/uploads/2014/10/3-CTBT-A-critical-evaluation-from-a-Pakistani-perspective.pdf, accessed 1 July 2024>.

13 "Statement by Pakistan at the Eighth CTBT Ministerial Meeting," 21 September 2016; "Statement by Pakistan," Conference on Disarmament, 30 July 2019,<https://docs-library.unoda.org/Conference_on_Disarmament_(2019)/Pakistan%2BStatement_E.pdf, accessed 1 July 2024>.

14 "Role of Nuclear Weapons grows as Geopolitical Relations Deteriorate - new SIPRI Yearbook out now," SIPRI, <https://www.sipri.org/media/press-release/2024/role-nuclear-weapons-grows-geopolitical- relations-deteriorate-new-sipri-yearbook-out-now, accessed 1 July 2024>.

15 Hans M. Kristensen & Matt Korda, "Indian Nuclear Weapons 2022," Bulletin of the Atomic Scientists, 78:4, 224-236, <https://www.tandfonline.com/doi/full/10.1080/00963402.2022.2087385#:~:text=India%20continues%20to%20modernize%20its,will%20soon%20be%20combat%2Dready, accessed 1 July 2024>.

According to the International Panel on Fissile Materials 2022 (IPFM), India's stockpile of fissile material is estimated to include 4.5±2 tones of unirradiated highly enriched uranium (HEU) enriched to 30% uranium-235 and about 9.6 tones of separated plutonium.[16] The report also stated that India has expanded its nuclear enrichment facilities by constructing new ones that will be operational by 2025. This buildup of nuclear arsenal raises concerns that India would need to resume nuclear testing.[17] Ashly Tellis, in Striking Asymmetries, encourages India to upgrade its nuclear weapons while it waits for an opportunity to resume nuclear testing. Due to these aspects, India resists signing any agreements designed to shelve the option of nuclear testing. Ultimately forcing Pakistan to follow to stay at power with India.

Pakistan is also apprehensive of selective exemption and discriminatory practices[18] that not only neglect the security concerns of Pakistan but upset the global nuclear order.[19] In July 2005, the U.S.-Indo nuclear agreement granted India a waiver by the Nuclear Suppliers Group (NSG), which allowed civilian nuclear trade among India and NSG member states.[20] The agreement meant that India would reduce the nuclear infrastructure for the weapons program as it would place the reactors under IAEA Safeguards.[21] However, this also meant that the uranium supply from NSG states would replace the indigenous uranium used at the reactors, freeing it for weapons development.[22] Ultimately, this allows vertical proliferation of nuclear materials, defeating the intent to terminate nuclear testing.

Pakistan's concerns regarding CTBT stem from the regional security dynamics.[23] While Pakistan would not pursue nuclear testing first, the onus of ending nuclear testing in South Asia rests with India and is not the sole responsibility of Pakistan.

The DPRK

The Democratic People's Republic of Korea (DPRK) is one among three countries with advanced nuclear weapons technological capability in Annex 2 which hasn't signed the Treaty. Since the Treaty was opened for signature in 1996, the DPRK has carried out six nuclear tests in (2006, 2009, 2013, January and October 2016, and 2017) respectively that are considered to be against "the de-facto norm against nuclear testing put in place a decade previously by the CTBT".[24] With all the international pressure and engagement to persuade the DPRK, the country shows less interest in adhering to CTBT or even signing the Treaty. However, in 2017 DPRK declared a self-imposed moratorium on testing nuclear weapons later followed by a DPRK-US "denuclearization" negotiation effort in 2018 that led to the Pyongyang announcement of the "closure of the nuclear test site at Punggye-ri".[25] Though

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16 "Global Fissile Material Report 2022," International Panel on Fissile Materials, 2022, <https://fissilematerials.org/library/gfmr22.pdf, accessed 1 July 2024>.

17 Ashley J. Tellis, "Striking Asymmetries: Nuclear Transitions in South Asia," Carnegie Endowment for International Peace, 2022, <https://carnegieendowment.org/files/202207-Tellis_Striking_Asymmetries-final.pdf, accessed 1 July 2024>.

18 "2016: CTBT20 Ministerial Meeting," CTBTO Preparatory Commission, June 2016, <https://www.ctbto.org/our-mission/ministerial-meetings/2016-ctbt20-ministerial-meeting, accessed 1 July 2024>.

19 Zafar Nawaz Jaspal, "Indo-US Nuclear Deal: Altering Global Nuclear Order," Strategic Studies 28, no. 2/3 (2008): 18-38, <http://issi.org.pk/wp-content/uploads/2014/06/1302498143_17101197.pdf, 1 July 2024>.

20 "U.S. - India: Civil Nuclear Cooperation," U.S. Department of State Archives, July 2005, <https://2001-2009.state.gov/p/sca/c17361.htm, accessed 1 July 2024>.

21 U.S. - India: Civil Nuclear Cooperation," U.S. Department of State Archives.

22 Sitara Noor, "Strategic Stability in South Asia: The Evolving Challenges and Potential Opportunities for India and Pakistan," Strategic Studies 43, no. 1 (2023): 64-94. <https://issi.org.pk/wp-content/uploads/2023/08/Sitara_Noor_SS_No_1_2023.pdf, accessed 1 July 2024>.

23 "Statement by Pakistan," Conference on Disarmament, 30 July 2019 https://docs-library.unoda.org/Conference_on_Disarmament_(2019)/Pakistan%2BStatement_E.pdf

24 CTBTO. "Detecting Nuclear Tests" <www.ctbto.org/our-work/detecting-nuclear-tests, accessed 1 July 2024>.

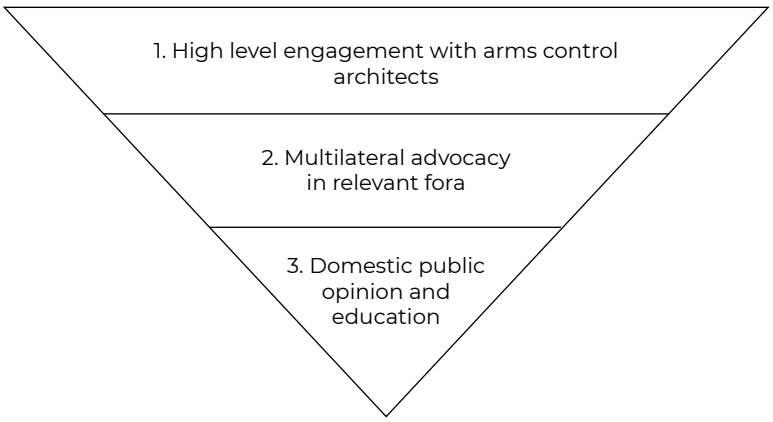
25 Niu, Qiyang, et al. "DPRK and the CTBT: What Could Come Next after the Moratorium?",Journal for Peace and Nuclear Disarmament, 10 Oct. 2022, pp. 1–9, <https://doi.org/10.1080/25751654.2022.2133335, accessed 1 July 2024>; Herzog, Stephen. "After the Summit: A Next Step for the United States and North Korea", Arms Control Today, vol. 48, no. 6, 2018, pp. 6–11, <www.jstor.org/stable/90022977 accessed 1 July 2024>.

the country has declared self-imposed moratorium and closure of the nuclear poligon, there is still a concern about DPRK's commitment to the verification of the site closed as the dismantling of the site at Punggye-ri hasn't been witnessed by international experts.[26]

The DPRK embarked on a nuclear programme back during the Cold War, when Kim Il Sung sought to protect the nation from the United States and its allies (Republic of Korea in particular).[27] Since then, DPRK has seen the development of the nuclear program as the only option to deter the US and its allies in the region. As of today, DPRK, reluctant to sign any major treaty on nuclear disarmament such as the CTBT, and remains skeptical that the United States could be trusted.[28]

OPPORTUNITIES FOR ENGAGEMENT: OUR RECOMMENDATIONS

In the evolving landscape of nuclear diplomacy, exploring avenues for constructive engagement with non-signatory Annex 2 states of the CTBT becomes paramount. These nations, possessing advanced nuclear capabilities, play a pivotal role in shaping global nuclear norms and security dynamics. Though the DPRK declared withdrawal from its self-imposed moratorium in 2020,[29] it has not yet reverted to nuclear testing. Likewise, the unilateral moratorium maintained by India and Pakistan is worth appreciation. Even though the unilateral moratorium is not a legally binding commitment, the two countries remain cognizant that a violation of the moratorium could lead to severe reputational damage and invite international criticism. The unilateral restrictions also portray the intent to abide by an arms control regime. While Russia's recent de-ratification has sparked increased global concerns about the CTBT, many countries are once again reiterating the norm against nuclear testing. It is opportune to capitalize on this momentum for constructive engagement with non-signatory Annex 2 states in any capacity possible. This exploration aims to identify strategic openings for engagement with non-signatory Annex 2 states at various levels.



[26] BBC News, "N Korea Nuclear Test Tunnels "Destroyed, "24 May 2018, <www.bbc.com/news/world-asia-44240047, accessed 1 July 2024>.

[27] Waxman, Olivia "How North Korea's Nuclear History Began", Time, 7 March, 2017, <time.com/4692045/north-korea-nuclear-weapons-history/, accessed 1 July 2024>.

[28] IISS, "DPRK Strategic Capabilities and Security on the Korean Peninsula: Looking Ahead", 4 July, 2021, <www.iiss.org/research-paper/2021/07/dprk-strategic-capabilities-security-korean-peninsula/, accessed 1 July 2024>.

[29] Kelsey Davenport and Julia Masterson, "North Korea Reiterates End to Test Moratorium," Arms Control Association, January 30, 2020, <https://www.armscontrol.org/blog/2020-01-30/north-korea-denuclearization-digest, accessed 1 July 2024>.

First level: High-level engagement with arms control architects

At the apex of engagement, a top-down approach involves urging the United States, as a key architect of the arms control regime, to take a leadership role and itself ratify the Treaty. This becomes more important now because if the US ratifies the CTBT, it could send the right signal to many across the world. Though experts argue that the domino effect could face blockades at the regional level,[30] both India and Pakistan have stated that the two states will not be the last man standing in the way of CTBT entry into force. This implies that if all states have signed CTBT, there is a possibility that these countries may also sign. This would require a reinvigorated effort by the international community, which shows that somewhat responsibility to drive the non-signatory states to sign the CTBT lies with the nuclear powers.

However, it would also be beneficial to acknowledge that there is no guarantee that the US ratifying the Treaty would spur a cascade of signatures and ratifications from the remaining abstainee states since states make their independent decisions based on their unique security considerations often linked to regional security challenges. Nonetheless, US ratification holds significant leverage and impact in the remaining states' security calculus and would be an important and positive step in the right direction.

Thought should also be given to the possibility of mandating 3-4 recently retired top-level officials from countries, which are enthusiastically supporting the CTBT, to engage in quiet diplomacy with India, Pakistan and DPRK leadership on the issues of the CTBT, carefully addressing concerns, standing in the way of those countries signing and ratifying the CTBT and developing recommendations on assurances capable to alleviate respective concerns or reassess their validity. The group's work should be conducted privately, without posturing and drum-beating and in a positive spirit, with due regard being paid to all kinds of sensitivities including those, that on the surface might not be directly related to the Treaty.

The case of DPRK would need special engagement from the US. The US, along with its allies, would need to indicate that DPRK's CTBT signature would be a reason to consider relaxing sanctions – "packaging the signing of the CTBT as part of future sanctions relaxation can serve as a possible mid-way solution for the DPRK and the international community: It could incentivize the DPRK while demonstrating that the international stakeholders still hold firm standards. Here, engaging the United States to negotiate an acceptable package or roadmap of sanctions relaxation is perhaps the most challenging task, for which the CTBTO, Russia, and China can coordinate the efforts to achieve the best effect."[31]

Second level: Multilateral advocacy in relevant fora

At the second tier, comprehensive advocacy should be undertaken at various multilateral forums. This entails emphasizing the significance of the CTBT in platforms such as the United Nations General Assembly's First Committee and the Security Council, supporting statements and resolutions on the CTBT during NPT review conferences and preparatory committees, and engaging in discussions at the Conference on Disarmament. Additionally, states with nuclear testing capabilities should consider declaring or reaffirming a unilateral moratorium and declarations, thereby promoting the entry into force and universalization of the CTBT. Such an approach may help in generating some minimal level of official

[30] Samran Ali, Aayushi Sharma, and Simon Yin, "Imagining the Day after the US Ratification of the CTBT," CTBTO-CENESS Research Fellowship Research Papers, 2022, <https://youthgroup.ctbto.org/system/files/2023-09/CTBTO%20Research%20Fellowship%202023.pdf, accessed 1 July 2024>.

[31] Qiyang Niu, Haeyoon Kim & Zhaniya Mukatay, "DPRK and the CTBT: What Could Come Next for the CTBT?" Journal for Peace and Nuclear Disarmament, Vol. 5, No. 2 (April 2022), <https://doi.org/10.1080/25751654.2022.2133335, accessed 1 July 2024>.

engagement on the CTBT by countries like India, which currently have none. This would also require a non-discriminatory approach and an equal weightage to all states.In this regard, targeted and sustained communication recognizing each of these countries' unique security considerations and positions could be beneficial.

Third level: domestic public opinion and education

Ultimately, any realistic engagement with the CTBT by Annex 2 non-signatory states would also require a dramatic overhaul of domestic public opinion rallying in favour of the Treaty. While how much influence domestic public opinion holds on a country's official policies (depending on their internal governance structures) is outside the scope of this paper, it is nonetheless worthwhile to promote the work of the CTBTO, especially among the younger generation, in upholding the Treaty. Education and awareness campaigns targeted at young people not only contribute to a broader understanding of the CTBT's significance but also foster a sense of responsibility in shaping the future of nuclear non-proliferation efforts.

One avenue the CTBTO can immediately consider for engagement and education is the CTBTO Youth Group (CYG).[32] The CYG, with its extensive membership, presents an opportune platform to further engage young individuals in promoting the CTBTO's work and the importance of upholding the norm against testing.

In the space of track 2 initiatives, the CTBTO can increase engagement with non-signatory states by engaging them in various expert training courses, workshops, exchanges, and general awareness months, or engaging them on the sidelines of various international events. The CTBTO can encourage looking into already proposed bilateral arms control and confidence-building measures. Pakistan and India have an agreement on not to attack each other's nuclear sites and are also currently upholding their commitment to a ceasefire along the Line of Control (LoC). These efforts could assist the non-signatory states in taking a step ahead of a unilateral moratorium and towards the signing of CTBT. Additionally, one could consider the possibility of setting up "university partnerships" with interested and relevant universities around the world to incorporate the CTBT and its aspects either in a tailored curriculum or through workshops, seminars or training courses. These measures can significantly enhance the spirit and work of CTBT and CTBTO among the younger generations in Pakistan and India.

CHALLENGES WITH ENGAGEMENT

Implementing a comprehensive engagement strategy for Annex 2 non-signatory states poses various realistic challenges. The financial implications of urging key arms control architects, to take a leadership role in CTBT ratification, may strain the budget of the CTBTO. Multilateral advocacy faces hurdles due to varying political will among participating states, potential resistance to unilateral moratoriums, and the current challenges and scepticism surrounding the international arms control architecture as a whole. Resource and time constraints further complicate active participation in various multilateral forums. Grassroots awareness campaigns targeting the younger generation encounter budgetary limitations, challenges in human resources, and time sensitivity. Overcoming these challenges requires strategic planning, international collaboration, and persistent advocacy for increased support and resources to ensure effective engagement with Annex 2 non-signatory states.

It is important to acknowledge that engaging with the DPRK presents a particularly complex case – and any engagement opportunity will only likely be possible in the spectrum of level one engagement as outlined above. Many states regard the "complete, verifiable, and

[32] CTBTO Youth Group, <https://youthgroup.ctbto.org, accessed 1 July 2024>.

irreversible denuclearization of the Korean peninsula" as a non-negotiable, necessitating broader diplomatic efforts to address regional security concerns. Limited international cooperation and restricted access hinder grassroots awareness campaigns, while the dire humanitarian and economic situation diverts attention from non-proliferation initiatives. Addressing these challenges requires a tailored and nuanced approach, emphasizing diplomatic finesse and persistence to encourage DPRK's participation in the CTBT.

CONCLUSION

Exploring opportunities for engagement with non-signatory states, particularly Annex 2 states, in the context of the CTBT demands a multifaceted approach. From high-level diplomatic efforts urging key architects of arms control regimes to advocating for the Treaty in various multilateral fora, and extending to grassroots awareness campaigns, the challenges are nuanced and diverse. The distinct case of the DPRK further exemplifies the complexities involved in this endeavor, requiring tailored strategies. Importantly, the recommendations provided herein transcend Annex 2 states, offering valuable insights applicable to all non-signatory nations. As we navigate these challenges, the shared goal remains universal: promoting a world free from the threat of nuclear weapons through global cooperation.

HISTORY OF NUCLEAR TEST MORATORIA BY NWS: POSSIBLE LESSONS FOR THE CURRENT ISSUES

■ Fahkar Alam ■ Angel Chun ■ Sofya Shestakova

ABSTRACT

During more than four decades of complicated discussions and negotiations leading to the conclusion of the Treaty which outlaws all nuclear tests – the CTBT, states more than once turned their attention to one particular approach which, in the view of many, could facilitate the achievement of the final objective. Namely, the temporary suspension of nuclear testing (in other words – moratorium). This paper explores the most important instances and periods when proposals for a moratorium and their actual implementation, by mutual agreement or unilaterally, contributed to the search of partial or comprehensive solutions. In particular, at the second half of 1950s and the second half of 1980s – early 1990s, when the concept of a moratorium was very much on the agenda. It concludes that on balance it turned out to be very helpful in terms of confidence building, stimulating negotiations and preparing more systematic solutions. The paper also looks at the concept of the moratorium in a different set-up – that of addressing nuclear issues on the Korean peninsula – and also finds the usefulness of this instrument.

