

Banning Nuclear Tests, Building Peace

The CTBT and Africa



CTBTO
PREPARATORY COMMISSION

Africa's Role in Non-Proliferation and Disarmament

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT)

African states have long been at the forefront of global efforts to achieve nuclear non-proliferation and disarmament, shaped by their history as a region where nuclear tests were once conducted.

Nearly all countries in the region are parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

The NPT aims to prevent the spread of nuclear weapons and weapons technology, to promote cooperation in the peaceful uses of nuclear energy and advance the ultimate goal of nuclear disarmament. In its preamble, in line with the objective of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), it seeks to achieve the “discontinuance of all test explosions of nuclear weapons for all time.”

The Treaty of Pelindaba

The African Nuclear-Weapon-Free Zone Treaty, also known as the Treaty of Pelindaba, further demonstrates

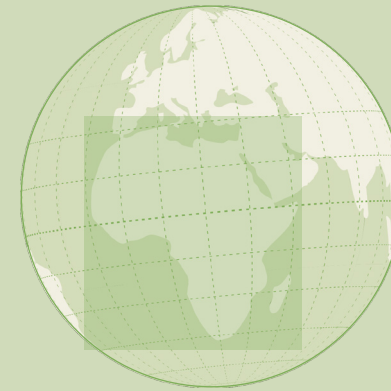
Africa's dedication to a nuclear-weapon-free future. This treaty established the entire continent - an area exceeding 30 million km² - as a zone free of nuclear weapons, making it the largest such region in the world. It entered into force in 2009, following its 28th ratification.

The Pelindaba Treaty bans the research, development, manufacture, stockpiling, acquisition, possession, control, or stationing of nuclear weapons. It also prohibits nuclear testing, aligning with the mission of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).

The African Commission on Nuclear Energy (AFCONE)

To oversee its implementation, the treaty established the African Commission on Nuclear Energy (AFCONE), headquartered in Pretoria, South Africa. AFCONE ensures compliance with treaty provisions and supports the peaceful application of nuclear technology across the continent.

The Treaty of Pelindaba



5th Conference of States Parties to Pelindaba Treaty, South Africa, 2021



Ambassador Harold Adlai Agyeman (Ghana), Chair of 2025 NPT Preparatory Commission. Credit: UN Photo/Evan Schneider

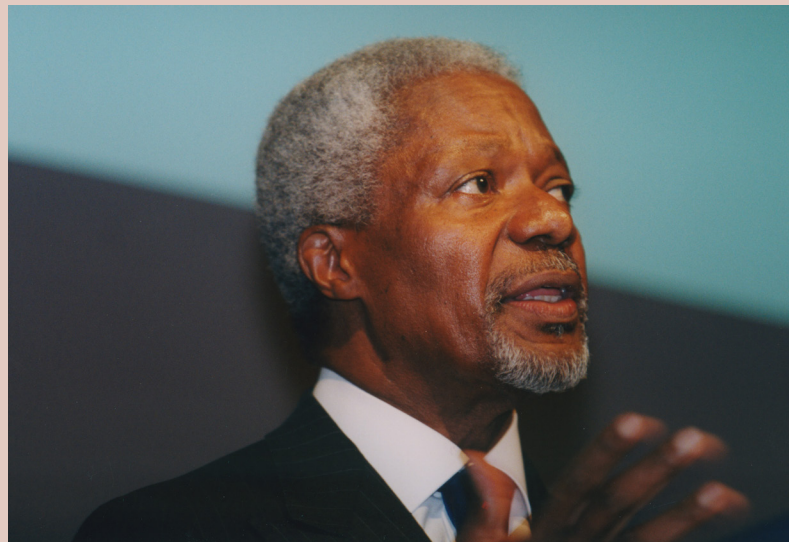


NPT Preparatory Committee, United Nations, 2022

Africa's Commitment to the CTBT

Africa is a key partner in the global effort to advance the goals of the CTBT.

With 54 states in the region, nearly all have ratified the Treaty - a testament to Africa's strong commitment to global peace and security. Over the past decade, CTBT membership has steadily expanded. Notably, in 2022, three African states were among the seven worldwide to ratify the Treaty. That year, Central Africa achieved full adherence with the ratifications of Equatorial Guinea and Sao Tome and Principe, while the Gambia's ratification marked full adherence in West Africa. Southern Africa was already in full adherence.



“I call on all states that have not signed or ratified the Treaty to do so... particularly those states who must ratify the Treaty in order to bring it into force.”

