NTI GLOBAL DIALOGUE ON NUCLEAR SECURITY PRIORITIES

REGIONAL TOOLS TO STRENGTHEN NUCLEAR SECURITY: LATIN AMERICA

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The purpose of this paper is to identify existing and potential regional tools in Latin America that can play a role in strengthening nuclear security in the region and in the world. "Regional tools" are those spaces of joint work on nuclear security (e.g., institutions, organizations, conferences, meetings, networks, etc.) where relevant actors can bring about both technical and political improvements to the current nuclear security system.

This paper identifies existing and potential new tools and examines each's current and potential role in nuclear security. The evaluation of each tool includes its capability to promote cooperation within the region and sub-regions; raise awareness and understanding of the importance of nuclear security as a key element for the peaceful use of nuclear technology; foster nuclear security culture; implement nuclear security good practices; and capture high-level political attention on the matter.

1. Background

Latin America and the Caribbean is the only inhabited region in the world where nuclear weapons have never been developed, tested, or deployed. All the region's 33 sovereign states are bound by the Treaty of Tlatelolco, which in 1969 set up the world's first Nuclear Weapon-Free Zone in a populated area. The region shows excellent nonproliferation credentials and historically has been a strong promoter of global nuclear disarmament.

Latin America is home to seven nuclear power reactors: three in Argentina, two in Brazil, and two in Mexico. There are two more reactors under construction in Argentina and Brazil, and a third one planned in Argentina. There are also 15 operational research reactors. They are in Argentina, Brazil, Mexico, Chile, Peru, Colombia, and Jamaica. At present, Brazil and Argentina have projects for two additional research reactors. Both countries have developed the most sensitive parts of the nuclear fuel cycle.

Currently, Latin America is free of weapons-usable materials—highly enriched uranium (HEU) and separated Pu—but there are hundreds of nuclear facilities throughout the region and thousands of radioactive sources which could be targets of theft or sabotage.[2]

Annex 1 shows a data collection, useful in shaping the region's nuclear security profile.

2. Regional and Sub-Regional Tools

The development of nuclear energy in Latin America presents security challenges, particularly as nuclear development outpaces the development of nuclear security measures in certain states. Efforts to develop nuclear security infrastructure in Latin America require countries to strengthen their national regulatory

[1] With contributions by Orpet Peixoto.

[2] Argentina is the most advanced country in Latin America in nuclear technology, followed closely by Brazil. Both have a long nuclear tradition starting in the 1950s and both carried out their own nuclear fuel cycle developments, including uranium enrichment and reprocessing. Argentina, in addition, developed technology of research reactors, conversion from HEU to LEU, and is building a prototype of a SMR, the CAREM 27. The country has achieved a strong reputation as international supplier of research reactors. More in Annex 1.

infrastructure, which is a significant challenge. While some states with more advanced nuclear programs, like Argentina and Brazil, have relevant tools in place, there is room for improvement in the rest of the region. It can be particularly beneficial for regions to develop specific political and technical tools to enhance nuclear security according to their identity, needs, and interests. Such regional tools can be drivers to:

1. Achieve universal regional adherence to key legal and voluntary commitments;
2. Increase participation by regional states in key nuclear security efforts and initiatives;
3. Increase cooperation by sharing information and best practices;
4. Perform the required preparation for regional and global events relating to nuclear security, such as the CPPNM Amendment Review Conference;
5. Jointly explore new threats including cyber and new technologies;
6. Build confidence through joint work;
7. Jointly address regional non-nuclear threats.

2.1 Current Latin American Regional and Sub-regional Tools

MERCOSUR (1991) Specialized Working Group of the MERCOSUR, Bolivia and Chile's Security Commission)
MERCOSUR is the regional common market between Argentina, Brazil, Paraguay, and Uruguay. It has established a vehicle for cooperation and coordination on regional security issues, including the illicit trafficking of radioactive and/or nuclear material among MERCOSUR member states, Bolivia, and Chile. This agreement normalizes the following procedures among the States: exchange of information, elaboration of procedures, detection and feedback action, and capacity building and training.
Through this initiative, the participating states can also interface with AMERIPOL (the Police Community of the Americas,) which is a hemispheric mechanism of cooperation between police organizations. AMERIPOL is integrated by 29 regional public institutions and international organizations. It coordinates and supports criminal investigations and offers legal assistance for prevention and neutralization of crimes.