INTRODUCTION

The global discourse surrounding nuclear weapons testing has been characterized by a complex interplay of geopolitical, technological, environmental, and humanitarian considerations. An important part of this narrative is the history of nuclear test moratoria[1] announced or adhered to by Nuclear Weapon States (NWS), with the view to address the environmental and security implications of nuclear testing, as well as for political reasons to respond to demands from civil society, scientists and wider international community as a whole (NNWS, UNGA resolutions, etc.) to put an end to testing. This paper addresses historical trajectories of nuclear test moratoria and examines motivations behind the specific moratorium, and reasons associated with failure or continuation of those moratorium announced by NWS. Moreover, it explores the evolution of NWS's efforts towards a legal total ban on nuclear testing and analyses the complicated dynamics related to the Democratic People's Republic of Korea's (DPRK) nuclear test moratorium. By drawing parallels and extracting insights from past initiatives, this paper seeks to identify valuable lessons that can inform and guide contemporary discussions on nuclear testing issues. As the international community deals with renewed challenges, including the DPRK's nuclear ambitions and broader arms control concerns, understanding the historical context becomes important for fostering informed decision-making and forging a path toward a more secure and stable global landscape.

[1] In this paper, a nuclear moratorium is seen as a voluntary interim measure that imposes a ban on nuclear weapons testing, while a legal ban on nuclear testing is a formal prohibition on nuclear testing under the international law.

THE ROLE OF NUCLEAR TEST MORATORIA IN ACHIEVING PTBT (MOSCOW TREATY OF 1963)

During the initial years of the Cold War, a ban on nuclear testing was not of interest to major powers, including the US and USSR. Back then, nuclear testing was viewed as a viable option to validate the destructive power, reliability, and performance of established weapons. Also, there was limited understanding of and consideration for the ecological and health consequences of nuclear weapons testing. However, by mid-1950s the situation started to change. There were several reasons for that: Korean war came to an end, both the US and the USSR succeeded in developing, almost simultaneously, thermonuclear weapons (so that segment race was over) and the scientific and medical communities in east and west began to come up with highly disturbing information about environmental and health consequences of nuclear testing, which, in turn, triggered the birth of public movements aimed at discontinuation of nuclear testing. There was also a growing understanding that continuation of nuclear testing would feed further rounds of the nuclear arms race.

The initiative of a nuclear testing "standstill agreement" was first put forward by Indian Prime Minister Jawaharlal Nehru on April 2, 1954. The USSR responded promptly and positively and, in its proposal, on May 10, 1954, went further to formulate the task of complete ban on nuclear testing. The main reason for that was the necessity to take practical measures to stop the buildup of nuclear weapons and their further improvement.[2] To enshrine such a proposal in international law the USSR put efforts to create favorable conditions to conclude an international treaty on a complete and comprehensive ban on nuclear weapons testing.[3]

Since 1954, the Soviet Union kept suggesting various substantive measures against testing, including moratoria and more elaborate agreements. On August 21, 1957, US President Dwight D. Eisenhower announced that the United States would be willing to suspend testing of nuclear weapons for up to two years under certain conditions and safeguards. Meanwhile a petition to the United Nations highlighting the need for an international agreement to immediately stop the nuclear weapons tests was signed by 9,235 scientists and presented to UN Secretary-General Dag Hammarskjold.

On 31 March 1958, USSR announced a unilateral moratorium on nuclear weapons testing and was meant to encourage the United States (and the UK, for that matter) to follow suit. One of the driving forces behind the ban was the growing awareness of the environmental and health dangers linked with nuclear testing. The global scientific community and public opinion were becoming increasingly alarmed by the radioactive fallout resulting from nuclear tests. This was also aimed to demonstrate goodwill and encourage further progress in efforts towards the nuclear test ban. Meanwhile negotiations were going on, the United States and United Kingdom began a one-year testing moratorium on 3 October 1958, thus turning its earlier announced unilateral moratorium in a trilateral one. On 29 December 1959, President Eisenhower stated that when the US nuclear testing moratorium expired at the end of 1959, though the US would not announce a new moratorium, it would not test nuclear weapons without a declaration. In the meantime, negotiations and discussions in Geneva, which were de facto going in two tracks (political and technical) had made significant progress on the verification of a future test ban. The emerging conclusion was that monitoring the absence of nuclear tests in atmosphere and under water would not be a problem, while identification of underground tests required a more sophisticated system.

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[2] Roland Timerbaev, "The Complete Prohibition of Nuclear Testing" [in Russian], PIR Center, <https://pircenter.org/wp-content/uploads/2023/09/1986-TIM-Complete-Prohibition-of-Nuclear-Testing.pdf, accessed 1 July 2024>.

[3] Mikhail Gorbachev response to the TASS correspondent of August 15, 1985, Sovetskaya Kultura, <https://portal-kultura.ru/upload/iblock/366/1985.08.15.pdf, accessed 1 July 2024>.

That moratorium collapsed in 1961 after the Soviet Union resumed nuclear testing in September 1961. As a result, the US also followed the same path resuming nuclear testing at the end of September 1961. Much wider tensions between US and USSR were the central factor that led towards resumptions of nuclear testing. However, the Cuban Missile Crisis of 1962 was among key factors that compelled the leadership from both sides to work for some arms control arrangements aggressively.[4]

In 1963, the Partial Test Ban Treaty (PTBT) was signed by the US, UK, and USSR in Moscow. It prohibited the nuclear weapons testing in the outer space, atmosphere and under water.[5] However, this Treaty did not ban the underground nuclear weapons testing. France entered the nuclear club in 1960s and was guided by the perceived need to ensure its independence in nuclear matters, largely influenced by the Suez Crisis.[6] China was not far from finalizing its nuclear weapons development programme (it conducted the first test in 1964) and therefore was not receptive to any measure limiting or prohibiting nuclear testing.

Thus, it can be concluded that from the early days of the cold war and nuclear arms race between the US and the USSR the idea of a nuclear test moratorium has emerged as a simple, easier to implement measure capable of creating better conditions and more constructive atmosphere for more in-depth negotiations on formal agreement or agreements, send messages of good will both internationally and for the own public. In that sense the moratoria on testing by major powers in the second half of 1950s-early 1960s partially succeeded. They helped galvanize and give a purpose to public movement to end nuclear testing, facilitated negotiations on the nuclear test ban in Geneva and productive expert-level exploration of verification issues involved. This process, literally speaking, was put to a halt by the spike of tensions between the US and USSR including the Berlin crisis, the U2 incident over the Ural Mountains and the Cuban Missile Crisis. However, the substantive results achieved were not lost – they facilitated the quick conclusion of the PTBT in 1963 and later provided a conceptual basis for the design of the International Monitoring System (IMS), which is a key element of the verification system under the CTBT as opened for signature in 1996.

NUCLEAR TESTING MORATORIA AND CONCLUSION OF THE CTBT

It was the period of the second half of 1980s-early 1990s which probably offered the most eloquent example of how nuclear testing moratoria could be a prologue for achieving a complete legal ban on nuclear testing. There were other factors enabling this transformation, in particular very powerful civil society pressure and initiatives of non-governmental organizations.

The Soviet Union announced a unilateral moratorium on any nuclear explosions as of August 6, 1985, by notifying the U.S. leadership in advance,[7] and urged the United States to do the same. Mikhail Gorbachev, General Secretary of the Communist Party of the Soviet Union, emphasized in “a complete cessation of nuclear testing would stop the nuclear arms race at its most dangerous – qualitative direction”.[8] The moratorium was initially in place until January 1, 1986, with a possible extension in the event of a US cessation of nuclear testing.[9] In

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4 C Lalengkima, “The Role of Crisis in the Arms Control Process,” World Affairs: The Journal of International Issues, March 2013, <https://www.jstor.org/stable/48535494, accessed 1 July 2024>.

5 Treaty Text of Treaty banning Nuclear Weapon Tests in the Atmosphere, in Outer Space, and Under Water, August 5, 1963, <https://2009-2017.state.gov/t/avc/trty/199116.htm#treaty, accessed 1 July 2024>.

6 Tariq Rauf (1995) French nuclear testing: A fool's errand, The Nonproliferation Review, 3:1, p. 56

7 Roland Timerbaev, “The Complete Prohibition of Nuclear Testing” [in Russian], PIR Center, <https://pircenter.org/wp-content/uploads/2023/09/1986-TIM-Complete-Prohibition-of-Nuclear-Testing.pdf, accessed 1 July 2024>.

8 Mikhail Gorbachev response to the American Time magazine of August 28, 1985, Sovetskaya Kultura, <https://portal-kultura.ru/upload/iblock/723/1985.09.03.pdf, accessed 1 July 2024>.

9 Roland Timerbaev, “The Complete Prohibition of Nuclear Testing” [in Russian], PIR Center, <https://pircenter.org/wp-content/uploads/2023/09/1986-TIM-Complete-Prohibition-of-Nuclear-Testing.pdf, accessed 1 July 2024>.

fact, Gorbachev returned to the nuclear test ban in his famous statement of 15 January 1986, which was devoted to a whole range of disarmament and arms control issues; in particular, he announced the extension of the moratorium, expressed the hope of it becoming first bilateral (with the US) and then multilateral (involving also other nuclear weapon states) and called for the resumption of CTBT negotiations which had been interrupted by the US President Ronald Reagan shortly after his inauguration in 1981.[10]

Initially, the US did not respond positively to the moratorium. According to the US, if they were to move toward a mutual cessation of all nuclear explosions, proper control of the moratorium would be fully ensured by national technical means and by international procedures – with on-site inspection where necessary.[11]

In the absence of a clear positive response from the US, where the tests were on going, the unilateral Soviet moratorium was discontinued, but not for long. It was renewed in 1991, and then in 1992 the US joined it as well.

In the U.S. Physicians for Social Responsibility organized "Code Blue" congressional lobbying events on the test ban and annual protests at the Nevada Nuclear Test Site, whereas in USSR, especially in Kazakhstan and Moscow, opinion leaders and citizens gather in 1989 to demand a nuclear test ban and the closure of the Soviet nuclear test site near Semipalatinsk (the Semipalatinsk test site was officially closed in 1991).[12] That massive campaign and other initiatives by the civil society and NNWSs fostered the process toward nuclear tests ban. In October 1991, Mikhail Gorbachev announced a unilateral nuclear test moratorium. In response, the US Congress approved a reciprocal test moratorium for nine months in 1992. In 1993, President Bill Clinton decided to extend the U.S. test moratorium.

The UK conducted the last nuclear test at the Nevada Test Range in the United States in 1991. In April 1992 France announced a unilateral nuclear testing moratorium after rigorous Mururoa Protest by environmentalists and social activists against the nuclear tests due to their ecological effect and the adverse effects on the health of nearby populations. However, France resumed testing briefly in 1995, when the probability of successful conclusion of the talks became almost certain, and permanently ended testing the following January. China performed a last nuclear test explosion in July 1996 and announced it would not test after September 1996.

In fact, during 1994-1996 the Conference on Disarmament in Geneva got involved in the last and very intensive phase of negotiations on the CTBT draft, which was successfully finalized in September 1996.

Thus, during the last several years before the finalization of the CTBT, the positive role of proposals for a moratorium and actual national decisions to announce or join the moratorium were even more evident than during the period of late 1950s. There were two sets of circumstances which enhanced this positive role. The first was that the movement to stop and outlaw nuclear testing during the late 1980s – early 1990s was unfolding against the background of wide protests against the risks of the new cycle of the nuclear arms race and dangers of nuclear war and first successes of that movement, as manifested by the INF Treaty. The second factor was the strong popular movements aiming at the closure of nuclear test sites for humanitarian reasons, especially in the US and the USSR. The momentum against nuclear testing was so strong that the moratorium was embraced not

[10] Statement by the General Secretary of the Central Committee of the CPSU Mikhail Gorbachev (In Rus.), 15 January 1986, <https://www.gorby.ru/userfiles/file/zayavlenie_msg_15_01_1986.pdf, accessed 1 July 2024>.
[11] Timerbaev, "The Complete Prohibition of Nuclear Testing".
[12] Arms Control Association, "Nuclear Testing and Comprehensive Test Ban Treaty (CTBT) Timeline", Arms Control Association, <https://www.armscontrol.org/factsheets/NuclearTestingTimeline, accessed 1 July 2024>.

only by the two nuclear superpowers, but also by other members of P5 (China, France and the UK), and several years later – by India and Pakistan (but not before these two latter countries conducted each a small series of tests to validate there recently acquired nuclear weapons). Another interesting peculiarity of the moratorium, which came into being shortly before the conclusion of the CTBT, has been sustained for almost 30 years in parallel with the Treaty, which, even if not in force, presents in accordance with the international law, a strong legal impediment for signatory states to test.

MORATORIUM AND THE ALREADY NEGOTIATED TREATY

In the paragraphs above we tried to demonstrate that during the long history of efforts to achieve the CTBT various initiatives promoting nuclear test moratoria usually played a positive, stimulating role. Truth be told, the positive results did not always materialize in the short run; sometimes the results were more modest than originally hoped for, but by large these initiatives worked and, as a result, the international community now has the fully negotiated Treaty, which has already been signed and ratified by an overwhelming majority of states, but which – alas – has not yet entered into force. The reason is very simple: the Treaty lists a number of states, so-called Annex 2 States, whose ratification is necessary, and some of these have not ratified the Treaty, while some others have not even signed it. As a result, today, almost 3 decades after the opening for signature, the Treaty is not in force. At the same time, there is a moratorium on nuclear tests, joined by all the P5, as well as by India, Pakistan and, so far, the DPRK (for the latter see the next section). At the moment, the parallel existence of the Treaty, which is, regrettably, not in force, and the moratorium, tend to reinforce the emerging norm against nuclear tests, with the moratorium – as long as it lasts – limiting the growing risks to the Treaty, but in the longer run the situation will be getting unstable, because any nuclear test, even if performed by a non-signatory to the Treaty, might severely damage the prospects for the Treaty's entry in force. Therefore, the international community is facing a double challenge of promoting the CTBT entry into force and preserving the existing moratorium. That requires not only political will, but careful and imaginative analysis and planning.

DPRK MORATORIUM

The history of nuclear testing moratoria includes one more example, but its context, origins, reasons, motivations, and outcomes are rather different from the moratoria described above.

On 20 April 2018, the DPRK declared a moratorium on the testing of nuclear warheads and long-range ballistic missiles. In the following month, the DPRK reported the destruction of its only known nuclear testing site at Punggye-ri, where six nuclear tests had been carried out from 2006 to 2017.[13] No foreign nuclear experts were granted access to verify the destruction of any tunnel or portal within the test site, while several international journalists observed the explosion from a distance.[14]

This self-imposed moratorium officially ended with leader Kim Jong Un's announcement[15] at the 5th Plenary Meeting (28-31 December 2019) of the 7th Central Committee of the

[13] "Punggye-ri Nuclear Test Facility", Nuclear Threat Initiative, 2023, <https://www.nti.org/education-center/facilities/punggye-ri-nuclear-test-facility/, accessed 1 July 2024>.

[14] Choe Sang-Hun, "North Korea's Big Moment Is Upended by Trump", New York Times, 2018 <https://www.nytimes.com/2018/05/24/world/asia/north-korea-shuts-nuclear-test-site.html, accessed 1 July 2024>.

[15] Stéphane Dujarric, Spokesman for the Secretary-General of the United Nations, "Statement attributable to the Spokesman for the Secretary-General – on the Democratic People's Republic of Korea", United Nations, 2020, <https://www.un.org/sg/en/content/sg/statement/2020-01-01/statement-attributable-the-spokesman-for-the-secretary-general-%E2%80%93-the-democratic-people%E2%80%99s-republic-of-korea?_gl=1*nydu84*_ga*MTM1MjExNTU3LjE2OTkyODQ5MzI.*_ga_S5EKZKSB78*MTY5OTI4ODQzMi4yLjAuMTY5OTI4ODQzMi42MC4wLjA.*_ga_TK9BQL5X7Z*MTY5OTI4ODQzMi4yLjAuMTY5OTI4ODQzMi4wLjAuMA, accessed 1 July 2024>.

Workers' Party of Korea. On 21 January 2020, the DPRK's Permanent Mission at the United Nations (UN) in Geneva stated that the DPRK would no longer observe the moratorium.[16] It is noteworthy, however, that despite announcing the end of its moratorium and carrying out four missile tests in 2020, doubled to eight in 2021, and more than seventy ballistic- and cruise-missile tests in 2022,[17] the DPRK has not conducted any nuclear tests as of June 2024.[18]

FACTORS LEADING TO THE DPRK MORATORIUM

The moratorium was declared against the backdrop of a historical summit between the heads of the DPRK and the Republic of Korea. On 27 April 2018, Kim Jong Un became the first DPRK leader to cross the border south to meet with the then ROK President Moon Jae-in, where alongside a pledge to convert the armistice that ended the hostility of the 1950-1953 Korean War into a formal peace treaty, they affirmed the shared goal of the denuclearization of the Korean Peninsula as part of the "Panmunjom Declaration".[19] This was a milestone achievement; especially given that in July 2017 the DPRK, as reported, successfully tested an ICBM technically capable of striking the United States of America for the first time. The result was an extremely nervous reaction by the US political and military leadership and many think tanks, the prospect of imminent nuclear war with DPRK was discussed in the US.

It is understood that the USA factor played a major role in the lead-up to the 2018 moratorium. It was announced at a time that the DPRK leadership hoped that bilateral negotiations, under the Trump administration, would prompt the USA to begin lifting "crippling sanctions" imposed on the DPRK.[20] The DPRK showcased a willingness to ease USA-DPRK tensions through several gestures, such as by the release of three American prisoners in May 2018.[21] Two months subsequent to his declaration of the moratorium on 12 June 2018, Kim Jong Un and the then President of the USA Trump met in Singapore, the first-ever meeting between the heads of two countries, and concluded with a joint pledge of lasting peace on the Korean Peninsula,[22] albeit with little detail revealed.