- The late Kofi Annan, former UN Secretary-General from Ghana

National Authorities: Strengthening CTBT Implementation

Over 30 African states have designated or established national authorities to serve as liaisons with the CTBTO and other Member States. These inter-institutional entities are made up of representatives from various government authorities. In some countries, they play a key role in implementing the Treaty at the national level. In others, they focus on negotiating and promoting the conclusion of facility agreements or collaborating with the Organization to establish a National Data Centre (NDC). In all cases, these bodies foster closer collaboration and a shared commitment to CTBTO's mission.



Permanent Representative of Tanzania to United Nations (Vienna) in 2024, Ambassador Naimi Aziz, meeting with CTBTO representatives

Leadership from Africa: Shaping the CTBTO

African states play a vital role in the Organization's work, with representatives from the region holding key leadership positions within the CTBTO. Notable figures include former Executive Secretary Dr Lassina Zerbo of Burkina Faso (2013-2021) and several Chairpersons of the Preparatory Commission, which was established to lay the groundwork for the implementation of the CTBT.

They include the late Jacob (Jackie) S. Selebi of South Africa (1996) the first ever Chairperson, as well as representatives from Algeria (1999, 2005, and 2020), Côte d'Ivoire (2025), Namibia (2010), and Nigeria (2015).

Their leadership has helped shape the CTBTO's direction and strengthen regional engagement.

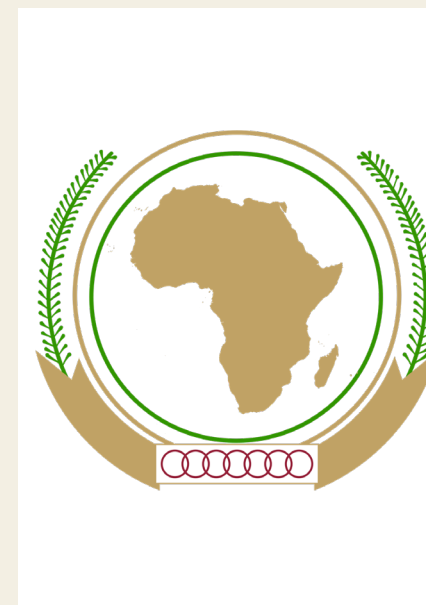


Former CTBTO Executive Secretary, Dr Lassina Zerbo of Burkina Faso (2013-2021)

African Union (AU)

The African Union (AU) has been a steadfast advocate for nuclear non-proliferation and disarmament, working closely with the CTBTO to advance shared goals. Through meetings and high-level engagements, including consultations within the framework of the AU Peace and Security Council, the African Union has actively worked to foster regional collaboration and encourage states to sign and ratify the CTBT.

In addition to its partnership with the AU and its affiliated bodies, the CTBTO cooperates with other regional organizations whose initiatives align with its mission. Key partners include the Organisation for African Geological Surveys (OAGS) and the African Seismological Commission (AfSC).



Strengthening Engagement: CTBTO Regional Workshop in the Gambia

To deepen Africa's engagement with the CTBT, the Organization hosted a regional workshop in the Gambia in 2024. Bringing together 27 participants from 23 countries, the event fostered meaningful discussions on the Treaty's role in enhancing regional security and ensuring that all Member States fully benefit from their participation.

Attendees explored key topics, including the legal and technical aspects of Treaty implementation and the capabilities of the International Monitoring System (IMS). Sessions also highlighted capacity building initiatives.

Building on previous regional training events in Egypt, Kenya, Morocco, Niger, Nigeria, Senegal, South Africa, and Tunisia, the workshop reinforced Africa's leadership in advancing the CTBT's objectives.



African journalists at Regional Workshop on CTBTO International Cooperation for Member States of African Group, The Gambia, 2024

The International Monitoring System (IMS)

Africa plays a pivotal role in the CTBT verification regime, which monitors the planet to ensure no nuclear test goes undetected.

Once complete, the region will host 21 seismic stations, nine infrasound stations, seven radionuclide stations, and one radionuclide laboratory. Additionally, South Africa co-administers an auxiliary seismic station in Antarctica in collaboration with Germany.

• **Seismic stations** monitor ground vibrations caused by underground or underwater nuclear tests. Like earthquakes, underground explosions generate seismic

waves, which are detected by IMS stations. However, these waves have distinct signatures that allow experts to differentiate between natural tectonic activity and explosive events.