Latin American Network for Education in Nuclear Technology (LANENT)
LANENT was established to contribute to preserving, promoting, and sharing nuclear knowledge, as well as fostering nuclear knowledge transfers in the Latin American region.[3]
Through LANENT, participating institutions have access to nuclear technology information that they can then use in their efforts to educate and train professionals and technicians in the Latin American region. Moreover, this network seeks to communicate the benefits of nuclear technology to the public with the aim of raising interest about nuclear technology in younger generations.
There are 77 institutions currently active as members of LANENT (62 full members, 14 collaborating members, and the IAEA) from 18 different countries.

Regional Training Center of the Argentine Nuclear Regulatory Authority (CCR – ARN)
Through the ARN and its predecessor, the regulatory branch of the National Atomic Energy Commission (CNEA), Argentina has been training people in radiation protection and nuclear safety for more than 30 years. Training takes place at the ARN's Regional Training Center for Nuclear, Radiological, Transport, and Waste Safety and Security for Latin America and the Caribbean located in the Ezeiza's Atomic Center.[4] An important part of these activities is carried out in collaboration with universities, such as the University of Buenos Aires (UBA), and under the auspices of the International Atomic Energy Agency (IAEA).

The Center derives from an agreement between Argentina and the IAEA (September 30, 2008) in which the country assumed the responsibility to train professionals from the region on such specific topics. Since then,

[3] LANENT website, https://www.lanentweb.org

[4] ARN website, https://www.argentina.gob.ar/arn/capacitacion-y-formacion-regulatoria

it has trained almost 900 nuclear experts from Latin American and the Caribbean, and also from outside the region.

The NPSGlobal Foundation

The Nonproliferation for Global Security Foundation (NPSGlobal) launched the International Program on Disarmament, Nonproliferation and Global Security (a postgraduate level education program) in 2010 and receives students from the region. These students have roles in governments, NGOs, universities, nuclear industry, political bodies, armed forces, and technical agencies. Nuclear security is a part of its core curriculum and the program provides political and technical foundations to raise awareness and understanding on nuclear security in order to develop policy making skills on the matter. The Program was initially funded by the Norwegian Ministry of Foreign Affairs and every year, NPSGlobal grants scholarships and financial aid to its students. The Foundation also has various agreements with government agencies and multilateral organizations, such as the Argentine Nuclear National Regulatory Agency (ARN) and the OPANAL.

Fundação Getúlio Vargas (FGV) International Relations Center

FGV has a program to study nuclear proliferation, control, and security in Latin America and the program is dedicated to studying Brazilian diplomatic strategies and nuclear policies. The initiative is supported by the Stanton Foundation based in the United States, which aims to support the consolidation process of the Getúlio Vargas Foundation as a major center of thought and debate in Brazil on issues of security and international strategy. The program has been active for two years, during which Stanton and FGV have promoted in-depth studies and discussions with decision makers from Brazil and Latin America.

.Comparison of existing regional tools

Table 1 shows a comparison of the existing regional tools with a role in nuclear security and their degree of development. It is clear that there is a room for improvement in the role of the current tools.

Regional Tool	Main Focus	Cooperation	Awareness	NS Culture	Sharing of good practices	Degree of development
Mercosur	Technical	Yes	Yes	Yes	Yes	Medium
LANENT	Technical	Yes	Yes	Yes	Yes	Low/Medium
CCR -ARN	Technical	Yes	Yes	Yes	Yes	Medium/High
NPSGlobal	Political	Yes	Yes	Yes		Medium
FGV	Political	Yes	Yes	Yes		Medium

Table 1. Existing tools and their potential of enhancement

2.2. Existing Regional Tools with Potential for Development in Nuclear Security

UNSCR 1540 and Voluntary Commitments

The region has improved its level of implementation and reporting on the 2004 United Nations Security Council Resolution 1540 (UNSCR 1540), that imposes binding obligations on all states to adopt legislation to prevent the proliferation of nuclear, chemical and biological weapons, and their means of delivery, and establish appropriate domestic controls over related materials to prevent their illicit trafficking, followed by the 2016 United Nations Security Council Resolution 2325 (UNSCR 2325), that reaffirmed the obligations in UNSCR 1540. Among other things this resolution calls upon all states to intensify their efforts to achieve full implementation of resolution, focusing, when and where appropriate, on areas where measures should be taken and strengthened.