The US policy and practical steps, as perceived and portrayed by the DPRK, was equally influential towards the end of the moratorium. According to Ju Yong-chol, a counselor to the DPRK's mission to the UN in Geneva the moratorium had the objective of "build[ing] confidence with the United States". Citing "brutal and inhumane" sanctions imposed by the USA, Ju concluded, "[as] it became clear now that the USA remains unchanged in its ambition to block the development of the DPRK and stifle its political system, we found no reason to be unilaterally bound any longer by the commitment that the other party fails to honour",[23] including its self-imposed temporary pause on nuclear testing since April 2018.

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[16] Kelsey Davenport, and Julia Masterson, "North Korea Reiterates End to Test Moratorium", Arms Control Association, 2020, <https://www.armscontrol.org/blog/2020-01-30/north-korea-denuclearization-digest, accessed 1 July 2024>.

[17] International Institute for Strategic Studies, "North Korea's missile activity in 2022", International Institute for Strategic Studies, 2022, <https://www.iiss.org/publications/strategic-comments/2022/north-koreas-missile-activity-in-2022/, accessed 1 July 2024>.

[18] International Institute for Strategic Studies, "North Korea's missile activity in 2022", International Institute for Strategic Studies, 2022, <https://www.iiss.org/publications/strategic-comments/2022/north-koreas-missile-activity-in-2022/, accessed 1 July 2024>.

[19] Official translation provided by the Inter-Korean summit, "READ: Full declaration of North and South Korean summit", CNN, 2018, https://edition.cnn.com/2018/04/27/asia/read-full-declaration-north-south-korea/index.html, accessed 1 July 2024>.

[20] Choe Sang-Hun, "North Korea is No Longer Bound by Nuclear Test Moratorium, Kim Says", New York Times, 2019, <https://www.nytimes.com/2019/12/31/world/asia/north-korea-kim-speech.html, accessed 1 July 2024>.

[21] Alex Ward, "North Korea has just released 3 American hostages", Vox, 2018, <https://www.vox.com/2018/5/9/17333964/north-korea-hostages-release-trump, accessed 1 July 2024>.

[22] Council on Foreign Relations, "1985-2022 North Korean Nuclear Negotiations", Council on Foreign Relations, 2023 <https://www.cfr.org/timeline/north-korean-nuclear-negotiations, accessed 1 July 2024>.

[23] Stephanie Nebehay, "North Korea abandons nuclear freeze pledge, blames 'brutal' U.S. sanctions", Reuters, 2020, <https://www.reuters.com/article/us-northkorea-nuclear-usa-idUSKBN1ZK1FX, accessed 1 July 2024>.

Indeed, the DPRK's Korean Central News Agency (KCNA) reported that at the 5th Plenary Meeting (28-31 December 2019), Chairman of State Affairs Kim Jong Un announced that the DPRK would "shift to shocking actual actions" to make the USA "pay for the pains sustained by our people" under Washington's sanctions regime". While DPRK officials also blame the USA's joint military exercises with ROK on the Korean Peninsula, and the USA's failure to make concessions by the year-end deadline for what they view as diplomacy that had yielded limited results, sanctions (and relief thereof) appear to be the determinative factor in the DPRK's issuance and withdrawal of the moratorium. At the 2019 talks in February in Hanoi, Vietnam, June in Pyongyang (which saw the sitting President of the USA set foot in North Korea for the first time), and October in Stockholm, Sweden, the DPRK has consistently sought sanctions relief but to no avail.

It appears that the DPRK is likely to have tactically refrained from testing nuclear weapons after the end of the moratorium mainly for political reasons. It also appears that limitations in resources have not prevented the DPRK from rapidly expanded its nuclear stockpiles, and the DPRK is technically capable of conducting another nuclear test. This is likely in pursuance of two-fold political objectives: to reinforce internal solidarity and divert attention (any, if at all) from what would otherwise be their top priorities; and more importantly and strategically, to use the prospect of nuclear tests as a powerful bargaining chip in diplomatic negotiations, especially with the USA.

There is increasing discussion on whether the question being considered by the DPRK has shifted from whether to test, to whether to use nuclear weapons. In fact, Lee Jong-sup, the Defense Minister of South Korea, has commented that the focus of efforts to deal with the DPRK should no longer be halting nuclear weapons development and testing, but to deterring the possible use by the DPRK.[24] Regrettably, this speculation is far from unfounded: the nuclear weapons policy legislation issued by the DPRK in September 2022 stipulates novel conditions for nuclear weapons launch which go further than the traditional aims of war deterrence and retaliation, including when a "catastrophic crisis threatens the existence of the state [of the DPRK] or the safety of the people",[25] which leaves the nature of such "crisis" unspecified so to possibly encompass even economic circumstances.

What is beyond clear is that efforts should not cease in calling upon the DPRK to sign and ratify the CTBT and adopt another moratorium.[26] However, it is also crucial for the international community to understand and leverage the USA's influence, in particular through sanctions on the DPRK, in bringing about another moratorium by the DPRK. Continuous diplomatic engagement is the pathway to sustainable peace.

POSSIBLE LESSONS FOR CURRENT SITUATION

In the current geopolitical environment, it is crucial to find a way to break the vicious circle and the long-standing stalemate in the arms limitation process. Impact of the moratorium on non-proliferation regime cannot be underestimated. First, it facilitates the management of nuclear risks. Second, it allows to reduce the possibility of nuclear tests by countries that are not CTBT signatory states such as India and Pakistan. For now, it can facilitate the process

[24] Josh Smith, "U.S. and allies turn to deterring war with North Korea as options for preventing nuclear tests dwindle", Reuters, 2022, <https://www.reuters.com/world/us-allies-turn-deterring-war-with-north-korea-options-preventing-nuclear-tests-2022-10-31/, accessed 1 July 2024>.

[25] Bong-geun Jun, "Comparing North Korea's Nuclear Forces Policy Laws", Asia-Pacific Leadership Network for Nuclear Non-Proliferation and Disarmament, 2022, <https://www.apln.network/analysis/commentaries/comparing-north-koreas-law-on-nuclear-forces-policy-2022-with-the-law-on-consolidating-the-position-of-nuclear-weapons-state-2013, accessed 1 July 2024>.

[26] It is acknowledged and appreciated that the CTBTO has ceaselessly contributed in this regard. See, for example, a statement by Dr. Robert Floyd, Executive Secretary of the CTBTO on 27 June 2022, <https://www.ctbto.org/resources/for-the-media/press-releases/ctbto-head-calls-n-korea-renew-commitment-suspend-nuclear, accessed 1 July 2024>.

of the CTBT entering into force because the moratoria are viewed as a step towards the CTBT ratification.

What should be particularly emphasized is that nuclear tests moratorium is a voluntary interim measure but not an alternative to the CTBT because it cannot replace the legal obligations of states under an international treaty. The point is that the CTBT implies not only a ban on nuclear testing, but a legal complex system of unique verification regime, which comprises a global network of monitoring stations – the International Monitoring System (IMS) – a consultation and clarification process, On-Site Inspections and a set of confidence-building measures.

In this regard, the following recommendations may be taken into account for a new version of moratorium.

1. It would be helpful if all the NPT NWS could find a way to jointly announce their continued commitment to the moratorium on nuclear testing as a step towards the entry into force of the CTBT. Such an announcement could envisage that non-NPT states possessing nuclear weapons could also become part of such a declaration. Such an approach is considered as a symbolic way to strengthen confidence-building measures. The DPRK should not be singled out or even mentioned in such a declaration.

2. It could be proposed that the DPRK announce another moratorium in exchange for something that would be of benefit to it. The moratorium could be initially for 6 months and then extended further if all conditions are met.

3. However, if an all-inclusive joint moratorium seems (so far) difficult to be achieved because of the unstable geopolitical environment, where various antagonistic dyads risk escalating towards nuclear testing, regional and bilateral moratoriums on nuclear testing could be established. For instance, on 12 August 2016, Pakistan invited India to convert their unilateral moratoriums on nuclear testing into a bilateral moratorium. Such regional and bilateral moratoriums would just not reduce the probability of nuclear testing rather they could serve as effective substitutes for a larger global moratorium or, at the very least, provide a foundation for establishing one.

GENERAL CONCLUSIONS – MORATORIUM AND THE CTBT TODAY

1. Over years, the international efforts to ensure a nuclear-weapons free world benefitted by proposals for, as well as from deliberations and implementation of moratoria on nuclear testing. Moratoria can also be an instrument, which can be applicable in other areas of arms control and disarmament. For example, a moratorium on deployment of medium and shorter-range missiles in certain areas or globally is still on the agenda following the demise of the US-Russian INF Treaty. There are discussions on a moratorium on anti-satellite weapons or, in a wider context, on space weapons. It will not be an exaggeration to say, that today, when the arms control architecture is disintegrating, and the new multidimensional arms race is looming, ideas of a moratorium on certain dangerous activities deserve even more, not less attention.

2. In a narrower area of nuclear testing, it appears that efforts should continue on both tracks: working towards the entry into force of the CTBT and strengthening the current de-facto global moratorium. Both deserve great attention on the part of the CTBTO Preparatory Commission and wider international community. Until the Treaty is brought into force, these are two mutually reinforcing factors, and both should be considered as priorities.

3. One of the possible ways to strengthen the current de-facto moratorium is to publicly reaffirm it. The yielded benefits would be to foster confidence and transparency, (re)set de-facto moratorium as a norm of international law (including by establishing a precedent) and be seen as an international commitment and validation by states, notably by the NWS.

SAUDI ARABIA AND THE CTBT

■ Hiba Al-Khodire ■ Abdulrahim Judaibi

ABSTRACT

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) may facilitate the establishment of a Nuclear-Weapon-Free Zone in the Middle East, a concept that Saudi Arabia advocates for. Yet, the ratification of the CTBT in the Middle East has been stagnant due to the geopolitical challenges in the region, as well as nuclear activities of Iran and Israel. Saudi Arabia has carried out diplomatic efforts to improve the security and stability in the region with both countries, which are deemed essential for the cooperation in the Middle East, and hence for the adoption of treaties such as the CTBT in the future. This paper highlights the stance of Saudi Arabia as a Middle Eastern country that has not signed the CTBT by addressing the challenges in the region and exploring potential pathways to support the Treaty's adoption in the future.

INTRODUCTION

Saudi Arabia plays a significant role in the geopolitics of the Middle East region due to its size, geographical location, and economy. It is the largest country in the Middle East by land area, and it connects three continents and sits between two important trade waterways, the Red Sea and the Gulf. It shares land borders with 7 countries and maritime borders with 5 others. In addition to its geographical position, its economy is also the largest in the region and it is the birthplace of Islam; the Middle East's dominant religion. The country aspires to advance its technological industries and is currently developing its nuclear industry with plans to introduce nuclear power as a clean baseload energy source to its energy mix.[1]

Saudi Arabia acceded to the NPT in 1988 and actively participated in the NPT Review Conferences. The country attended the 1999 CTBT conference, the first Article XIV Conference on Facilitating the Entry-Into-Force of the CTBT, as an observer without signing the Treaty. Saudi Arabia supports the objectives of the CTBT and has installed one primary and one auxiliary seismic station– assegments of the International Monitoring System (IMS), envisaged by the Treaty as a key verification tool. The country has also been advocating for a Nuclear-Weapon-Free Zone in the Middle East (NWFZ-ME)[2] which it sees as an essential element for the security and stability in the region. It reaffirmed[3] the importance of the NPT to fully implement a NWFZ-ME as per the resolution of NPT/CONF.1995/32. Saudi Arabia voted in favour of concluding the Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2016. The following year, in March 2017 it released a statement[4] supporting the TPNW and voted in favour of TPNW adoption in July 2017.[5] In a 2022 statement,[6] it called for peaceful cooperation to eliminate all nuclear weapons.

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1 World Nuclear Association. Nuclear Power in Saudi Arabia. <https://world-nuclear.org/information-library/country-profiles/countries-o-s/saudi-arabia.aspx, accessed 1 July 2024>.
2 International Atomic Energy Agency (IAEA). Statement of the Kingdom of Saudi Arabia at the 67th Session of the General Conference of the IAEA. 29 September 2023.
3 United Nations General Assembly. Resolution adopted by the General Assembly on 23 December 2016.
4 United Nations. Statement of Saudi Arabia During the work of the UN Conference to Negotiate a Legally Binding Instrument to Prohibit Nuclear Weapons with a view to Complete Elimination. 27 March 2017.
5 United Nations General Assembly, 72nd Session. Item 9, A/CONF.229/2017/L.3/Rev.1. Vote Date: 7 July 2017.
6 United Nations General Assembly, 77th Session. High-level Plenary Meeting to Commemorate and Promote the International Day for the Total Elimination of Nuclear Weapons. 26 September 2022. <https://webtv.un.org/en/asset/k1m/k1mlpmot2p, accessed 1 July 2024>.

ENGAGEMENT WITH THE CTBT

Saudi Arabia attended the 1999 CTBT conference as an observer without signing the Treaty. It joined the Confidence Building Measures Program (CBM) to improve its seismological expertise and improve its understanding of the CTBT. In 2008, Saudi Arabia joined the training program on the Comprehensive Nuclear-Test-Ban Treaty in Kazakhstan organised by the CTBTO. The country cooperated with the Lawrence Livermore National Laboratory (LLNL) in seismological research in 2011[7] and hosted the Gulf Seismic Forum (GSF) in 2012. As part of the UN Disarmament Fellows' training program, Saudi fellows engaged in the activities of the two-day CTBT immersion in 2017.[8]

During the 78th session of the United Nations General Assembly (UNGA) in 2023, Saudi Arabia cast an affirmative vote[9] in favour of approving a document titled "Conclusion of effective international arrangements to assure non-nuclear-weapon States Against the Use or Threat of Use of Nuclear Weapons". Additionally, the country supported the draft resolution titled "General and Complete Disarmament: Humanitarian Consequences of Nuclear Weapons" by voting in favour of it.[10]

The 78th UNGA meeting also encompassed voting on the draft resolution[11] titled "Comprehensive Nuclear-Test-Ban Treaty". The draft resolution as a whole garnered 176 votes in favour, 1 against, and 5 abstentions including Saudi Arabia.[12]

CHALLENGES

The CTBT aims to eliminate nuclear explosion testing worldwide. Although the Treaty was opened for signature in 1996 and has been ratified by 178 countries as of 1 July 2024,[13] it has still not entered into force because of the condition outlined in Article XIV of the Treaty stating that the 44 countries listed in the Annex 2 must first ratify the Treaty before it can enter into force. As of July 2024, nine of the Annex 2 states are to yet ratify the Treaty. Saudi Arabia is not listed in Annex 2 and is considered a non-signatory non-Annex 2 state. In other words, the entry into force of the CTBT does not directly depend on action (or inaction) by Saudi Arabia. At the same time, adherence of Saudi Arabia does have an impact on the universalization of the Treaty. Every new adherence strengthens the norm against nuclear testing and build further momentum of signatures and ratifications – particularly for the region.

The signature and ratification of the CTBT by Saudi Arabia may require solutions to some challenges that relate to the geopolitics and security of the Middle East region. Saudi Arabia is carrying out diplomatic missions to improve bilateral relations with Iran and Israel.[14] The bilateral relations between Saudi Arabia and Iran were historically hindered by a series of events that caused tensions between the two states. Both countries have not ratified the

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7 Lawrence Livermore National Laboratory, International Cooperation of Seismology for Support to the CTBT. LLNL-CONF-490374. 7 July 2011.
8 CTBTO. Two-Day CTBT-Immersion of 2017 UN Disarmament Fellows. 11 September 2017.
9 United Nations General Assembly, 78th Session. Document A/C.1/78/L.25. 9 October 2023.
10 United Nations General Assembly, 78th Session. Humanitarian consequences of nuclear weapons Document. A/C.1/78/L.23. 9 October 2023.
11 United Nations General Assembly, 78th Session. Comprehensive Nuclear-Test-Ban Treaty. A/C.1/78/L.45. Dated 11 October 2023.
12 United Nations General Assembly, 78th Session. Report of the First Committee on the draft resolution "Comprehensive Nuclear-Test-Ban Treaty". A/78/414. 10 November 2023.
13 CTBTO. Status of Signature and Ratification. <https://www.ctbto.org/our-mission/states-signatories, accessed 1 July 2024>.
14 International Crisis Group. Understanding Saudi Arabia's Recalibrated Foreign Policy. 14 September 2023. <https://www.crisisgroup.org/middle-east-north-africa/gulf-and-arabian-peninsula/saudi-arabia/understanding-saudi-arabias, accessed 1 July 2024>.

CTBT (but Iran did sign it) and the regional challenges contribute to the stagnation in this regard. The main challenge for Saudi Arabia is Iran's nuclear activities. Concerns over Iran's potential ambitions to acquire a nuclear weapon are raised by Saudi Arabia and a number of other countries.

Diplomatic efforts were made by Saudi Arabia and Iran to resume diplomatic relations,[15] earning praise from neighboring countries. Saudi-Iranian efforts in conflict resolution and trust-building measures are required to facilitate the adoption of the CTBT by both countries.

Israel's policy of nuclear opacity poses another regional challenge for Saudi Arabia. Similar to Iran, Israel is an Annex 2 country that did sign, but is to yet ratify the CTBT. Israel has also not signed the Biological Weapons Convention (BWC) or NPT, nor ratified the Chemical Weapons Convention (CWC). It is estimated to maintain a stockpile of tens of nuclear warheads.[16] The concept of a NWFZ-ME is de facto resisted by Israel[17], which voted against a UNGA draft resolution[18] titled "Establishment of a Nuclear-Weapon-Free Zone in the Region of the Middle East". It also voted against another draft resolution[19] titled "The Risk of Nuclear Proliferation in the Middle East" proposed at the meeting of the UNGA in 2023.