• **Infrasound stations** detect low-frequency sound waves that travel through the atmosphere from atmospheric or surface nuclear explosions. These explosions generate infrasound waves that can travel vast distances, providing evidence of an above-ground test.

• **Radionuclide stations** monitor the air for radioactive particles and gases released into the atmosphere by nuclear explosions. These particles provide important evidence that may be used to detect a nuclear detonation.

• **Radionuclide laboratories** provide detailed analysis of radionuclide samples collected by stations, offering high-precision data to confirm and understand the nature of a nuclear explosion.

• **Hydroacoustic stations** record signals that detect changes in water pressure caused by sound waves, which may be linked to an underwater nuclear explosion.

Facility Agreements

In addition to these monitoring efforts, regional states like the Central African Republic, Kenya, Mauritania, Namibia, Niger, Senegal, South Africa, Tunisia, Uganda, the United Republic of Tanzania, and Zambia have concluded facility agreements with the CTBTO. These agreements address political, legal, technological, and operational issues, ensuring the seamless functioning of IMS facilities in the region.



Reference

- Seismic Primary Array (PS)
- ◆

 Seismic Primary 3-Component Station (PS)
- ◆

 Seismic Auxiliary 3-Component Station (AS)
- Radionuclide Station (RN)
- +

 Radionuclide Station with Noble Gas Monitoring Capabilities (RN)
- L

 Radionuclide Laboratory (RL)
- Infrasound Station (IS)

Primary Seismological Stations 7

City	Country
Bangui	Central African Republic
Dimbokro	Côte d'Ivoire
Luxor	Egypt
Kilimambogo	Kenya
Torodi	Niger
Boshof	South Africa
Kesra	Tunisia

Auxiliary Seismological Stations 14

Lobatse	Botswana
Arta Tunnel	Djibouti
Kottamya	Egypt
Furi	Ethiopia
Masuku	Gabon
Ambohidratompo	Madagascar
Kowa	Mali
Midelt	Morocco
Tsumeb	Namibia
Babate	Senegal
Sutherland	South Africa
Mbarara	Uganda
Lusaka	Zambia
Matopos	Zimbabwe

Radionuclide Stations 7

Edea	Cameroon
Addis Ababa	Ethiopia
Misratah	Libya
Nouakchott	Mauritania
Agadez	Niger

Cape Town	South Africa
Dar es Salaam	United Republic of Tanzania

Radionuclide Laboratories 1

Pelindaba	South Africa
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Infrasound Stations 9

Cape Verde Islands	Cabo Verde
Bangui	Central African Republic
Dimbokro	Côte d'Ivoire
Djibouti	Djibouti
Nairobi	Kenya
Moramanga	Madagascar
Tsumeb	Namibia
Boshof	South Africa
Kesra	Tunisia



Outdated seismometer removed from borehole at auxiliary seismic station AS97, Babate, Senegal



Installation of equipment at radionuclide station RN13, Edea, Cameroon

Empowering Africa Through Data: Civil and Scientific Applications

The International Monitoring System, a vital part of CTBTO’s global operations, detects and records hundreds of events each day. These events, whether stemming from natural causes or human activity, provide valuable data that can be applied in many civil and scientific areas.

In some instances, the Preparatory Commission has authorised the CTBTO to share data directly with outside parties for these purposes.

Early Tsunami Warning

The devastating tsunami triggered by the 2004 Sumatra earthquake highlighted the critical need for reliable early warning systems.

In response, the CTBTO began sharing seismic and hydroacoustic data with tsunami warning centres worldwide under the auspices of bilateral agreements.

This collaboration has strengthened countries’ ability to issue timely alerts, helping to save lives and minimise economic losses from such disasters.

In Africa, Madagascar is among the states that have established a tsunami warning agreement, showing how CTBTO data can be used to build resilience and protect communities.

Seismic Monitoring and Earthquakes

Seismic monitoring data plays a crucial role in distinguishing underground nuclear explosions from the many natural and human-made seismic events that occur daily, such as earthquakes.

In Africa, certain regions are particularly vulnerable to seismic activity. The East African Rift, spanning countries like Ethiopia, Kenya, and the United Republic of Tanzania, experiences frequent tectonic activity due to the ongoing separation of the African Plate into the Nubian and Somali plates. In North Africa, Algeria and Morocco face seismic risks because of their location near the boundary between the African and Eurasian plates.