The 1540 Committee, was created to oversee the implementation of the UNSCR 1540. States are called upon to provide reports to the 1540 Committee on their current situation and future plans vis-à-vis the obligations laid out in the resolution.

In Latin America, some states have experienced difficulties with the implementation of UNSCR 1540. Yet, considerable advances and cooperation efforts are to be found throughout a region fighting with other relevant issues.

The 1540 Committee has assisted to Bahamas, Barbados, Belize, Bolivia, Colombia, Ecuador, Grenada, Guatemala, Jamaica, Peru, Chile, Belize, and Mexico. In addition, the United Nations Office for Disarmament Affairs (UNODA) has held four seminars—Peru (2006), Jamaica (2007), Brazil (2008), and Bolivia (2018)—on the importance of implementing UNSCR 1540. In 2009, the IAEA held a regional seminar explaining the role of the UNSCR 1540 in international nuclear security and encouraging participants to comply with its requirements. A Technical Meeting on Effective Border Control Coordination was held in 2013.

Regional and sub-regional organizations have also put forward efforts to support the full implementation of UNSCR 1540.

Organization of American States (OAS) - International Committee Against Terrorism (CICTE)
The CICTE is the only regional entity whose purpose is to prevent and combat terrorism in the Americas. CICTE promotes cooperation and dialogue among member states to counteract terrorism, in accordance with the principles of the OAS Charter, with the Inter-American Convention against Terrorism, with full respect for the sovereignty of countries, and for the international law.

CICTE has assisted with the implementation of UNSCR 1540 through the implementation of seven workshops, training of 600 officials, three peer reviews, and five national action plans. It also aids countries to adopt legislation in accordance with the obligations established by the Resolution, as well as technical assistance, general training, and support for drafting national action plans for implementation.

Together with the 1540 Committee, and UNODA, CICTE assists in carrying out peer review exercises on the implementation of UNSCR 1540. So far, peer reviews were conducted in 2017 by the governments of Chile and Colombia, and in 2019 between Panama and Dominican Republic, and between Uruguay and Paraguay. CICTE programs include cyber, maritime, and port security, which seek to strengthen the capacity of OAS member states to counter terrorism financing, through greater compliance with relevant international and regional legal obligations. This includes an ambitious project to prevent terrorism based on the detection and elimination of its funding sources and the criminalization of the financing of terrorist activities, through the promotion of international cooperation, exchange of information, incorporation of legislation in accordance with international standards, and training of national authorities for effective implementation.

OPANAL
In order to ensure compliance with the obligations of the Treaty of Tlatelolco, the contracting parties established the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) in 1969. The Agency is responsible for holding meetings among member states related to the purposes, provisions, and procedures established by the Treaty. Even though OPANAL does not have an inspectorate body, it may be a potential venue for formalizing rules for nuclear security in Latin America and the Caribbean states.[5]

[5] OPANAL website, http://www.opanal.org/en/about-us/

CELAC - Community of Latin American and Caribbean States

The Community of Latin American and Caribbean States (CELAC) is an intergovernmental mechanism for dialogue and political agreement, which permanently includes the 33 CELAC aspires to be a unique voice for structured policy decision-making in support of regional integration programs. It was created with a commitment to advance the gradual process of regional integration, unity and the careful balancing of political, economic, social, and cultural diversity of Latin America and the Caribbean of 650 million people.
At the 2016 meeting, held at Quito, Equator, all participants signed a statement to work towards eliminating international terrorism. This organization might be used as a future tool to enhance nuclear security.