Saudi Arabia is working to normalise diplomatic ties with Israel to resolve conflicts and strengthen stability in the region. The most recent Israeli-Palestinian conflict that started in October 2023 has slowed down the normalisation efforts between the two countries, but at the same time has brought international attention to the urgent need for diplomatic measures to resolve the long-standing conflict.[20] During the conflict, further concerns were raised about Israel's nuclear threat after the statement made by the Israeli Heritage Minister where, according to some news agencies and commentators, a nuclear strike on Gaza was suggested.[21]

MEASURES TO SUPPORT THE CTBT

States signatories can enjoy many benefits from the global verification regime. They benefit from the data it collects, the data analyses it generates and distributes, and the technologies it uses. Despite that some countries in the region express reservations about the CTBT verification system. To overcome this issue, it is recommended to involve experts, including of a new generation, from signatory and non-signatory Middle Eastern countries in the CTBTO verification system activities by providing them with training and additional expertise. Participation of regional experts in capacity building courses on the use of IMS data for civil and scientific applications (climate research, tsunami warnings, etc.) should be also encouraged.

Nomination of candidates from the region for leadership roles inthe CTBTO would uphold the dedication of Middle East countries to the Treaty's objectives. It would also foster confidence in the verification mechanism and its efficacy. Furthermore, it is recommended to motivate non-signatory countries, including Saudi Arabia, to attend future CTBT's conferences and workshops without requiring political commitment to join the Treaty.

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15 AP News. Saudi, Iran restore ties, say they seek Mideast stability. 6 April 2023.
16 Nuclear Threat Initiative. <https://www.nti.org/analysis/articles/israel-nuclear, accessed 1 July 2024>.
17 Nuclear Threat Initiative. <nti.org/analysis/articles/israel-nuclear-disarmament, accessed 1 July 2024>.
18 United Nations General Assembly, 78th Session. Report of the First Committee on the draft resolution "Establishment of a nuclear-weapon-free zone in the region of the Middle East". A/78/405. 10 November 2023.
19 United Nations General Assembly, 78th Session. Report of the First Committee on the draft resolution "The risk of nuclear proliferation in the Middle East". A/78/411. 10 November 2023.
20 Carnegie Endowment for International Peace. Arab Peace Initiative II: How Arab Leadership Could Design a Peace Plan in Israel and Palestine. 17 November 2023.
21 Times of Israel. 5 November 2023. <https://www.timesofisrael.com/liveblog_entry/netanyahu-suspends-from-cabinet-meetings-minister-who-touted-option-of-nuking-gaza, accessed 1 July 2024>.

Moreover, enhancing the involvement of Saudi scientists and engineers in events related to the Treaty and inspiring young people to engage in various platforms and organisations, such as the CTBTO Youth Group (CYG) could prove advantageous.

CONCLUSION

The regional challenges in the Middle East demand concerted efforts in conflict resolution and the implementation of measures to build trust, aiming to attain stability and security in the region. The CTBT being fundamental to nuclear disarmament could be used as an instrument to build that trust. Saudi Arabia is actively engaged in diplomatic missions to promote peace and cooperation in the region, which not only could lead to the adoption of the CTBT by Saudi Arabia and neighboring countries, but also the establishment of a NWFZ-ME. This overarching objective aligns with Saudi Arabia's advocacy for such measures, demonstrated through its participation in the NPT and its support of the TPNW.

THE CTBT AND THE RISKS ASSOCIATED WITH INFORMATION RECEIVED FROM 'UNCONVENTIONAL SOURCES' IN THE PROCESS OF VERIFICATION

Fateme Fazel

ABSTRACT

Any verification of arms control and disarmament agreements usually includes collection of information relevant to a given treaty. (1) Some information collection methods/instruments, presumably the most important ones, are usually described in detail in the treaty text and various annexes, protocols and other documents. (2) Some other methods can be only mentioned in general. (3) Yet there can be some, that for one reason or another, may not be mentioned, but still assumed to be used by individual states or treaty organizations. As far as the CTBT is concerned, this "third category" might be deemed to include the use of information obtained from open-sources or government intelligence services. The present article attempts to explore potential consequences of the employment of such methods both from the point of view of the effective functioning of the Treaty, once it enters into force, and from the point of view of addressing concerns of some states with these methods – which may play a role in discouraging those states from accelerating their ratification processes and thus in delaying the Treaty's entry into force (EIF).

Technological advancements have brought notable changes to information collection methods, presenting both positive outcomes, such as improved Treaty verification capabilities, and negative aspects, including dissemination of intentional disinformation or the abuse of intelligence. Although the CTBT requires on-site inspections to be contingent on information gathered from the international monitoring system and national technical means consistent with the generally recognized principles of international law, the Treaty, depending on interpretation, does not rule out the reception of information from sources beyond these two. In other words, it can be argued that there is some room for the use of such information for raising suspicions and/or implementing punitive measures against a country. While it may be too late to address this problem through changes in the Treaty text (which had been painstakingly negotiated in Geneva), there could be a possibility to fine-tune certain implementation-related rules and arrangements that are being developed during the current preparatory phase before the EIF of the Treaty. The future CTBTO's approach to handling such information should take into account both positive and negative aspects, such as establishing mechanisms for information validation. Collaborating with organizations like the IAEA and the OPCW, and drawing upon their experiences in managing such information, is one of the recommended strategies in this context.

INTRODUCTION

Historically, the potential utilization of data collection methods beyond those explicitly mentioned in treaty texts for verifying states-parties' compliance with respective treaties has consistently been a concern for many countries. The Comprehensive Nuclear-Test-Ban Treaty (CTBT) is no exception, where countries adopted dual approaches regarding the use of information obtained from sources outside Treaty texts, particularly employing espionage. While some countries like China, Iran, India, and Israel explicitly expressed their apprehensions, representatives of others like the United States, while not overtly endorsing

the use of such information, voiced concerns about the ineffectiveness and lack of confidence in the Treaty's monitoring mechanisms, with the International Monitoring System (IMS) being the most crucial. Ultimately, Treaty drafters aimed to alleviate the concerns of the first group by restricting data collection methods that could prompt on-site inspections to information gathered from the international monitoring system or national technical means (NTM), provided these methods comply with international legal principles (Article 4, paragraphs 5 and 37).

FORMAL INFORMATION-GATHERING METHODS IN THE CTBT

During the drafting of the CTBT, one of the foremost concerns of governments, which continues to hinder the accession to the Treaty even today, revolves around the potential for parties to employ methods beyond those explicitly mentioned in the Treaty text for gathering information and for incriminating other countries Treaty violations. The term "methods beyond the Treaty text" referred to approaches through which countries could collect information without utilizing the IMS outlined in the Treaty.

Information obtained through methods outside the Treaty text may lack accuracy and reliability, be subject to manipulation for specific political purposes, may exhibit biased orientations, failing to accurately reflect the actual situation, and may be even intentionally false (i.e. disinformation).[1] The utilization of disinformation during verification of the CTBT may lead to misunderstandings, miscalculations, and negatively impact impending decisions,[2] endangering the national sovereignty of countries. For instance, countries might leverage disinformation to pressure their rivals, providing false information to the organization.[3] Such disinformation in the realm of Treaty compliance can yield adverse outcomes. For example, a country might influence the decision-making authority of the CTBTO by presenting a distorted view of another country's nuclear program, prompting unnecessary on-site inspections, which, in turn, could lead to further information acquisition and espionage activities.[4] Regarding this issue, countries such as China, India, Israel, and Pakistan have prioritized their security and national sovereignty concerns over the implementation of the Treaty's objectives. They have reluctantly accepted on-site inspections as the organization's last resort.[5]

Israel expressed concerns that neighboring countries might misuse on-site inspection rights to conduct espionage on its nuclear facilities.[6] One reason India has not joined the Treaty is its concern about other countries' compliance verification through the use of satellites and other national technical means (NTM).[7] The term "national technical means" refers to remote sensing technologies that countries employ for compliance verification with arms control treaties[8]. The introduction of the term "national technical means" into arms control treaties first occurred in the 1972 Anti-Ballistic Missile Treaty (ABM) between former Soviet

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1 M. Fowler, E. Bergner, K. Nitisa, "Combating Nuclear Misinformation and Disinformation", Open Nuclear Network, 2022, p. 1, <https://opennuclear.org/sites/default/files/2023-04/id-269---fowler-bergner-nitisa.pdf, accessed 1 July 2024>.

2 Ibid, p. 2.

3 Allison Carnegie and Austin Carson, "The Disclosure Dilemma: Nuclear Intelligence and International Organizations", American Journal of Political Science, Vol. 63, No. 2, 2019, pp. 269-285, <https://www.jstor.org/stable/45132477, accessed 1 July 2024>.

4 M. Fowler, E. Bergner, K. Nitisa, op. cit., p. 1.

5 Rebecca Johnson, "Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing", UNIDIR, 2009, p. 161, <https://unidir.org/files/publication/pdfs/unfinished-business-the-negotiation-of-the-ctbt-and-the-end-of-nuclear-testing-346.pdf, accessed 1 July 2024>.

6 Ibid, p. 165.

7 Sean West, "The CTBT: lack of progress in the Middle East and South Asia", Trust & Verify, Verification Research Training and Information Centre (VERTIC), issue. 121, 2005, p. 2, <https://www.vertic.org/media/assets/TV121.pdf, accessed 1 July 2024>.

8 Mauricio Baker, "Nuclear Arms Control Verification and Lessons for AI Treaties", Cornel University, 2023, P. 10 <https://doi.org/10.48550/arXiv.2304.04123, accessed 1 July 2024>.

Union and the United States. In this Treaty, state-parties were prohibited from interfering with these methods, which each party employed to ensure the other's treaty compliance. This concept was later used in other treaties such as SALT 1 & 2, but no clear definition of the technical means that countries could use was provided.

The deliberate ambiguity in defining these means was aimed at not disclosing the specific methods and equipment used for this purpose, leaving countries free to use any method. Therefore, NTM encompass any method that provides information about the implementation of Treaty commitments by other members. The general opinion is that these methods generally refer to satellites.[9] Treaty drafters devised measures to address the concerns of these countries by restricting information obtained from NTM to those acquired through methods compliant with international law.[10] Article 4, paragraph 37 of the CTBT restricts requests for on-site inspections solely to those based on information obtained from the IMS, NTM, or a combination of both. Furthermore, information obtained from NTM is deemed acceptable only if collected in accordance with principles of international law. The use of the IMS is explicitly limited to the methods specified in the Treaty and its protocols. Therefore, the utilization of methods beyond those explicitly mentioned in the Treaty for the IMS is not feasible, and states cannot request on-site inspections (after CTBT EIF) using such methods.

Regarding the use of NTM, paragraph 5 of the same article stipulates that states can only employ these methods for information collection if their use aligns with recognized principles of international law, such as the principle of respecting the sovereignty of nations. The subsequent paragraph emphasizes that states should not impede such actions. Concerning the use of cooperating national facilities as auxiliary tools for the Treaty, regulations are outlined in paragraphs 27 and 28 of Article 4. These regulations include the requirement for these tools to undergo scrutiny by the organization and operate with authorization from the organization. These provisions clearly illustrate that the Treaty adopts a stringent approach towards information collection methods, striving to alleviate countries' concerns regarding the use of any information from any source to ensure compliance. Only information obtained from two credible sources – the IMS and NTM – while adhering to specific conditions and regulations, can lead to a valid request for on-site inspection. However, is the scope of information accessible to the CTBTO limited to these two methods, or are there other methods for obtaining information in the Treaty? A careful examination of the Treaty text reveals that the mentioned two methods are not the exclusive means for acquiring information, and the CTBTO can leverage information obtained from various sources and methods. In the second part, we will explore these sources and methods, along with the challenges associated with their use by the organization.

OTHER METHODS OF INFORMATION COLLECTION AVAILABLE FOR FUTURE CTBTO

Paragraph 14, subsection (a) of Article 4 states that the Technical Secretariat of the organization can receive information related to CTBT verification. This section of the paragraph does not explicitly specify the sources of information it refers to. Subsection (b) of the same paragraph mentions that the organization can receive any other information relevant to its work from member states or international organizations, in accordance with the provisions of the Treaty and its protocols. These two clauses in this paragraph suggest that IMS and NTM are not the sole sources of information; rather, there are other sources alongside them. Generally, information obtained through methods other than those explicitly mentioned in the Treaty is categorized into open-source information and information acquired from national intelligence means.

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[9] Michael P. Gleason and Luc H. Riesbeck, "Noninterference with National Technical Means: The status quo will not survive", Center for Space Policy and Strategy, 2020, p. 1-2, <https://csps.aerospace.org/sites/default/files/2021-08/Gleason_NTM_20200114.pdf, accessed 1 July 2024>.

[10] Rebecca Johnson, op. cit., 168.

Open-Source Information

This term usually refers to information that is publicly accessible, allowing individuals to legally collect it through various means. This definition encompasses a broad spectrum of information, including scientific articles, news published on official government websites, news agencies, information released by international organizations, commercial satellite imagery, and trade analysis.[11] Not only countries but also international and non-governmental organizations, or even individuals can obtain information through these channels and share it with the CTBTO.[12]

In 2015, the Organization for the Prohibition of Chemical Weapons (OPCW) published a report on the use of new technologies in verification activities. This report had acknowledged the benefits of utilizing open-source information. Among other it refers to the IAEA experience of use of open-source information to gain a more comprehensive understanding of countries' nuclear programs. However, it is essential to note that open-source information is not among the primary information that the IAEA must obtain for executing its duties; rather, it serves as a supplementary and clarifying role for the primary information acquired.[13]

The challenge associated with using open-source information revolves around the debate of its validity. As mentioned earlier, the possibility of disseminating false information with the intention of misleading governments or international organizations is not excluded. Technological advancements have made it easier to create and spread disinformation. One of these new technologies is artificial intelligence (AI). AI can generate high-quality multimedia content, including text, images, videos, and lifelike sounds, similar to real samples. It is quite possible for an individual or state to use AI capabilities to produce misleading content about another country's nuclear program, complicating the verification process and causing trouble for the concerned country. Countries can also use AI-generated false content to conceal their unlawful military nuclear activities.[14]

Government intelligence services information

The term “information obtained from intelligence services” refers, for purposes of this article, to data acquired through covert methods. Use of capabilities and capacities of the intelligence services of states parties is one of the ways to enhance the verification capabilities of international treaties in the field of arms control. International organizations sometimes lack the facilities, equipment, and resources available to some countries, especially advanced ones, and, as a result, are not as capable of fulfilling their responsibility to identify non-compliance by parties effectively. This limitation in resources and capabilities makes them eager to utilize information that other governments have acquired through their own means, especially the resources available to their intelligence services.[15] However, the information provided by these services is not always accurate and reliable, similar to information obtained from open-sources. There are possibilities of politicizing intelligence

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[11] G. Renda, G.G.M. Cojazzi, “Open Source Information Analysis in Support to Non-Proliferation”, European Commission (JRC Technical Reports), 2018, p. 6, <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC102286/jrc102286_os_for_nonproliferation.pdf, accessed 1 July 2024>.

[12] V. Gupta, F. Pabian, “Commercial satellite imagery and the CTBT verification process”, the Non-proliferation Review, Vol. 5, No. 3, 89-97, pp. 93-94, <https://doi.org/10.1080/10736709808436724, accessed 1 July 2024>.

[13] OPCW, “Verification; Report of the Scientific Advisory Board’s Temporary Working Group”, OPCW, 2015, pp. 3-24<https://www.opcw.org/sites/default/files/documents/SAB/en/Final_Report_of_SAB_TWG_on_Verification_-_as_presented_to_SAB.pdf, accessed 1 July 2024>.

[14] J. Vaynman, “Better Monitoring and Better Spying: The Implications of Emerging Technology for Arms Control”, Texas National Security Review, V. 4, No. 4, 2021, pp. 50-51 <https://tnsr.org/wp-content/uploads/2021/09/TNSR-Journal-Vol-4-Issue-4-Vaynman.pdf, accessed 1 July 2024>.

[15] James M. Action, “International Verification and Intelligence”, Carnegie, June 04, 2014, <https://carnegieendowment.org/2014/06/04/international-verification-and-intelligence-pub-55862, accessed 1 July 2024>.

services and the abuse of intelligence to achieve specific partisan and political purposes. Intelligence officers may, under the influence and pressure of policymakers, decide to manipulate information that should be impartial and objective. Subsequently, policymakers and decision-makers may rely on this false or incorrect information to make important decisions.[16] The US- and the UK-led invasion to Iraq in 2003 under the pretext of information received from their intelligence about the existence of Iraqi WMD programs is an example of the abuse of intelligence.[17]

In the following section, we will review the ways the CTBTO can utilize information obtained from sourcesbeyond the IMS and NTM.

CTBTO UTILIZATION OF INFORMATION OBTAINED FROM OTHER SOURCES

The primary goal of any information CTBTO obtains is to verify countries'compliance with the Treaty and the absence of nuclear tests. The verification regime of the Treaty consists of four elements (Paragraph 1 of Article 4):
- international monitoring systems,
- consultations and clarification,
- on-site inspections, and
- confidence-building measures.

Two essential elements where information obtained is used are on-site inspections and consultations and clarification. While the Treaty explicitly bases the request for on-site inspections on information obtained from the IMS or NTM in Paragraph 37 of Article 4, according to Section "c" of the same article countries' requests for conducting consultations and clarification to address concerns about Treaty violations could be based on information obtained from any specific source. This means that countries do not need to base their requests for consultation and clarification solely on information obtained from the IMS or NTM in accordance with general principles of international law. Their concerns about possible Treaty violations can stem from information received from open sources or their intelligence services (or even from "third party intelligence"). It means that states can then request clarification and resolution of concerns without being tied to information obtained from a specific source.