Village near Sumatra coast, Indonesia, in ruins after 2004 Indian Ocean tsunami

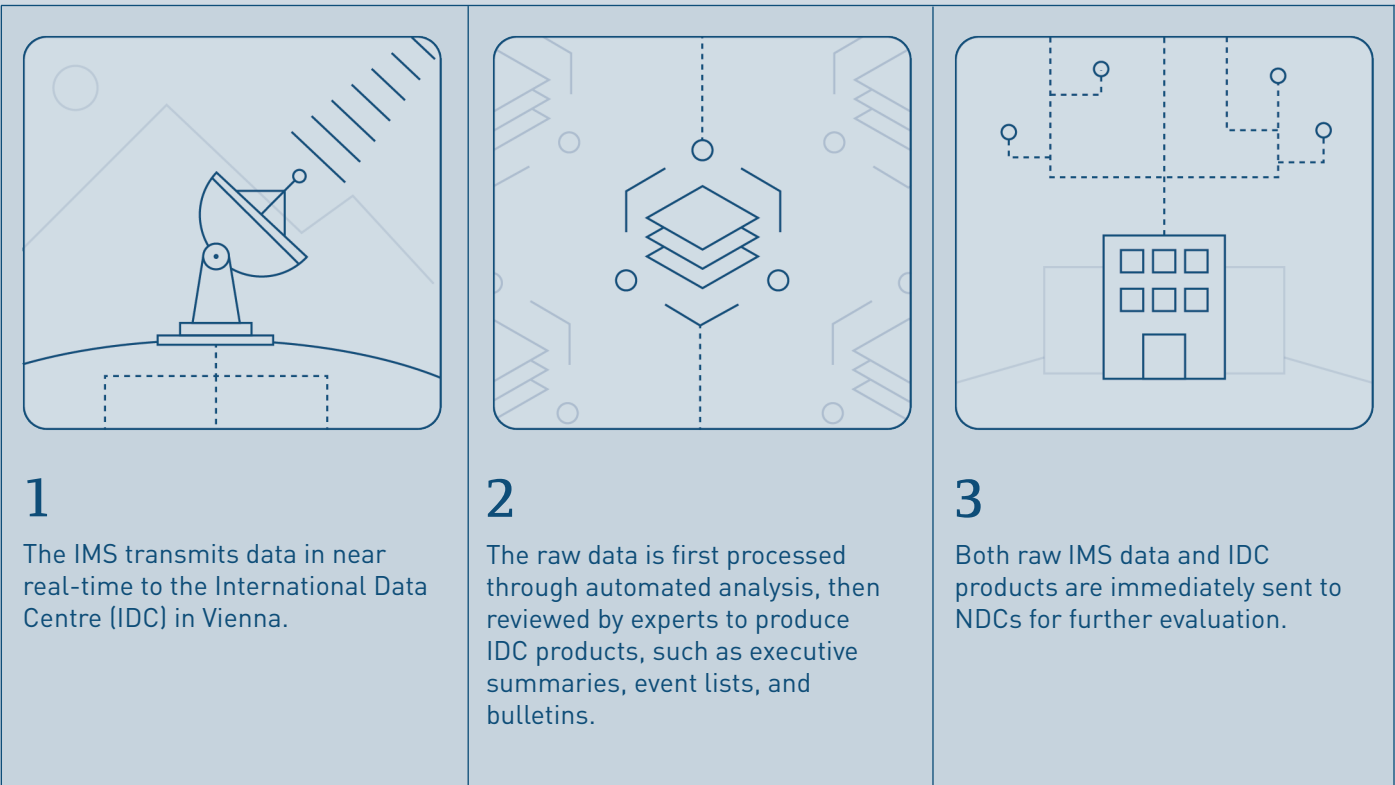


Aerial view of primary seismic station PS26, Torodi, Niger

National Data Centres (NDCs)

National Data Centres (NDCs) are at the heart of the CTBT’s global monitoring system.

These technical institutions provide governments with critical insights into verification processes, enabling them to make informed decisions and fulfil their commitments under the Treaty.



To help establish and support NDCs, the CTBTO provides equipment, software, and training, with a focus on developing countries.

Thanks to these efforts, and the National Data Centres-for-All (NDCs4All) initiative, over 35 Member States in Africa have successfully set up their NDCs.