ABACC

Latin America's peaceful environment favored the creation of an innovative model of nuclear confidence building: the neighbor-to-neighbor safeguards verification put into practice by the Brazilian-Argentine Agency of Accounting and Control of Nuclear Materials (ABACC). The principal mission of ABACC is to guarantee to Argentina, Brazil, and the international community that all the existing nuclear materials and facilities in the two countries are being used exclusively for peaceful purposes. The objective of ABACC is to administer and apply the Common System of Accounting and Control of Nuclear Materials with the aim of verifying that nuclear materials in Argentina and Brazil are not diverted toward nuclear weapons uses. [6]
The ABACC has internationally recognized competence and a highly qualified body of inspectors. The bi-national agency has important features that could be useful in the area of nuclear security, including, if there were a political decision to reformulate its mandate and serve as a potential nuclear security center of excellence.

An outline of a future development of ABACC in the field of nuclear security is included in the book "O modelo ABACC".[7]

FORO Iberoamericano de Reguladores Nucleares

The Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (FORO) was created in 1997 with the objective of promoting radiological, nuclear, and physical safety at the highest level in the Ibero-American region. Currently, the FORO is made up of the radiological and nuclear regulatory agencies of Argentina, Brazil, Chile, Colombia, Cuba, Spain, Mexico, Paraguay, Peru, and Uruguay.

In the area of physical protection, the FORO has published studies about the risk of nuclear and radioactive materials being used in an attack as a threat to national or international security. The basic premises in this area are that the responsibility for physical security depends entirely on each state, but that international cooperation initiatives are vital to facilitate the peaceful use of nuclear energy and improve global efforts to combat nuclear terrorism.[8] FORO works with its participants to study ways to more effectively avoid malicious acts, prevent the unauthorized withdrawal of nuclear and radioactive materials, provide means for the rapid location and recovery of diverted material, and defend the heritage and physical integrity of workers and the public.

Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL)

The Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean (ARCAL) was established in 1984. It provides a framework for member states' mutual

[6] ABACC website, https://www.abacc.org.br/en/the-abacc/about

[7] Irma Arguello, El futuro de ABACC, in "O modelo ABACC, Um marco no desenvolvimento das relações entre Brasil e Argentina." Editora UFSM, 2016.

[8] FORO website, http://200.156.7.83/pt/areas-colaborativas/seguridad-fisica

cooperation with the support of the IAEA and other international sources. ARCAL addresses key development priorities in the region, focusing on pressing needs related to food security, human health, environment, energy, industry, and radiological safety. Through ARCAL, 30 states have engaged in technical cooperation since 1984, with more than 400 courses and 200 missions. As a training and knowledge transfer framework between states and the IAEA, it could be an appropriate tool for strengthening nuclear security human resource development.

Comparison of potential regional tools

Table 2 shows a comparison of existing regional tools without a strong role in nuclear security and their potential for enhancement or reorientation. As with the tools shown in Table 1, most of the tools in this table could enhance their role in nuclear security. Depending on the tool, mandates should be updated to include such new activities, but this would require political will to do so within each organization.

Regional Tool	Potential of development	Cooperation	Awareness	NS Culture	Sharing of good practices	Political/ technical
OAS CICTE	High	Yes	Yes	Yes	Yes	Both
OPANAL	Medium/ Low	Yes	Yes			Political
ABACC	High	Yes	Yes	Yes	Yes	Technical
FORO	High	Yes	Yes	Yes	Yes	Technical
CELAC	Medium	Yes	Yes			Political
ARCAL	Medium	Yes	Yes	Yes	Yes	Technical

Table 2. Regional tools that could be expanded or reoriented to a stronger nuclear security role

2.3. Regional Tools that could Be Created

Latin American Nuclear Security Support Centers

Nuclear Security Support Centers (NSSCs) have been recognized as an important component of the global nuclear security architecture. NSSCs serve as a mechanism for ensuring individuals—whether facility managers, regulatory staff, scientists, engineers, or technicians—are trained on a wide number of important nuclear security issues. These centers focus on the important "human factor" of the global effort to secure nuclear material.[9]

Several countries have established NSSCs/CoEs, including Pakistan, Lithuania, China, the Republic of Korea, and Japan, among others. The latter three have established the Asia Regional Network to promote coordination and collaboration among their centers. Their goals are to share information about trainings, good practices, and resources. These centers can promote a regional approach to nuclear security training, rather than a solely national approach.