If the response from the country in question cannot alleviate the concerns of requesting country, the latter can request a meeting of the Executive Council (Paragraph 33 of the same article). In this session, the Executive Council examines the matter and can recommend measures under Article 5, titled "measures to redress a situation and to ensure compliance, including sanctions". These measures include restricting or suspending the rights and advantages of the suspected country in the Treaty, collective actions by member states against the suspected country, or, in urgent cases, submitting the case to the United Nations and subsequently the Security Council.

In addition to states, the Technical Secretariat itself, as observed in Paragraph 14 of Article 4, can receive any information relevant to the Treaty's verification and resolving concerns

[16] M. Warner, "The Use and Abuse of Intelligence in the Public Square", Studies in Intelligence, V. 63, No. 3, 2019, pp. 15 & 17, <https://www.cia.gov/static/Use-Abuse-Intelligence.pdf, accessed 1 July 2024>.
[17] D. Sabbagh, "Abuses and intelligence failures hang over UK 20 years after Iraq war", The Guardian, 2023, <https://www.theguardian.com/world/2023/mar/17/iraq-war-20-years-uk-abuses-intelligence-failures-shadow, accessed 1 July 2024>; Bonnie Azab Powell,"Seeking the Truth.Hans Blix speaks to CNN's Christiane Amanpour on Disarming Iraq", IAEA Bulletin, 46/1, June 2004, pp. 69-71, <https://www.iaea.org/sites/default/files/publications/magazines/bulletin/bull46-1/46102096971.pdf, accessed 1 July 2024>.

regarding a country's adherence to the Treaty through consultation (paragraph 48 of Article 2). If this method does not yield results, the Secretariat can inform the Executive Council of the matter.[18] Additionally, in Paragraphs 31 and 44 of Article 4, it is stipulated that the Technical Secretariat must provide the Secretary-General with relevant information that can assist in alleviating concerns about a contributing country's violation of commitments and any other additional information useful for decision-making regarding on-site inspection requests. This pertinent information can be derived from sources other than the primary sources mentioned in the Treaty text, namely the IMS and NTMs.

Consequently, it is evident that CTBTO can acquire information from various diverse sources, and these pieces of information may have practical utility. Therefore, it is not only information obtained from the IMS and NTMs, as well as on-site inspection requests, that can lead to punitive or corrective measures against a country, which is accused of violating the Treaty.

What mechanisms the CTBTO should have in place to deal effectively with information received from 'unconventional' sources? This question will be addressed in the next section.

CHALLENGES AND CONSEQUENCES OF OBTAINING INFORMATION FROM OPEN-SOURCES OR INTELLIGENCE SERVICES OF COUNTRIES

In 2006, information obtained by the United States and several other countries regarding the potential military dimensions of Iran's nuclear program[19] led to the deterioration of relations between Iran and the IAEA.[20] Ultimately, the case was referred to the United Nations Security Council, resulting in severe sanctions against Iran. Official Tehran repeatedly objected to this matter, considering the presented information baseless and politically motivated.[21] The experience of Iran and some other countries, like Syria, have made them, as well as those aligned with them, concerned about utilization of information obtained beyond the primary sources outlined in the CTBT text.

Moreover, the possibility of the CTBTO utilizing information acquired from other sources, especially the intelligence services of states, benefits primarily Western and other statesequipped with advanced technologies for information gathering. This is because only they (with a few exceptions) have the capability to collect information related to nuclear tests conducted by other countries in this manner, while other countries cannot exploit this opportunity.[22] Additionally, as mentioned earlier, the use of information from open-sources or intelligence services of countries may resulted in the spread of disinformation or abuse of intelligence.

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[18] It is self-evident that the Technical Secretariat performs this task using information obtained from sources other than the IMS since, according to Paragraph 18 of the first part of the Treaty protocol, the final judgment regarding information acquired from the IMS lies with the commitment of the countries. Therefore, the Technical Secretariat, responsible for receiving, processing, examining, and reporting on the information received from the IMS, cannot independently request an on-site inspection. This matter is also mentioned in Paragraph 34, Article 4 of the Treaty, emphasizing that only governments can express opinions about the nature of the occurred events and, if suspicious, request an on-site inspection. Additionally, information obtained from NTMs can independently fall within the purview of countries for requesting on-site inspections, albeit subject to inspection by the Executive Council and the technical Secretary (Derived from Paragraph 38, Article 4, and subsequent paragraphs).

[19] James Martin Center for Non-proliferation Studies, "The Possible Military Dimensions of Iran's Nuclear Program", Iran Fact File Project, 2014, p. 3 (pdf)<https://www.files.ethz.ch/isn/184750/PMD-fact-sheet-final.pdf, accessed 1 July 2024>.

[20] Tom Coppen, "Developing IAEA Safeguards: An Institutional Perspective on the State-level Concept", Journal of Conflict and Security Law, Vol. 20, No. 2, 2015, pp. 169-193, p. 180, <https://doi.org/10.1093/jcsl/krv004, accessed 1 July 2024>. Article 8 of the Agency's Statute requires member states to provide any information they deem helpful to the Agency. Thus, similar to the CTBTO, the Agency can obtain information from various alternative sources.

[21] For example, in INFCIRC/737, INFCIRC/739, INFCIRC 768 and INFCIRC/786.

[22] Tom Coppen, op. cit., p. 179.

On the other hand, one of the reasons for a country like the United States not showing interest in ratifying the Treaty is its concern about the inadequacy of the methods outlined in the Treaty for acquiring information and dealing with Treaty violations. In this context to enhance the verifiability and monitoring capabilities of the CTBT some proposed reliance on information obtained by countries through open-sources or in the course of their investigations.[23]

Given the potential risks of abuse, efforts are required to minimize those risks. Furthermore, states parties have to be assured that efforts to reduce such risks are receiving constant attention from the CTBTO. Otherwise, the organization and its relevant structures would not be able to achieve the necessary degree of trust among all states-parties, and that is another major factor for successful operation of the Treaty as a whole, and of its verification system in particular.

Since the use of information from open sources or intelligence services of countries could yield potentially both positive and negative results, CTBTO must adopt an approach regarding this information that considers the concerns of all categories of countries (including Iran and the United States among others) and endeavors to address and alleviate them. To accomplish this, CTBTO needs to establish a framework for the verification, validation, and accuracy of the information obtained through these methods. The IAEA and the OPCW have each devised methods and mechanisms to assess the reliability of sources and verify the accuracy of information obtained through them.[24] Additionally, the European Union published the Code of Practice on Disinformation in 2022, aiming to combat this phenomenon and provide conditions for distinguishing false from accurate news.[25] Currently, CTBTO has concluded agreements with various international organizations such as the United Nations,[26] OPANAL,[27] and IAEA[28] for further collaboration in various fields. For instance, CTBTO can enter into agreements with IAEA and OPCW to learn from their experiences in dealing with information obtained from open-sources and intelligence services of countries and in the verification of this information. CTBTO can even, like the European Union, publish a document or protocol in this regard and communicate it to all member and non-member countries to demonstrate that it comprehends countries' concerns regarding the use of such information and is striving to mitigate these concerns through appropriate methods.

Implementing these actions would increase the trust of countries, both those that have joined and those that have not, in using this information and reduce their concerns about the use of false or misleading information. The organization's approach to this issue can

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[23] Ola Dahlman, Jennifer Mackby, Svein Mykkeltveit, Hein Heak, "Detect and Deter: Can Countries Verify the Nuclear Test Ban?", Springer, 2011, p. 197, <https://link.springer.com/book/10.1007/978-94-007-1676-6, accessed 1 July 2024>.

[24] M. Barletta, N. Zarimpas, R. Zarucki, "Open-source information acquisition, analysis, and integration in the IAEA department of safeguards" James Martin Center for Non-proliferation Studies, 2009, <https://www.nonproliferation.org/wp-content/uploads/2016/10/presentation_paper_barletta_zarimpas_zarucki.pdf, last access on: 1 July 2024>.

[25] European Commission, "The 2022 Code of Practice on Disinformation", European Commission, n. d., <https://digital-strategy.ec.europa.eu/en/policies/code-practice-disinformation#:~:text=The%20Code%20will%20strengthen%20the,challenges%20related%20to%20such%20techniques., accessed 1 July 2024>.

[26] CTBTO, "The Preparatory Commission and The United Nations Conclude an Agreement to Regulate Their Relationship", CTBTO preparatory commission, n. d, <https://www.ctbto.org/resources/for-the-media/press-releases/preparatory-commission-and-united-nations-conclude-agreement, accessed 1 July 2024>.

[27] CTBTO, "CTBTO Preparatory Commission Signs Relationship Agreement with OPANAL", CTBTO preparatory commission, n. d, <https://www.ctbto.org/news-and-events/news/ctbto-preparatory-commission-and opanal-sign-relationship-agreement#:~:text=sign%20relationship%20agreement-,CTBTO%20Preparatory%2Commission%20and%20OPANAL%20sign%20relationship%20agreement,have%20signed%20a%2relationship%20agreement., accessed 1 July 2024>.

[28] CTBTO, "IAEA & CTBTO Signs Practical Arrangements on Nuclear Emergencies", CTBT preparatory commission, n. d, <https://www.ctbto.org/news-and-events/news/iaea-ctbto-sign-practical-arrangement-nuclear emergencies#:~:text=These%20practical%20arrangements%20streamline%20the,with%20its%20area%2of%20expertise.&text=The%20CTBTO%20is%20the%20only%20global%20network%20which%20detects%2atmospheric%20radioactivity., accessed 1 July 2024>.

significantly impact the future behavior and decisions of countries regarding joining the Treaty. It is imperative for CTBTO to prioritize this issue and take actions in this regard to underscore its attention to one of the most significant concerns of countries regarding the Treaty.

CONCLUSION

The subject of utilizing by CTBT of information collection methods beyond the specified primary mechanism, i.e., the IMS, was a significant aspect addressed during the negotiations on the Treaty text. Ultimately, due to concerns raised by a group of countries, it was decided that information collection, in addition to the IMS, could be admissible through alternative methods such as national technical means, provided that these methods align with the generally accepted principles of international law. Member states were then allowed to base their on-site inspection requests on information gathered from both sources (Article 4, Paragraph 37). Nevertheless, a meticulous examination of the Treaty text reveals that these two sources are not exclusive for information collection (Article 4, Paragraph 14). Organizations or member states are not only permitted to gather information from other sources, such as open-sources or national intelligence services, but can also utilize the information obtained through the consultation and clarification process. This flexibility empowers them to compel countries in questions to undertake corrective or punitive actions. However, the utilization of this information comes with inherent concerns and potential negative consequences, including the use of false information or the abuse of intelligence. On one hand, the use of such information can exacerbate apprehensions and yield adverse outcomes; on the other hand, it has the potential to enhance the verifiability of the Treaty and strengthen its monitoring capabilities. Therefore, it is imperative for the CTBTO to adopt a judicious approach in dealing with these issues, ensuring not only the mitigation of negative outcomes but also the maximization of positive results. In this regard, the CTBTO can enter into agreements with other international organizations, such as the IAEA and the OPCW, which possess experience in utilizing these sources of information. The appropriate handling of these sources by the CTBTO will contribute to building trust among state-parties and non-parties, thereby facilitating the acceptance and implementation of the Treaty by nations.

One should not close his eyes to these risks or ignore it. The issue is delicate, so an extra effort should be made to ensure its smooth, non-controversial and professional discussion. Perhaps, a good way to begin, could be for the CTBTO to organize several informal seminars of governmental experts, to some of which non-governmental experts and experts from such organizations as the IAEA and OPCW could also be invited.

ADDRESSING THE ENVIRONMENTAL AND HUMANITARIAN EFFECTS OF THE NUCLEAR TESTS

■ Sara Abdelaziz ■ Asylbek Kaparov ■ Ankit Kumar

ABSTRACT

This paper provides an overview on the impact of nuclear tests on the environment and humans. It also discusses briefly the global perspective on consequences and remediation efforts, the international efforts to deal with the nuclear testing issues, either by the treaties, non-governmental organizations or the public role.

INTRODUCTION

Eight countries have conducted more than 2,000 nuclear tests (including peaceful nuclear explosions) at dozens of test sites with the first nuclear test explosion on 16 July in 1945 in the USA and the last one on 3 September 2017 in the DPRK. There are four different types of nuclear tests: atmospheric tests, underground tests, upper atmospheric tests, and underwater tests. In total, 530 atmospheric[1] and 1,517 underground tests were conducted. The US conducted the most nuclear tests (1,030), the USSR the second (715), and France the third (210).[2]

The geography of nuclear test sites includes extensive territories in different regions of the world (with the exception of Latin America and Antarctica). The list of landfills includes more than 25 places where nuclear weapons were tested on a regular or irregular basis. The largest number of tests were conducted in Nevada (928 nuclear tests) in the USA; Semipalatinsk (468) in the former USSR – now Kazakhstan; French Polynesia in the South Pacific (190); Novaya Zemlya in the Arctic Ocean (130) – in the former USSR now Russia; the atolls of the Pacific (67) – site of the USA testing; Lop Nor in China (45); Algeria (17), where France conducted its first nuclear device; Australia (12), where the United Kingdom detonated nuclear weapons; Punggye-ri in the DPRK (6); South Atlantic (3) – site of the USA testing; Pokhran I and Pokhran II in India (3); Chagai-I in Pakistan (2), and elsewhere.[3]

It did not become immediately obvious, that nuclear testing has multiple and long-lasting negative consequences going far beyond the moment of the explosion, and beyond the immediate vicinity of the test site. Scientists started to ring the alarm bells in this regard in mid-1950s, and it became one of the triggers for the campaign to stop nuclear testing, that dates back to those days. One of tangible results was the conclusion of the Partial Test Ban Treaty (PTBT), which outlawed nuclear tests in all environments except the underground ones. This helped reduce global atmospheric consequences of nuclear testing. Many years later, in the late 1980s-early 1990 the problem of nuclear testing consequences again became a hot political issue, but this time, in addition to academic circles, much broader societal groups got involved.[4] This brought to life movements such as Nevada-Semipalatinsk, whose

[1] A few of atmospheric tests were conducted underwater: Frequently Asked Questions (FAQS), CTBTO. <https://www.ctbto.org/resources/information-materials/frequently-asked-questions, accessed 1 July 2024>.
[2] Locations of Nuclear Explosions. CTBTO. <https://www.ctbto.org/map/#, accessed 1 July 2024>.
[3] Nuclear Test Sites. Atomic Archive. <https://www.atomicarchive.com/almanac/test-sites/testing-map.html, accessed 1 July 2024>.
[4] Lawrence S. Wittner, "Disarmament movement lessons from yesteryear", Bulletin of the Atomic Scientists, 27 July 2009, <https://archive.ph/20121209103702/http://www.thebulletin.org/web-edition/op-eds/disarmament-movement-lessons-yesteryear#selection-263.26-263.38, accessed 1 July 2024>.

activities made a significant contribution in achieving the moratorium on testing by Russia and the US which, in turn, opened the way to the successful negotiation on the CTBT.

ENVIRONMENTAL AND HEALTH EFFECTS RESULTING FROM THE NUCLEAR TESTING

Nuclear testing has negative environmental consequences, due to the release of hazardous materials into the environment, including radioactive isotopes, that contaminate air, soil, and water. These contaminants, such as cesium, strontium, and plutonium, persist for extended periods, causing ecological damage. In the atmosphere, nuclear explosions produce radioactive fallout, leading to the deposition of particles over large distances, contributing to long-term contamination of soil, water vegetation and wildlife. When particles settle on the Earth's surface, they enter the food chain and human consumption. Underground nuclear tests can result in the creation of subsurface cavities and fractures, altering the geological structure and potentially facilitating the migration of radioactive materials.

One of the serious matters of the nuclear test damage is how brutal it may affect human health. In the case of atmospheric nuclear tests, the radioactive fallout is probably the greatest threat to human life and health. There are many pathways, some being more "certain" than others, through which radionuclides finally reach the individuals. Much depends on the altitude of the explosion, the type, design and yield of the device/warhead (which would affect the amounts and proportions of various resulting emissions and particles), local and global weather conditions, prevailing winds and precipitation patterns, surface and underground water flows. Finally, one has to take into account other factors, such as contamination of food sources.

ECONOMIC AND SOCIAL CONSEQUENCES

The effects of nuclear testing are not limited to radiation-induced diseases but include the loss of land heritage, with people being displaced and having no property left. This, in turn, has often led to a variety of mental health problems.

A comprehensive examination of global nuclear testing reveals a disconcerting timeline, with numerous nations conducting tests at various sites around the world. From the deserts of Nevada to the coral atolls of the Pacific and the steppes of Kazakhstan, nuclear testing has been a global phenomenon with wide-ranging implications.

The consequences of nuclear testing are not confined to political or military considerations; they extend to the very fabric of societies. Ecological disturbances, such as soil contamination, radioactive fallout, and disruption of ecosystems, underscore the harmful effects of nuclear testing.

The Semipalatinsk test range in Kazakhstan stands as an example of the devastating consequences of nuclear testing. The legacy of Soviet-era nuclear tests has resulted in persistent radioactive contamination, turning the once fertile land into a haunting reminder of the environmental degradation caused by nuclear explosions.

The Pacific region has also been a focal point for nuclear testing, with atomic bombs detonated over atolls and even in Australia during the mid-20th century. The ecological ramifications of these tests persist, emphasizing the global and intergenerational scope of the environmental fallout from nuclear testing. The impact on marine life, coupled with the displacement of indigenous communities, serves as a testament to the far-reaching consequences of nuclear tests.[5]

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[5] Atomic Bomb Testing at Bikini Atoll 1946, Nuclear Princeton, <https://nuclearprinceton.princeton.edu/pacific#:~:text=Impact%20on%20the%20Pacific&text=67%20nuclear%20tests%20were%20conducted,bomb%20named%20Castle%20Bravo%20Bomb, accessed 1 July 2024>.