Some Highlights of NDC Support in Africa

- Regional Workshop for Arabic Speaking NDCs – Algeria, 2024
- NDC Capacity Building Training for the African Region – Kenya, 2024
- French-Language NDC Training – Niger, 2023
- African Regional Infrasound Workshop for NDCs – Tunisia, 2018
- NDC Capacity Building Workshop on Regional Seismic Travel Time (RSTT) – Namibia, 2017
- Development, Testing and Validation of Regional Seismic Travel Times (RSTT) in Africa – Egypt, 2016

African Support for On-Site Inspection (OSI)

On-Site Inspection (OSI) is the final component of the CTBT verification regime.

Once the Treaty enters into force, States Parties will have the ability to request an inspection to gather on-the-ground evidence if the global monitoring system detects a potential nuclear explosion.

The CTBTO has collaborated closely with the African region to build technical expertise through various OSI activities, which include:

OSI Regional Introductory Courses (hosted in Africa with experts from across the region)

OSI 21st Regional Introductory Course (RIC21) – South Africa, 2016

This foundational course introduced experts from 33 African states to the principles of OSI, providing insight into key concepts, technologies, and operational procedures. It laid the groundwork for future collaboration in verification efforts.

OSI 26th Regional Introductory Course (RIC26) – Egypt, 2024

This was the second course of its kind in Africa. RIC26 brought together technical experts from 26 regional states, strengthening expertise to support the CTBT’s verification efforts.



26th edition of OSI Regional Introductory Course (RIC), Egypt, 2024

OSI Surrogate Inspector Training (held in Africa with OSI surrogate inspectors from around the world)

OSI Advanced Course – South Africa, 2018

70 participants from 44 Member States worldwide took part in this programme. Designed to prepare trainees for practical OSI activities, the course combined various methodologies, emphasising hands-on experience through field training exercises.

OSI Ground and Airborne Visual Observation Course – South Africa, 2018

Building on the Advanced Course, 16 surrogate inspector trainees from 15 Member States took part in this training. It focused on the use of equipment for visual observation and position finding, including pre-flight planning and helicopter overflights, with hands-on practice in identifying OSI observables through ground and aerial techniques.



OSI Advanced Course, South Africa, 2018

Participation of African Experts in Other OSI Activities

OSI Workshops

OSI workshops play a crucial role in strengthening the OSI component of the CTBT verification regime by focusing on specific, practical topics. Over the years, more than 50 experts from African countries have actively participated in these workshops, contributing to regional and global expertise.



Participant from Africa taking part in workshop at RIC-26, hosted by Egypt’s National Research Institute of Astronomy and Geophysics (NRIAG), 2024

OSI Exercises

OSI exercises provide an opportunity to test and validate inspection activities, techniques, processes, and procedures in an integrated manner. They are instrumental in developing the OSI component of the verification regime. Most participants are trained OSI surrogate inspectors, with experts from African countries regularly taking part in these exercises.



Participants from Africa during OSI Build-Up Exercise (BUE24), Hungary, 2024



OSI Directed Exercises (DEs), Austria, 2023

Shaping the Future: Opportunities for Youth and Women

The CTBTO places a strong emphasis on diversity and inclusivity, guided by what it calls the “three Gs”: gender, geographical, and generational balance. These principles ensure a broad representation in the Organization’s work and activities, fostering meaningful contributions from diverse perspectives.

A key pillar of the “three Gs” is generational representation, which prioritises engaging and empowering young people. By providing opportunities for education, advocacy, and collaboration, the CTBTO inspires the next generation to actively contribute to its mission of creating a safer and more secure future.

To support this goal, the Organization has launched several impactful initiatives:

The CTBTO Youth Group (CYG)

With over 250 members from African states, this group encourages young professionals and students to deepen their knowledge and promote awareness of the Organization’s objectives.

The CTBTO Mentoring Programme

This initiative empowers early-career women in STEM fields, with a special focus on participants from underrepresented regions, including Africa. By fostering skill development and career advancement, it contributes to building a more inclusive community in science, technology, engineering, and maths.

The Research Fellowship Programme

Established in partnership with the Centre for Energy and Security Studies (CENESS), this programme fosters collaboration in critical research areas and has seen active participation from African representatives.

These efforts collectively ensure that capable, well-prepared leaders from Africa and around the world are shaping the future of global security.



CTBTO Mentoring Programme participant at CTBT Science Diplomacy Symposium, Vienna, 2022



Youth participants at CTBT Science Diplomacy Symposium, Vienna, 2022



CTBTO Mentoring Programme participant at Science and Technology Conference, Vienna, 2023



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