Due to economic restrictions in most Latin American countries, the most feasible proposal is for a political decision to create a Nuclear Security Support Center with joint participation of several Latin American countries—Argentina, Brazil, Mexico, and Chile would be natural initial choices, while remaining open to the participation of more countries.

[9] Jenkins Bonnie, "Nuclear Security Centers of Excellence," Belfer Center, Apr 2014. https://www.belfercenter.org/publication/nuclear-security-centers-excellence

The IAEA supports an NSSC Network, which currently consists of 108 members from 43 countries and promotes coordination, collaboration, and best practices among existing centers and centers under construction. The support of the NSSC Network would be necessary for the design and implementation of an NSSC in Latin America. The network is complemented by the IAEA Nuclear Security Education Network (INSEN), which is focused on the promotion of education in nuclear security.

Table 3 shows the level of potential contribution to enhance Nuclear Security of a Latin American NSSC. If appropriately developed, such NSSC could facilitate regional cooperation, build awareness of nuclear security, promote nuclear security culture, and encourage sharing of good practices.

Regional Tool	Potential	Cooperation	Awareness	NS Culture	Sharing of good practices	Political/ Technical
Latin American Center of Excellence	High	Yes	Yes	Yes	Yes	Both

Table 3. Regional tools to be created

3. Conclusions

The regional and sub-regional tools already in place in Latin America and the Caribbean should receive more regional attention, as well as more international support to improve their role in enhancing nuclear security. In addition, there are several regional tools devoted to non-nuclear security areas such as non-proliferation, safeguards, safety, and radiological protection, which presently do not play a strong role in nuclear security but could be expanded to include nuclear security. Based on a comprehensive approach to reduce nuclear risks, and considering that all risks are intertwined, those tools should take a relevant role as a part of the regional nuclear security community. Any action would require clear political will, as well as a detailed case-by-case analysis to assess the potential of the tool.

As a region without weapons-usable nuclear materials, risks in Latin America can be perceived as lower than those in other regions of the world. As such, the prevention and detection of and response to events of theft, sabotage, unauthorized access, illegal transfer, or other malicious acts involving nuclear material and radioactive sources must be understood as necessary for the peaceful use of nuclear technology.
The creation of a Latin American NSSC would be a positive development, if adequately planned and implemented. It could promote nuclear security culture, encourage regional sharing good practices, and enhance human resource development and sustainability efforts. It could also facilitate cooperation with players inside and outside the region to help strengthen nuclear security. Further specific analysis is required to confirm this future development, but it is evident than many positive steps to enhance nuclear security can be taken based on tools already in place.

Annex 1

To date the Latin American and Caribbean region is home to seven nuclear power reactors: three in Argentina, two each in Brazil and Mexico, and one more in construction in Brazil.

There are also 16 operational research reactors in Argentina, Brazil, Chile, Colombia, Peru, and Jamaica, and two more projects underway in Argentina and Brazil. Both countries have uranium enrichment facilities and several other nuclear fuel cycle-related plants. As in the rest of the world, there are also thousands of radioactive sources that are being used in many activities such as medicine and industry.

All 33 states in the region are parties of the Tlatelolco Treaty, which established the first Nuclear Weapons Free Zone in an inhabited part of the world (1967).