ACHIEVING THE END OF NUCLEAR TESTING AND COOPERATION TO REMEDY ITS HARMFUL CONSEQUENCES

By acknowledging the negative consequences of nuclear testing and aligning efforts with international agreements, humanity can strive towards a future free from the environmental scourge wrought by nuclear explosions. The paramount need to uphold the moratorium on testing and accelerate the entry into force of the CTBT is obvious. It would ensure that environmental, health and socio-economic problems resulting from nuclear testing do not worsen. This would allow us to concentrate on addressing the consequences of earlier testing more effectively, without the fear that renewed testing would make such efforts useless. However, it would not solve those problems altogether.

Discussions on international cooperation for assisting victims and rehabilitating affected areas involve existing instruments and institutions like the Treaty on the Prohibition of Nuclear Weapons (TPNW), the World Health Organization (WHO), and UN disaster relief programs. The International Atomic Energy Agency (IAEA) and the United Nations Environment Programme (UNEP) could play a role on issues relating to nuclear safety. These entities contribute to the ongoing dialogue on the most effective mechanisms for addressing the multifaceted challenges posed by nuclear testing. Coordination among these organizations becomes essential to ensuring a comprehensive and sustained global response.

However, there is a need for a comprehensive discussion of the problem as a whole and a proper "distribution of labor". This raises the question of the role of the UN as a whole.

UN GENERAL ASSEMBLY

The UN General Assembly adopted a number of resolutions which contained certain principles and, in some cases, specific recommendations, which are relevant to the problem. One notable example is the resolution 75/210 of 21 December 2020, focused on rehabilitation and economic development of the "Semipalatinsk region of Kazakhstan".[6] Yet, until 2023, there had been no UNGA resolution, which would address the issue in a comprehensive way. Such a resolution was adopted under the title "Addressing the legacy of nuclear weapons: providing victim assistance and environmental remediation to Member States affected by the use or testing of nuclear weapons".[7] The resolution, among other things, firmly puts the issue on the UN agenda and asks the UNSG to seek views and proposals of Members states for further discussion.

This is a positive step, but the adoption of this resolution raises two questions. One is that the resolution attempts to glue together the issues of nuclear weapons use and nuclear testing. The former is much more complicated and controversial than the latter, and this could complicate further discussion of remediation of consequences of testing. The second question, apparently related to the first one, stems from the fact that it was adopted by vote, with no nuclear weapons states voting in favor (some voted against, other abstained). This is not the best start towards creating a cooperative environment needed to address the subject matter of the resolution, and it is to be hoped that during "further discussion" states could embrace a non-confrontational approach to these issues.

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[6] A/RES/75/210 International cooperation and coordination for the human and ecological rehabilitation and economic development of the Semipalatinsk region of Kazakhstan, 30 December 2020, <https://undocs.org/en/A/RES/75/210, accessed 1 July 2024>.

[7] A/RES/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, 28 December 2023, <https://digitallibrary.un.org/record/4033026?ln=en, accessed 1 July 2024>.

CONCLUSION

Based on the above research, a conclusion can be reached, that concerns about environmental and socio-economic consequences of nuclear testing had contributed in the past to progress towards comprehensive ban on such tests, including the successful negotiation of the CTBT in 1996. However, the issue of how states should cooperate in order to remedy those consequences, requires more research and more efforts by states, both in terms of substance and politics around it.

EXPLORING SYNERGIES BETWEEN THE CTBT AND CLIMATE CHANGE MITIGATION STRATEGIES

■ Layal Alghoozi ■ Christelle Barakat ■ Andhika Yudha Prawira

ABSTRACT

This paper aims to examine the perceived gap in existing research regarding the synergies between the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and climate change mitigation. Its main focus is on three key aspects: the impact of nuclear testing on climate, the interconnection between the CTBT and climate change, and how (in which way) the CTBT can contribute to climate change mitigation efforts.

INTRODUCTION

Climate change is one of the major global issues with significant impacts on the environment, economic development, and global security. Nuclear tests and climate change are two distinct notions. Yet, as many studies show, nuclear testing has produced innumerable negative consequences for the environment, biodiversity, and human and animal health.[1] Nuclear testing is also one of the key factors fueling the nuclear arms race and proliferation of nuclear weapons – both eroding further stability and thus increasing the risks of nuclear weapons use and nuclear war. The actual use of nuclear weapons can lead to severe climate modification and have catastrophic environmental, economic, social, and humanitarian consequences, as large parts of the Earth may suffer famine caused by a nuclear winter.[2] Nuclear testing, if it is allowed to resume despite the fact that the CTBT is signed by a vast majority of states (which, under international law, do not have an option of testing) and despite the currently observed moratorium on testing, would probably not result in such far-going consequences, as would the use of nuclear weapons, but it would take the humanity several steps closer to nuclear war.

Besides looking at the harmful consequences of nuclear testing, the paper explores the potential role of the CTBTO in environmental and climate monitoring and risk mitigation and the interaction between the emerging CTBTO monitoring system and ongoing climate change mitigation processes and conferences.

ENVIRONMENTAL AND HUMANITARIAN CONSEQUENCES OF NUCLEAR TESTING

Nuclear tests, like climate change, have the potential of reaping serious humanitarian consequences, both in the immediate term and the long-term future.[3] Climate change can act as a threat multiplier and exacerbate existing tensions and conflicts,[4] while nuclear tests pose a risk of radioactive pollution in atmospheric, aquatic, and underground environments.[5]

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1 Remus Prăvălie, "Nuclear weapons tests and environmental consequences: a global perspective", Ambio, 2014, p. 729-744, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4165831/,accessed 1 July 2024>.

2 Lili Xia et al., "Global food insecurity and famine from reduced crop, marine fishery and livestock production due to climate disruption from nuclear war soot injection", Nature Food, 2022, p. 586-596, <https://www.nature.com/articles/s43016-022-00573-0, accessed 1 July 2024>.

3 ICAN, "Impact of nuclear weapons: Long term impact", ICAN, 2018, <https://www.icanw.org/catastrophic_harm_long_term_impact, accessed 1 July 2024>.

4 UN, "The climate crisis is a humanitarian crisis", UN News, April 29, 2021, <https://www.un.org/en/climatechange/the-climate-crisis-is-a-humanitarian-crisis, accessed 1 July 2024>.

5 Remus Prăvălie, "Nuclear weapons tests and environmental consequences: a global perspective".

Beyond the direct release of radionuclides and other pollutants into the atmosphere, a nuclear explosion contaminates surface soil and groundwater, leaving environmental disturbances with the formation of craters or partially collapsed mountains.[6] The environmental effects of nuclear testing are felt worldwide and have long-lasting impacts. It also poses a risk of potential leaching of radionuclides into drinking waters.

Among the most significant examples of this is the nuclear testing legacy and environmental damage faced by the Marshall Islands. The United States conducted 67 nuclear weapons tests in the Marshall Islands between 1946 and 1958, resulting in significant impacts onthe environment and human health.[7] Communities in the Marshall Islands "have suffered unimaginably" from radioactive contaminants that remain to this day.[8] The Marshallese are attempting to live on smaller and lower islands because of those nuclear tests. It should be noted that the most harmful environmental effect of nuclear testing comes from tests in the atmosphere and underwater.

Nuclear tests could potentially have long-term impacts on the climate as nuclear explosions release a variety of radionuclides into the atmosphere along with greenhouse gases. Radionuclides do not have a direct warming effect, but they can nevertheless influence atmospheric chemistry. Atmospheric nuclear testing transformed the chemical makeup of the atmosphere, altering the carbon composition of life on Earth. Atmospheric bomb testing before the Partial (or Limited) Test Ban Treaty of 1963 had produced almost twice the amount of carbon-14 in the atmosphere compared with previous levels.[9] Moreover, nuclear explosions with a higher yield can generate "black, sooty smoke"[10] from the fire that could be ejected into the Earth's stratosphere, blocking sunlight and leading to a drop in temperature. Beyond the immediate climatic impact, this can lead to widespread disruption of regular ecosystems and agricultural systems, thereby affecting communities reliant on agriculture and the chain of food supply.

As of today, the CTBT did not end nuclear testing completely and did not end the threat of nuclear war, but it has resulted in asignificant reductionin the number of nuclear tests. Since the CTBT's opening for signature in 1996, "only" 10 nuclear tests have been conducted cumulatively by India, Pakistan, and the DPRK.[11] Therefore it contributes positively to the protection and safeguarding of the environment.[12]

HOW THE CTBT CAN SUPPORT CLIMATE CHANGE MITIGATION EFFORTS

Future CTBTO capabilities can be applied to climate change research and early warning systems. The Treaty includes a verification regime that monitors parties' compliance and which is implemented through the International Monitoring Systems (IMS). Even though the CTBT is not designed for climate change monitoring, the applications of the IMS data through international cooperation and cooperation with state authorities can

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6 Alistair Walsh, "How nuclear testing leaves lasting environmental scars", DW, October 12, 2022, <https://www.dw.com/en/nuclear-testing-north-korea-environment-biodiversity/a-63418634, accessed 1 July 2024>.

7 UN, "Nuclear testing legacy is 'cruellest' environmental injustice, warns rights expert", UN News, July 16, 2020, <https://news.un.org/en/story/2020/07/1068481, accessed 1 July 2024>.

8 Ibid.

9 Richard Fisher, "The atomic bomb marker inside your body", BBC Future, 2023,<https://www.bbc.com/future/article/20230808-atomic-bomb-spike-carbon-radioactive-body-anthropocene/,accessed 1 July 2024>.

10 Alan Robock, "Nuclear winter" wires climate change", 2010, p. 420, <https://climate.envsci.rutgers.edu/pdf/WiresClimateChangeNW.pdf, accessed 1 July 2024>.

11 Guy Faulconbridge, "Nuclear testing: Why did it stop, and when?", Reuters, October 6, 2023, <https://www.reuters.com/world/nuclear-testing-why-did-it-stop-when-2023-10-05/, accessed 1 July 2024>.

12 CTBTO, "Banning nuclear explosions protect the environment", CTBTO, <https://www.ctbto.org/news-and-events/news/nuclear-test-ban-contributes-protection-environment, accessed 1 July 2024>.

provide essential informationto detect the effects of climate change and act as an early warning system for climate risks.[13] Given the broad spectrum of data collectible from the IMS, including seismic, hydroacoustic, infrasound, and radionuclide, coupled with the rise in climate change-induced disasters, IMS data has proven useful in several contexts. At present, 21 warning centers in 20 Treaty signatory countries have signed a Tsunami Warning Agreement with the CTBTO PrepCom. The most recent among them was in February 2024 by Venezuela.[14]

Several studies have been presented at the CTBTO's Science and Technology Conference Series, pointing to the potential use of IMS data for climate monitoring applications.[15] Infrasound, radionuclide, and hydroacoustic monitoring could contribute to the study and understanding of climate change. Seismic stations can be utilized to examine the melting of glaciers, which can affect seismic signals and contribute to the geophysical process of earth-climate systems. Hydroacoustic sensors can pick up data that can improve weather predictions and estimate oceanic temperature. Infrasound sensors can detect landslides and avalanches and capture low-frequency acoustic waves that can be utilized to monitor atmospheric phenomena, such as hurricanes and tornadoes. Radionuclide stations can measure airborne particles and noble gases, which can be important in understanding the long-range exchange of pollutants through transport tracking or validating atmospheric transport models assisted by the World Meteorological Organization (WMO). This could be utilized to monitor stratosphere/troposphere exchange, which is important in validating global climate models using radionuclides tracers.

The wide array of data collected by the IMS, as well as the capacity building on each station, present an important asset for climate change monitoring and mitigation. It could empower countries/communities that face the immediate consequences of climate change to better predict and respond to such challenges. The CTBTO's virtual Data Exploitation Centre (vDEC) provides scientists and researchers from many different disciplines and from around the globe with access to data, free of charge, to conduct research and publish new findings. Therefore, a global network established by the IMS could play an important role in both ensuring compliance with the CTBT and providing robust data and information to mitigate the effects of climate change.[16] The important point here is that, in order to widen the scope of IMS capabilities[17] usable for climate and disaster monitoring beyond verification of a nuclear test ban, the CTBT should be first brought into force. In other words, those interested in climate monitoring should work to accelerate the entry into force of the CTBT and the CTBTO's formal establishment.

CLIMATE CONFERENCES AND THE CTBTO

While the Non-Proliferation Treaty (NPT) serves as a cornerstone of the nuclear non-proliferation regime, the United Nations Framework Convention on Climate Change (UNFCCC) is seen as the foundational framework for climate negotiations at the international level. It seeks to balance greenhouse gas emissions with the aim of combating the harmful impacts of climate change. The UNFCCC paved the way for negotiating important international instruments such as the 1997 Kyoto Protocol and the 2015 Paris Agreement.[18]

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[13] CTBTO, "Using IMS data for climate studies", CTBTO, 27 November, 2015, <https://www.ctbto.org/news-and-events/news/using-ims-data-climate-studies, accessed 1 July 2024>.

[14] Tsunami Early Warning, CTBTO,<https://www.ctbto.org/our-work/civil-and-scientific-application/tsunami-early-warning, accessed 1 July 2024>.

[15] CTBTO, "Science and technology conferences", CTBTO, 2023, <https://www.ctbto.org/news-and-events/science-and-technology-conference, accessed 1 July 2024>.

[16] However, it should be noted that the legal and institutional raison d'être for the IMS is verification of compliance with the CTBT, while other potential functions can only be supplementary.

[17] According to the CTBTO, "around 90 percent of these 337 facilities are already up and running, providing a steady flow of real-time data."

[18] United Nations, "Climate action: UN climate change conferences", <https://www.un.org/en/climatechange/un-climate-conferences, accessed 1 July 2024>

The 198 state parties to the UNFCCC have been meeting yearly since 1995 at a Conference of Parties (COP) worldwide based on a regional rotation to determine progress and coordinate multilateral efforts to advance the climate movement. These include climate mitigation and adaptation strategies, transitioning from non-renewable to renewable energies, and decreasing greenhouse gas emissions. COPs have also fostered an inclusive environment in which governments come together with multiple stakeholders and experts to look for innovative solutions.

In 2023, United Nations Secretary-General Antonio Guterres convened a Climate Ambition Summit to bring together innovators with initiatives aimed at reducing carbon emissions and achieving climate justice. This summit produced a roadmap for the future, focusing on the use of science to advance climate targets and on the need for increased accountability. It was divided into three tracks: ambition, credibility, and implementation.[19]

At the same time, one should be mindful of serious differences characterizing the work of an arms control body, like the future CTBTO, and an emerging climate-related system of governance. The latter hasmuch greater reliance on partnerships and networks, while the former ismore restricted in this regard for the purposes of ensuring trust and credibility of verification.

SYNERGISTIC RELATIONSHIP: ENVIRONMENTAL AND SECURITY RESPONSIBILITIES

One of the most known climate-related documents is the Paris Agreement which entered into force in 2016, and which focuses on climate change mitigation, finance, and adaptation. Although the CTBT and the Paris Agreement are two distinct international agreements, there may be an interconnection and potential synergistic relationship between them; both treaties are concerned with the humanitarian and environmental long-term consequences of human-induced actions.

The data shows an interesting link between the disproportionate impact of nuclear tests and the contribution to growing global warming effects by some states. Six out of eight countries that have conducted nuclear tests are among the 20 largest contributors to cumulative CO2 emissions in the past.[20] Hence, their participation and leadership are crucial for both treaties. Indeed, the ability to conduct nuclear tests and the capability to sustain nuclear weapon arsenals indicates the presence of financial resources and technological innovation. While each state possesses the right to have its own national sovereignty and make its own security decisions, there is an alarming trend of rising armament spending, driven partly by ongoing geopolitical and security incidents.[21] That being said, often underrated threats that have only recently infiltrated policy discussions are the security threats emerging from climate change that deserve a collective response by the international community.[22] While climate change alone has not been responsible for conflict, it can nevertheless act as a threat multiplier to existing tensions and conflict. Therefore, it is evident that a lot more can be done in terms of climate change mitigation efforts, namely resource mobilization and reallocation, especially when it comes to large CO2-emitting states.[23]

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[19] United Nations, “Climate ambition summit 2023”, <https://www.un.org/climatechange/climate-ambition-summit, accessed 1 July 2024>.

[20] Simon Evans, “Analysis: Which countries are historically responsible for climate change?”, Carbon Brief, October 5, 2021, <https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change/, accessed 1 July 2024>.

[21] SIPRI, “Trends in world military expenditure, 2022”, April 2023, <https://www.sipri.org/publications/2023/sipri-fact-sheets/trends-world-military-expenditure-2022#:~:text=World%20military%20expenditure%20rose%20by,growth%20in%20spending%20in%202022, accessed 1 July 2024>.

[22] UN, “With climate crisis generating growing threats to global peace, Security Council must ramp up efforts, lessen risk of conflicts, speakers stress in open debate”, UN News, June 13, 2023, <https://press.un.org/en/2023/sc15318.doc.htm, accessed 1 July 2024>.

[23] WorldOMeter, “CO2 emissions by countries”, <https://www.worldometers.info/co2-emissions/co2-emissions-by-country/, accessed 1 July 2024>.

The interlinkage between environmental and security risks has been recognized in a number of recent studies.[24] Slowing down climate change and avoiding environmental crises will be essential in maintaining peace and security. Hence, the CTBT and climate change mitigation efforts are interlinked in their broad objectives of maintaining security, although not explicitly spelled out when it comes to climate change.

There may be another indirect connection between mitigating climate change and achieving a nuclear test-free world. It took a number of countries some time to agree that nuclear energy should be viewed as one of the important alternatives to carbon-based energy. Together with the arrival of new technologies for nuclear power stations, this can result in a much faster spread of nuclear power generation across the world, thus reducing the need for carbon-based energy generation. However, if nuclear energy continues to be associated with nuclear weapons in the perception of people, it would serve as an obstacle to decarbonization.

The main conclusion here is that states should more actively explore synergies between nuclear arms control (including the CTBT) and climate change mitigation, but should also continue to be mindful of important differences between these two objectives, which dictates a certain degree of caution in this regard.

POLICY RECOMMENDATIONS

1. States should continue to work on ratifying the CTBT and the Paris Agreement,[25] as well as other political agreements relating to climate change and nuclear non-proliferation. States that have already signed the CTBT should seek to understand the political, technical, and financial hurdles facing other states when it comes to ratification, monitoring, and verification. They should also aim to share their good practices with those reluctant to join.

2. States that play a leading role in promoting climate change mitigation should try to understand that successes and setbacks in nuclear arms control would indirectly affect (positively or negatively) the achievement of their climate agendas. In particular, this applies to bringing the CTBT into force, ensuring the sustainability of the NPT, and preventing a new round of the nuclear arms race.

3. In view of important potential uses of IMS data for environmental purposes, states should consider modalities for applying this data, especially for climate research and disaster responses. Specifically, they should explore the feasibility of an integrated monitoring system that monitors nuclear test-related indicators and environmental indicators. Such activities, however, should not put at risk norms and procedures governing the IMS as a key segment of the CTBT verification system.

4. States should foster collaborative research by nuclear experts and climate change experts to promote global security by jointly addressing nuclear and climate risks.

5. States and relevant international fora should invite the CTBTO to observe and be represented at key climate conferences and carve out a space for it to contribute to the growing collaboration for climate mitigation, adaptation, monitoring, and regulation. Simultaneously, these conferences constitute avenues for CTBTO representatives to network with multileveled actors to build synergies as well as approach non-signatory and non-ratifying states, exercising soft diplomacy.

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[24] SIPRI, "Environment of peace: Security in a new era of risk", May 2022, <https://www.sipri.org/sites/default/files/2022-05/environment_of_peace_security_in_a_new_era_of_risk_0.pdf, accessed 1 July 2024>.
[25] Iran, Libya, Yemen have yet to ratify the latter.

6. States are encouraged to facilitate the mobility of experts and discussions relating to the intersection of climate security and nuclear testing by creating platforms for networks and collaborations among climate change, energy transition, and arms control specialists to foster a more comprehensive dialogue on interconnected challenges.

APPENDIX

Table 1. Countries that have conducted nuclear tests and their commitments to mitigating climate change

Country	CTBT	Paris Agreement Status	Shares of global CO_2 emissions in 2021	Implied CO2 emissions reductions needed to achieve the NDC target	Net zero commitment
China	Not ratified	Party	30.90%	Reducing CO2 emission intensity of its economy by over 65% below 2005 levels by 2030, having its CO2 emissions peak before 2030	Reach CO2 emissions peak before 2030, and achieve carbon neutrality before 2060
DPRK	Not signed	Party	0.15%	Aims to reduce its GHG emissions by 16.4% relative to a business-as-usual trajectory by 2030, and by up to 52% by the same date, conditional on the provision of international support	Not yet made a pledge
France	Ratified	Party	0.82%	The EU and its Member States jointly aim at reducing their GHG emissions by at least 55% below 1990 levels by 2030.	Net zero domestic GHG emissions by 2050 at the latest
India	Not signed	Party	7.30%	45% below 2005 levels by 2030. Increased implied emissions	Pledged to become net zero by 2070
Pakistan	Not signed	Party	0.62%	Reduce its GHG emissions by 15% relative to a business-as-usual trajectory by 2030, and by up to 50% conditional on the provision of international support. Increased implied emissions	Not yet made a public pledge to reach net-zero emissions
Russia	Not	Party	4.73%	Aims at limiting the growth of its GHG emissions to 70% of 1990 levels by 2030.	Balance between anthropogenic emissions of GHG and their absorption no later than 2060
United Kingdom	Ratified	Party	0.93%	Aims at reducing its GHG emissions by at least 68% below 1990 levels by 2030.	The net UK carbon account for the year 2050 is at least 100% lower than the 1990 baseline
United States	Notratified		13.49%	Aims at reducing its GHG emissions by 50% to 52% of 2005 levels by 2030.	Net zero GHG Emissions by 2050

EXPLAINING THE CTBT'S RELEVANCE IN CIVIL SOCIETY

■ Ang Cheng Kai Noel ■ Esam Al-Mohamadi ■ Thomas Viscovich

ABSTRACT

The Comprehensive Nuclear-Test-Ban Treaty (CTBT), adopted in 1996, enjoys near-universal support but has yet to enter into force. While civil society played an important role in advocacy and awareness-raising around some other nuclear treaties like theIntermediate-Range Nuclear Forces (INF) Treaty and more recently the Treaty on the Prohibition of Nuclear Weapons (TPNW), the CTBT has become less prominent in contemporary nuclear policy debates. It might be recalled, though, that from the late 1950s till early 1990s the situation was rather different in terms of the attention of the civil society to the issue of nuclear testing. This paper analyzes possible reasons for the decline in the CTBT's relevance for civil society actors and public engagement efforts. It looks at such factors as the evolution of communication technologies (bearing in mind that debates on nuclear testing began in a much less interconnected era) and the Treaty's technical complexity. The paper also outlines factors that differentiate the CTBT from the TPNW, which has galvanized NGO activism. To revitalize civil society interest, the paper recommends reframing CTBT messaging for diverse audiences, launching targeted social media campaigns, and cultivating non-expert stakeholder groups. Renewed civil society engagement will be vital to building momentum and pressure for the CTBT's entry into force.

THE ROLE OF CIVIL SOCIETY IN ADVANCING NUCLEAR TREATIES

Ever since the advent of the nuclear age and the weapons that brought it about, there has been a public anti-nuclear movement, which reshaped over time into the nuclear disarmament movement. This rose to prominence in mid-to-late 1960s and since then, there has been a myriad of different groups each working to advance their shared goal of total (or, in a number of cases, partial) nuclear disarmament. Their efforts have allowed civil society to play a significant role in advancing the nuclear non-proliferation and disarmament agenda globally, generating change by mobilizing public and political support for treaties such as the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and more recently, the Treaty on the Prohibition of Nuclear Weapons (TPNW). Civil society itself has also taken on a more significant role in the nuclear domain, transitioning from being a background supporter in the 1960s to becoming a key driver behind the achievement of the TPNW in the 2010s. This marks a sharp shift from UN treaties being led by governments to civil society, reflecting the relatively reduced role governments played more recently in promoting non-proliferation and disarmament initiatives.

To better understand the role of civil society in advancing nuclear non-proliferation and disarmament, this paper will look at four examples, New Zealand, the Nevada-Semipalatinsk Movement, the NPT and the TPNW.

The nuclear testing by the United States at Bikini Atoll and the environmental effects it produced was a catalyst which led to protests against nuclear testing by population in South Pacific. This can also be considered the origin of anti-nuclear activism in New Zealand, which led to strong domestic pressure on their government to take anti-nuclear stances even when this meant challenging the United States and the ANZUS Security Arrangement, deemed

to be important for national security of New Zealand.[1] This was mirrored by the Nevada-Semipalatinsk movement within the Soviet Union. Formed in 1989 and led by renowned Kazakh poet Olzhas Suleimenov, it quickly gained international fame as one of the first Soviet anti-nuclear grass-roots movements. Their campaign against nuclear testing at the Semipalatinsk test site was among the most successful, having stopped 11 of the 18 planned detonation tests and resulting in the subsequent closure of the test site in 1991. It can also be said that Nevada-Semipalatinsk played a positive role in drawing attention to the estimated 2.6 million victims of nuclear weapons testing and production[2], building a foundation for future humanitarian initiatives expand upon. Given that it was still the height of the Cold War and fears of a global conflict between the United States and the Soviet Union were still present, this is an indication of the force which civil society can bring to bear upon their own governments.

The NPT was primarily negotiated by the 18-Nations Committee on Disarmament in Geneva before being endorsed by UN General Assembly Resolution 2373 and opened for signature. This success was made possible thanks in part to civil society and the significant role they played in shaping public discourse on nuclear weapons internationally and creating a political environment which was conducive towards the NPT, though this was still largely limited to academic and scientific circles. Civil society, represented by a number of peace activists, non-governmental organisations (NGOs), and grassroots movements, played a crucial role in raising awareness about the dangers of nuclear weapons. Originating primarily in top academic and the wider scientific circles in the 1960s, this movement slowly spread to the wider public by the 1980s where the European Missile ("Euromissile") Crisis had brought nuclear dangers to the forefront of public debate.[3] These efforts contributed to a broader shift in public opinion towards supporting international initiatives to prevent the further proliferation of nuclear weapons. It can be said that public pressure created an environment where governments felt compelled to take action against the nuclear threat to retain their popularity amongst voters.

Some scholars argue that the TPNW arose out of a perception that the existing NPT was becoming increasingly unproductive in terms of achieving a nuclear drawdown and total disarmament.[4] Others argue that it arose out of the anti-nuclear movement within wider Europe that originated in the 1980s in the wake of the "Euromissile crisis" or out of the growing awareness of the humanitarian consequences and impact of nuclear weapons, which resulted in the NPT's Humanitarian Initiative. It is likely that it was a combination of these factors which led to the formation of the International Campaign to Abolish Nuclear Weapons (ICAN) in 2006 by the Medical Association for Prevention of War (MAPW) and International Physicians for the Prevention of Nuclear War (IPPNW).[5] The ICAN initiative would then grow into an international network of different nuclear disarmament organisations, which gave it a global reach and allowed for coordinated effort towards nuclear disarmament in different regions simultaneously. ICAN would go on to become the main civil society actor operating alongside governments to encourage their participation and support for the TPNW, leading to its approval in the United Nations General Assembly. This is a historical precedent as the TPNW is the first legally binding global international treaty with a primary focus on achieving

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1 Naoki Kamimura, "Civil Society, Nuclear Disarmament, and the U.S. Alliance: The Cases of Australia, New Zealand, and Japan," East-West Center Working Papers, Politics and Security Series, October 1, 2004,<https://www.eastwestcenter.org/publications/civil-society-nuclear-disarmament-and-us-alliance-cases-australia-new-zealand-and-japan, accessed 1 July 2024>.

2 UNESCO, "Audiovisual Documents of the International Antinuclear Movement 'Nevada-Semipalatinsk,'" UNESCO, 2004, <https://en.unesco.org/memoryoftheworld/registry/319, accessed 1 July 2024>.

3 Katrin Rücker, "The Challenge for High Politics", The Cambridge University Press, 2017, P. 316 <https://doi.org/10.1017/9781316479742.015, accessed 1 July 2024>.

4 Renee Moorjani, "Discussion Paper: The Role of Civil Society in Reducing Nuclear Dangers," Nuclear Threat Initiative, October, 2022.

5 Dimity Hawkins, Dave Sweeney, and Tilman Ruff, "ICAN's Origins – fromLittle Things, Big Things Grow...," International Campaign to Abolish Nuclear Weapons (ICAN), October, 2019.

nuclear disarmament. As a result, some scholars described the efforts of ICAN and its 650 partner organisations across over 100 countries as the establishment of a new nuclear norm via civil society influence.[6] ICAN was directly credited" for its work to draw attention to the catastrophic humanitarian consequences of any use of nuclear weapons and for its ground-breaking efforts to achieve a treaty-based prohibition of such weapons"[7] and was awarded a Nobel Peace Prize in 2017 in recognition of their work.[8]

These examples demonstrate the importance of civil society and draw a clear correlation between the success of a given treaty and the involvement of civil society. The CTBT is no different, where civil society played a crucial role in the pre-negotiation phase of the CTBT.[9] However, following the conclusion of CTBT negotiations in 1996, and the subsequent widespread ratification of over 170 countries, civil society support and interest had begun to dissipate. This mirrors the Chemical Weapon Convention in 1992, where following its adoption by the UN General Assembly, civil society interest had also begun to fade. The next section of this paper will examine if the shift in focus of civil society away from CTBT towards the TPNW and its ratification has led to reduced public awareness and its impact on CTBT's continued support/success.

CIVIL SOCIETY BETWEEN CTBT AND TPNW

The TPNW and CTBT have some similarities with each other in being involved in the nuclear realm. The TPNW includes a comprehensive set of prohibitions on participating in any nuclear weapon activities. These include undertakings not to develop, test, produce, acquire, possess, stockpile, use or threaten to use nuclear weapons. No NWS are a partyto TPNW.[10] At the same time, the CTBT bans all nuclear explosions, whether for military or peaceful purposes.[11] The main difference here is that 44 states from Annex 2 must ratify the Treaty for it to enter into force – the provision the TPNW does not have (Annex 2 includes states which possessed nuclear power or research reactors at the time of the negotiation of the CTBT). In other words, while both treaties recognise, that in order to achieve their respective goals and purposes, participation of nuclear weapon possessing and capable states is crucial, they take different approaches to how this could be achieved. As the result, CTBT is not in force yet, while the TPNW is in force, but it cannot achieve its object and purpose in the absence of current NWSs.

There are also some major differences between the two treaties in terms of their relevance and engagement with civil society. Since our research question aims to find out if there is more engagement for TPNW with civil society than in case of the CTBT, we are going to touch on the differences between them from the civil society relevance perspective.

The first major point that might answer our research question is the role of path dependence and lock-in politics. Path dependence is the impact of a historical point for an event that plays a key role in determining its results and outcomes.[12] The CTBT negotiation process

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6 Espen Mathy, "Why Do States Commit to the Treaty on the Prohibition of Nuclear Weapons?," The Nonproliferation Review, April 17, 2023, pp. 1–20,<https://doi.org/10.1080/10736700.2023.2175994, accessed 1 July 2024>.

7 The Nobel Prize, "The Nobel Peace Prize 2017," The Nobel Prize, 2017, https://www.nobelprize.org/prizes/peace/2017/summary/, accessed 1 July 2024>.

8 Renee Moorjani, "Discussion Paper: the Role of Civil Society in Reducing Nuclear Dangers", Nuclear Threat Initiative, October, 2022, <https://www.nti.org/wp-content/uploads/2022/10/Final_Moorjani.pdf, accessed 1 July 2024>.

9 Espen Mathy, "Why Do States Commit to the Treaty on the Prohibition of Nuclear Weapons?," The Nonproliferation Review, April 17, 2023, pp. 1–20, <https://doi.org/10.1080/10736700.2023.2175994, accessed 1 July 2024>.

10 Treaty on the prohibition of nuclear weapons, UNODA, <https://disarmament.unoda.org/wmd/nuclear/tpnw/,accessed 1 July 2024>.

11 The Comprehensive Nuclear-Test-Ban Treaty, CTBTO, <https://www.ctbto.org/our-mission/the-treaty,accessed 1 July 2024>.

12 Dov M. Gabbay et al., Philosophy of Complex Systems, Elsevier Science & Technology, 2011, <http://ebookcentral.proquest.com/lib/sfu-ebooks/detail.action?docID=712213, accessed 1 July 2024>.

proceeded in different forms and phases since the late 1950s, but the final outcome of the CTBT itself, which was the successful treaty itself that resulted from decades of negotiations, was not clear until the 1990s when the CTBT was ratified by different member states.[13]

Examining the role of civil society must lead us to take a look at the situation and status quo of civil society between the 1950s and the 1990s, which was the period of negotiating the CTBT.[14] Examining the role of civil society in this context is limited because of several reasons. For example, the CTBT is an international treaty that has a transboundary impact; therefore, it will be difficult and harder to see the role of civil society across the whole globe in a wide timespan like the 1950s-1990s when globalization, transportation, and interconnectedness between the whole globe was much less compared to our present time.

To overcome this challenge, we will conduct a macro or wholesale examination by looking at different trends of civil society between the 1950s-1990s period and the time period of 2014-2021, when the TPNW was formed.[15] The first difference we will see is the extent of having an interconnected world through social media and globalization. A simple comparison between these two periodical cycles (1950s-1990s) and (2014-2021) tells us clearly that the world did not have the same interconnection in the former as in the latter cases. The working mechanism of that can be attributed to means which can be used by civil society. For example, it is impossible to think that there were no racist accidents against black minorities in the U.S. between the 1950s and 1990s, but even if such racist events took place, they would not be able to have a global movement that would be a part of global civil society. Therefore, they would be only in the U.S. However, the situation is extremely different with some recent civil society movements, like the Black Lives Matter (BLM) movement in 2020. BLM can be seen as a more active action of civil society because it happened in a time when there is vital interconnection between the world with social media platforms in hand-handled screens across the whole globe. Although this example of BLM is not relevant as such to our goal in this paper, it clarifies for us the role of globalization and social media in having a more active civil society that can play a role in the emergence of international agreements. The CTBT was negotiated in a time period when the world was not connected in active globalization as we are now, and that means the CTBT – unlikethe TPNW – was locked in a path-dependence in its engagement with civil society.

Comparing the TPNW to the CTBT in terms of who (which players) were their key initiators shows to us a much bigger role of the civil society in case of the TPNW than the CTBT. Although the historical context of path dependency explains to us the most vital and fundamental differences in the relevance of civil society for the TPNW and CTBT, the initiators also differ in both. The CTBT was initiated mostly by states and governments.[16] Different bilateral and multilateral discussions and negotiations were held by the USSR, the US, and the UK at the end of the 1950s.[17] On the other hand, the TPNW was largely initiated by non-state actors.[18] The ICAN was a primary actor, and it was a "global coalition of non-governmental organizations in over 100 countries".[19] Without ICAN, the TPNW might not have been

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[13] Pierce S. Corden, "Historical Context and Steps to Implement the CTBT," in Banning the Bang or the Bomb?: Negotiating the Nuclear Test Ban Regime, Cambridge University Press, 2014, pp. 17–31, <https://doi.org/10.1017/CBO9781107358348.004, accessed 1 July 2024>.

[14] Rebecca Johnson, "Unfinished Business: The Negotiation of the CTBT and the End of Nuclear Testing", United Nations, 2009, <https://unidir.org/files/publication/pdfs/unfinished-business-the-negotiation-of-the-ctbt-and-the-end-of-nuclear-testing-346.pdf, accessed 1 July 2024>.