Current status

Operational power reactors	Argentina, 3: Atucha 1 and 2, Embalse (1,627 MWe) Brazil, 2: Angra 1 and 2 (1,896 MWe) Mexico, 2: Laguna Verde 1 and 2 (1,365 MWe)
Power reactors under construction or projected	Argentina: 1 under construction (SMR – Carem 27 MWe), 1 projected (about 1200 MWe) Brazil: 1 under construction, Angra 3 (1,405 MWe), also developing 1 naval reactor for its submarine project (PROSUB).
Countries with operational research reactors **(all currently fueled with LEU)**	Argentina: 5; Brazil: 4; Chile: 1; Colombia: 1; Peru: 2; Jamaica:1; Mexico: 2
Countries with research reactors under construction or projected	Argentina: 1 under construction (RA10) Brazil 1 under construction: MBR (Argentine technology alike to OPAL reactor sold to Australia, and operational since 2007)
Civilian HEU stocks	None
Military HEU stocks	None
Separated Pu stocks	None
Uranium enrichment capabilities Argentina: gaseous diffusion, research in ultracentrifugation and laser, Brazil: ultracentrifugation	Argentina: Pilcaniyeu (less than 20 SWU/yr) Brazil: Resende (120 SWU/yr). CTMSP /ARAMAR Navy Center: small facility.
Reprocessing capabilities	Argentina: LPR Pilot Plant Ezeiza, cancelled at 85% of completion in 1996.
Research reactors design/ construction/ conversion capabilities	Argentina: National Atomic Energy Commission - CNEA/ INVAP
Non HEU radioisotopes production capability	Argentina, CNEA/ INVAP
Suppliers of Nuclear technology	Argentina: CNEA/ INVAP, 2 RR to Peru, 1 RR to Egypt, 1 RR to Algeria, 1 RR to Australia, 1RR to Brazil (under development), Netherlands, Saudi Arabia.

IAEA members	31/33 Non-members, 2: St. Kitts & Nevis and Suriname
Countries with CSAs	33
Countries without Additional Protocols	15/33: Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Dominica, Grenada, Guyana, St. Lucia, St. Vincent & the Grenadines, Suriname, Trinidad & Tobago, Venezuela
CPPNM Parties Currently worldwide: 157	28/33: Not-yet parties: Barbados, Belize, St. Vincent & the Grenadines, Suriname, Venezuela
A-CPPNM 2005 Amendment Parties Worldwide ratifications to date: 118	18/28: Not yet ratified: 10/ 28, relevant: Brazil; Guatemala; Honduras
ICSANT Parties Currently worldwide: 116	21/33. Signatories pending of ratification, 4: Colombia. Ecuador, Guatemala, Guyana. Non-signatories, 12/33: Bahamas, Barbados, Belize, Bolivia, Dominica, Grenada, Haiti, Honduras, St. Kitts & Nevis, Suriname, Trinidad & Tobago, Venezuela
PSI endorsing states Currently worldwide: 107	Members, 15/33. Non-members, 19/33: Barbados, Bolivia, Brazil, Costa Rica, Cuba, Ecuador, Grenada, Guatemala, Guyana, Haiti, Jamaica, Mexico, Nicaragua, Peru, St. Kitts & Nevis, Suriname, Uruguay, Venezuela
GICNT members Currently worldwide: 89	Members, 5/33: Argentina, Chile, Mexico, Panama, Paraguay
UNSCR 1540 Level of implementation according to the 2018 NTI Nuclear Security Index [10]	30/33 submitted the report. Pending: St. Lucia, Grenada, Dominica. Very good: Argentina, Brazil, Cuba, Mexico, Jamaica Good: Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Honduras, Nicaragua, Panamá, Paraguay, Peru, Venezuela Moderate: Barbados, Trinidad & Tobago, Uruguay Weak: Bahamas, Guyana. Others: not assessed.
Participants in the Nuclear Security Summits 2010, 2012, 2014, 2016	Argentina, Brazil, Chile and Mexico
Signatories of Strengthening Nuclear Security Implementation 2014 INFCIRC/869 (35 states)	Chile, Mexico
Signatories of In Larger Security 2014 (15 states)	Argentina, Brazil, Chile, Mexico
Signatories of In Larger Security 2016 (16 states)	Argentina, Brazil, Chile, Mexico
Nuclear Security Contact Group Members (48 states)	Argentina, Chile, Colombia, Mexico

[10] 2018 NTI Nuclear Security Index. <www.ntiindex.org>