[15] Motoko Mekata, "How Transnational Civil Society Realized the Ban Treaty: An Interview with Beatrice Fihn", Journal for Peace and Nuclear Disarmament 1, no. 1, January 2, 2018, pp. 79–92, <https://doi.org/10.1080/25751654.2018.1441583, accessed 1 July 2024>.

[16] Pierce S. Corden, "Historical Context and Steps to Implement the CTBT".

[17] Ibid.

[18] Motoko Mekata, "How Transnational Civil Society Realized the Ban Treaty: An Interview with Beatrice Fihn".

[19] Ibid.

negotiated.[20] However, it can be argued, that the CTBT process had the participation of civil society actors in its negotiations[21], but it was limited to the epistemic communities, which had the required scientific and technical expertise.[22] Meanwhilein the TPNW case we see an active engagement from civil society actors that are not part of epistemic communities. It is important to note that this may be also related to the fact thatthe nature of the Treaties differs, thus influencing the involvement of civil society. The TPNW emphasizes the severe humanitarian consequences of nuclear war, naturally drawing more involvement from civil society. On the contrary, the CTBT aims to curb nuclear weapons proliferation drawing more involvement from states. In brief, the participation of civil society actors that were not epistemic communities shows us the difference between the TPNW and the CTBT in terms of civil society engagement.

Another line of comparison could be drawn if we look the effects and impact of the TPNW and the CTBT. Although the TPNW was initiated primarily by civil society actors, the TPNW has fewer ratifications than the CTBT. As of June 2024, the TNPW is ratified by 70 states around the world. On the other hand, the CTBT is ratified by 178 states. This variation in the number of parties who ratified both treaties may have different attributes. But the most important one is that when states initiate a treaty, their interests are at the top of such treaty initiations. On the other hand, civil society actors do not bring states' interests to the forefrontsince they do not have the required knowledge and expertise. It's noteworthy to mention that countries aligning with the TPNW are Non-Nuclear Weapon States (NNWSs), reflecting the frustration among NNWS regarding the lack of action from Nuclear Weapon States (NWSs) in the field of nuclear disarmament. Additionally, the TPNW is still a relatively recent initiative compared to its counterpart. As a result, CTBT has better results and impacts in terms of having a higher number of signatory and ratifying states than the TPNW, and that may be the result of the variation of the civil society engagement in both.

MAKING THE CTBTRELEVANT: STRATEGIES TO INCREASE PUBLIC AND SOCIAL MEDIA ENGAGEMENT

The main repercussions of this situation are seen in the few public initiatives and campaigns from civil society to support the implementation and grow engagement towards the CTBT. As mentioned previously, the CTBT remained categorized as an initiative of epistemic communities, where prior technical knowledge is necessary to understand what it is and how it works.

On the other hand, the fact that the Treaty has not yet entered into force and this situation has remained for almost three decades contributes to the deprioritization of civil society towards it. The focus of work to overcome this situation should be to design a strategy that allows improving engagement with the CTBT and public empathy with the cause. This will break down the wall related to the engagement of actors that are not part of epistemic communities. For example, the initiatives of the CTBT Youth Group and the Group of Eminent Persons (GEM) are important and focused approaches. But they are limited to people with a nuclear or related background and specific interests. This would be a limitation in terms of increasing the participation of non-governmental organizations that do not necessarily know deeply about the CTBT's role, because those initiatives start from an advanced knowledge level.

And as we mentioned, in the case of the TPNW, ICAN was key to boosting the negotiation. So, as a preliminary goal the recreation of a similar tool but focused on social media could help start a CTBT campaign. In these terms, the campaign requires an active role on social media.

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[20] Renee Moorjani, "Discussion Paper: the Role of Civil Society in Reducing Nuclear Dangers".
[21] Rebecca Johnson, "The Role of civil society in negotiating the CTBT," in Mordechai Melamud, Paul Meerts, I. William Zartman, eds., Banning the Bang or the Bomb? (Cambridge University Press, 2014), p. 96.
[22] Ibid.

The strategy has to be based on reaching the targets and resonating with their interests.So, the kind of content to be shown has to combine it with the message that we would like to project in its campaign. The objectives must be to improve public empathy with the cause and break with the deprioritizing of the Treaty. At the same time, the technical perspective of the CTBT and how it prevents the serious health and environmental impacts of nuclear tests can be accompanied by a more socio-centric approach. Furthermore, influencing civil society on the importance of the application of the CTBT must be accompanied by raising awareness about the vital and necessary role of mutual reinforcement among the CTBT with other international instruments, this supporting wider international architecture against nuclear arms race progress towards, and supporting nuclear non-proliferation and disarmament.[23] CTBT´s entry into force would be a powerful demonstration of the global community's shared commitment to nuclear disarmament and non-proliferation.

Too often, arms control treaties are considered as technical agreements lacking inspirational value. However, the promise at the heart of the CTBT represents a moral vision for a more peaceful world. Its narrative power resides in the pact between nuclear and non-nuclear weapon states – a joint undertaking to restrain tests that undermine global stability.

Civil society should be inspired to rally around the CTBT because it brings us incrementally toward the fulfillment of the NPT disarmament obligations. The advocacy around the CTBT also strengthens norms against nuclear weapons possession and the progress across the international disarmament efforts. The CTBT narrative for the civil society should highlight that the Treaty curbs not just current dangers but future uncertainties in an increasingly fragile world. It offers a starting point for restoring faith in collective security solutions to common threats. In championing and campaigning for the CTBT's entry into force, global citizens can help shape our shared destiny away from nuclear disaster and toward cooperation.

The strategy requires a general outlook to be applied in all countries. The first three steps to start developing it could be: 1) the identification of stakeholder and public categories to engage and their interests or questions related to nuclear nonproliferation fields; 2) the development and implementation of social media content engagement programs; and 3) analyze the stakeholders and public feedback.[24] The second step is crucial, and in order to assure its effectiveness it will be necessary to set a list of questions that will be responded to in the content to be developed. For example, something as simple as "Why Is the CTBT a Good Thing?". Using simple language and staying away from too many technical terms can facilitate engagement and garner broader support from civil society.

IN CONCLUSION

Comparing the processes that led to the conclusion of, respectively, the CTBT and the TPNW, and different nature of contributions from the civil society we should also bear in mind, that in the modern inter-connected world it is easier to start big campaigns, but there a risk that they might be less sustainable over longer period of time. Another riskis losing sight of cultural, political and religious sensitivities – and they matter, because at the end of the day the ratification processes take place on a country-to-country basis. What is common to the two treaties is that they both achieved successful end of negotiations and entered the period of less glamorous and long-lasting hard work, which is more difficult to be inspired by broad campaigns. As far as the CTBT is concerned, the challenge is to develop and apply various sets of arguments, that facilitate concentration on the current-day priorities and generate inspiration for the hard work ahead.

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[24] Rashid Faisal, ZulfacarZolkaffly, Noriahj Jamal "Stakeholder engagement for promoting the Comprehensive Nuclear-Test-Ban Treaty (CTBT): Malaysia's experience", IOP Conference Series: Materials Science and Engineering, 2018, pp. 4-9 <doi:10.1088/1757-899X/298/1/012054, accessed 1 July 2024>.

CYG: IDEAS FOR FUTURE PROJECTS AND ACTIVITIES

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ABSTRACT

The CTBTO Youth Group (CYG) plays an important role in advocating for nuclear test ban and promotion of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). To further popularize and facilitate understanding of Treaty's goals among young professionals, this paper suggests new collaborative project ideas, which are supported by the two proposed distinct activity classifications that align with the group's overarching goals and trajectories. With a focus on fostering education, advocacy, cultural impact, youth empowerment, global collaboration, innovation and public engagement, the proposed projects aim to enhance the group's effectiveness in promoting the early entry into force and effective implementation and sustainability of the CTBT.

INTRODUCTION

In a time when the global community grapples with significant challenges linked to nuclear testing, the CYG emerges as a proactive force. Comprised of enthusiastic young advocates dedicated to achieving the entry into force and universalization of the CTBT, the continued build-up of its verification regime, and the promotion of the Treaty and its verification technologies for international peace and security,[1] the group actively contributes to the promotion of the nuclear test ban and advocates for the full and effective implementation of the CTBT. In the face of intricate geopolitical dynamics and rapid technological advancements, the importance of facilitating youth engagement becomes apparent.

The CYG, in line with the broader objectives of future CTBTO,[2] has set forth an agenda aimed at achieving key milestones in the realm of nuclear test ban. The objectives include the imperative to "revitalize the discussion around the CTBT among former, current, and emerging decision-makers, scientists, academics, experts, and the media". This speaks to the need for engaging diverse voices across various areas of knowledge to facilitate a comprehensive and well-informed discussion on the significance of the CTBT.

Additionally, the Youth Group endeavors to "raise awareness of the importance of the nuclear-test-ban on a global level", recognizing the crucial role that widespread understanding and support play in achieving the CTBT's entry-into-force and universalization. Simultaneously, the group seeks to "build a basis for knowledge transfer to the next generation", acknowledging the perpetual need for an informed and engaged youth population to carry the torch of nuclear test ban into the future.

Crucially, the objectives include involvement "of new technologies in advancing the CTBT's universalization and entry-into-force". This forward-thinking approach recognizes the transformative potential of technology in enhancing monitoring capabilities, communication strategies, and data analysis relevant to the CTBT's goals. Moreover, the Youth Group aims to "place the CTBT on the agenda of the world's most important nuclear-related events", ensuring that discussions on nuclear test ban remain central to global conversations.

1 "About the CTBTO Youth Group", <https://youthgroup.ctbto.org/about, accessed 1 July 2024>.
2 Ibid.

HISTORY OF THE CYG

The CYG was launched in January 2016, a month after the passing of UNSCR 2250, which calls for increased participation of youth in activities and mechanisms of the war prevention and the resolution of conflicts. Understanding the importance of proactive integration of young people into international security decision-making, the group was founded with the goals of raising awareness amongst current and future decision-makers on the risks faced due to the lack of a legally enforced ban on nuclear testing, actively engaging in the CTBT and its verification regime promotion and revitalizing the discussion around the CTBT among decision-makers, academia, students, the public, and media.[3]

Already upon its inception the CYG consisted of people from various countries who have all had different specializations (be it social sciences, humanities, applied sciences, etc.). This representation has stayed to this day, equally representing both males and females. Members include participants from all the geographical regions and 129 states, the DPRK being the only remaining Annex II country not represented in the CYG. The United States and the Russian Federation, which has recently recalled its ratification, are the two most represented countries. The CYG has been growing at a steady rate of about 200 people a year. As of July 2024, it consists of about 1500 people with background in every academic discipline.

One important aspect to understand about the CYG is its legal status. The CYG is not directly connected to the CTBTO. The CYG has a quasi-independent form: it was initially expected to be independent from the CTBTO in favor of promoting constantly developing and energetic youth giving it the ability to speak on its own. However, such independence makes youth initiatives hardly sustainable in the sense that youth organizations need a constant flow of new young and passionate experts and funding. This sustainability is provided with the help of the CTBTO, making the CYG a quasi-independent youth organization.

We cannot talk about new projects and activities without first looking at what the CYG already had or has to offer and its characteristics. It is very important for the projects and activities to be sustainable to support the educational level of the events provided and participants' expectations. It is also very important for the CYG activities to provide participants with information of wide application area: the knowledge may be presented for a narrow topic of nuclear test ban and the CTBT, but it can also be applied to a wide range of other areas. These sustainable programs, some of which were postponed due to the COVID-19 pandemic, include the CTBTO Mentoring Programme open to women in STEM interested in putting end to nuclear testing,[4] CTBTO Research Fellowship (in cooperation with CENESS) which allows people with various background from various countries to collaborate on writing articles addressing relevant problems,[5] the Citizen Journaling Academy aimed at helping the CYG members further enhance their communication skills and effectively use various communications and media tools to promote the CTBT,[6] specific sections and meetings in the context of the CTBT Science and Technology Conference (SnT). [7]

This paper explores the future trajectory of the CYG, seeking to align its objectives with new projects and activities. By exploring new and concrete proposals, categorized according to the proposed classifications, we aim to further expand the CYG framework to catalyze change, engage in diplomatic discourse, foster global collaboration, and utilize creative expressions to bring attention to the problem of nuclear testing. In the pages that follow, we present ideas that uphold the objectives of the CYG and promote the nuclear test ban.

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4 "Supporting Women in STEM: CTBTO Mentoring Programme", <https://www.ctbto.org/news-and-events/news/supporting-women-stem-ctbto-mentoring-programme, accessed 1 July 2024>.
5 "CTBTO Research Fellowship", <https://youthgroup.ctbto.org/node/2672, accessed 1 July 2024>.
6 "Citizen Journalism Academy", <https://youthgroup.ctbto.org/citizenjournalismacademy, accessed 1 July 2024>.
7 "CTBT: Science and Technology Conference", <https://conferences.ctbto.org/event/23, accessed 1 July 2024>.

ACTIVITY CLASSIFICATION

In this section we propose two distinct activity classifications: one based on the CYG objectives, and another based on general activity type.

Crafting a long-term activity classification for the CYG involves considering its objectives and aligning activities with the overarching goals. Given the multifaceted nature of the CYG's objectives, a comprehensive classification can be organized based on the primary goals set forth by the group.

OBJECTIVE-BASED CLASSIFICATION

The following classification is rooted in the core objectives of the CYG. By categorizing activities according to these objectives, it ensures that each initiative serves a specific purpose in advancing the overarching goals of the group. This approach allows for a focused and purpose-driven strategy, enabling the youth advocates to make a meaningful impact in areas crucial to the CTBT's mission.

CYG Objective	Activity Nature
Revitalizing the discussion around the CTBT	Diplomacy-Oriented Policy Research and Analysis
Raising global awareness of the nuclear-test-ban	Educational Initiatives Public Engagement
Building a basis for knowledge transfer to the next generation	Youth Empowerment Programmes Educational Initiatives
Involving new technologies in advancing the CTBT entry into force	Innovation Challenges Technical Monitoring and Reporting
Placing the CTBT on the global agenda	International Partnerships Global Collaboration and Networking

ACTIVITY-TYPE-BASED CLASSIFICATION

Building on the objectives, the following classification further organizes activities based on their inherent nature: whether they are educational initiatives, advocacy and policy influence endeavors, cultural and creative expressions, or technical monitoring and reporting efforts, this classification provides clarity on the diverse roles each activity plays. It allows for a holistic understanding of the varied approaches employed by the CYG, ensuring a well-rounded and balanced advocacy strategy.

Activity Type	General Examples
Educational Initiatives	Workshops, Webinars, and Educational Modules
Advocacy and Policy Influence	Policy Papers, Diplomatic Roundtables, Collaborative Projects
Cultural and Creative Expression	Arts Festival, Storytelling Campaign, Movie Making
Youth Empowerment and Skill Development	Leadership Training, Mentorship Programs
Global Collaboration and Networking	International Partnerships, Youth Summits, Exchange Programs
Public Engagement and Influence	Social Media Campaigns, Public Events
Technical Monitoring and Reporting	Citizen Science Initiatives, Collaboration with Tech Experts, Data Visualization Challenges

The proposed classifications serve as a strategic guide for the CYG to plan and implement long-term activities. It underscores the importance of a multifaceted approach, ensuring that each initiative contributes purposefully to the overarching objectives, and sets the stage for a dynamic, impactful, and sustained advocacy effort in the realm of nuclear test ban. We also note that technical classes are aimed at facilitating the early Treaty entry into force.

PROPOSED ACTIVITIES

In this segment, we introduce initiatives, each tailored to contribute significantly to the goals of the CYG. These proposals, classified according to the results of the previous section, are aligned with the primary objectives of the CYG.

1. International Youth Diplomatic Exchange Programs *(Advocacy and Policy Influence)*. Establish an exchange program where aspiring career diplomats from different countries engage in diplomatic training with a focus on nuclear test ban (and wider nuclear and other WMD issues), participate in international conferences, and collaborate on nuclear test ban initiatives. This immersive experience aims to develop a cadre of skilled youth diplomats and develop and build lasting cross-disciplinary and cross-cultural connections.

2. CTBTO Global Film Project (Cultural and Creative Expression). Initiate a collaborative filmmaking project, where international youth create short films highlighting the human stories and consequences of nuclear weapons test not only for environment and human well-being, but also for international security, nuclear arms race and global stability. The resulting films will be showcased globally, creating a powerful narrative to raise awareness and inspire action.

CONCLUSION

Concluding our exploration into the future endeavors of the CYG, we envision a dynamic and impactful roadmap that leverages the energy and creativity of the youth through the proposed activities, classified to align with the goals of the group. The classification methodology employed in these proposals ensures a multifaceted strategy, addressing educational, diplomatic, cultural, technological, and public engagement dimensions.

The virtual diplomacy challenges and global film projects stand testament to the diversity and strategic precision underpinning our approach. These activities are not mere proposals but pathways toward sustained engagement, fostering global collaboration, and integrating new technologies to fortify the CTBT's universalization.

The formalization of activity proposals within the confines of our methodology is an effort to harmonize innovation with purpose. Through these initiatives, we envision the CYG not only revitalizing discussions around the CTBT but also inspiring the global youth to engage with nuclear test ban advocacy.

As we conclude this discourse, we hope to see the future where the energy and dedication of young specialists engaged in these activities spark a cascade of positive change. The CYG, through its objectives, is poised to leave a mark on the global stage, fostering a generation of advocates and contributing significantly to the realization of a world free from the specter of nuclear weapons.

RECOMMENDATION

Considering the vague legal status of the CYG, we recommend the legal document to be designed to support it. Clarifying legal status and describing the scope and responsibilities of the CYG as youth organization and its participants via the document would facilitate better understanding between the parties thus allowing it to reach wider audience and set the right expectations for future participants.