



Rethinking Multilateralism

# ***MAPPING NUCLEAR NON-PROLIFERATION***

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**IGARAPÉ INSTITUTE**  
a think and do tank



# ***MAPPING NUCLEAR NON-PROLIFERATION***

## ***Introduction***

Notwithstanding growing appetite for networked multilateralism in some circles, there are relatively few illustrations of what it looks like in practice. Policy makers will be better equipped to design and bolster cooperation on key public goods challenges if they can better understand the character and dynamics of effective multilateral collaboration. One way to do this is through network analytics – mapping the constellation of state, non-state and private actors operating on common problem sets. Network analysis can help decision-makers better apprehend the density and distribution of the nodes and edges connecting international actors, thus providing insight into the nature of cooperation, or lack thereof.

To help set out a stronger empirical case for networked multilateralism, the Igarapé Institute is conducting a series of experiments to map out networked multilateralism, including in relation to nuclear non-proliferation initiatives. The principal goal is to determine if there is utility in mapping the networks that characterize state and non-state commitments to international treaties, conventions and agreements. The Institute is deploying KUMU, a network analysis software platform, to study state and non-state cooperation.

## ***Background***

Interactive network maps can offer potentially more compelling and dynamic visual representations than tables, charts, and text. In this short note, the Igarapé Institute applies<sup>1</sup> network mapping to examine key actors involved in nuclear non-proliferation (e.g. including ratified signatories, non-ratified signatories and non-signatory countries, non-governmental organizations and international organizations) and instruments (e.g. relevant conventions and treaties). Objectives include highlighting the interconnectedness of networks in the nuclear non-proliferation ecosystem, as well as to ascertain the form and function of “impact hubs” driving action. A deeper appreciation of networks and hubs can potentially enhance global efforts to control the proliferation of nuclear weapons.

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<sup>1</sup> This note is inspired by Schmidt, P. and Muggah, R. (2021) “The Global Networks Working to Abolish Nuclear Weapons”, Foreign Policy, July 19, <https://foreignpolicy.com/2021/07/19/nuclear-weapons-non-proliferation-npt-arms-control-ngos-abolish-illegal/>.

The network maps featured in this note are far from comprehensive. Even so, they can highlight the multiple ways in which global cooperation manifests over time. Network tools can help reduce information asymmetries, build confidence and potentially stimulate collective action, especially when they better understand the varied contributions of other entities. A superficial analysis of the network maps reveals a series of preliminary insights:

- **First, nuclear countries tend to be comparatively less committed to nuclear non-proliferation instruments.**

Of the ten countries with the most connections to international non-proliferation instruments, only one (United States) is a nuclear country.

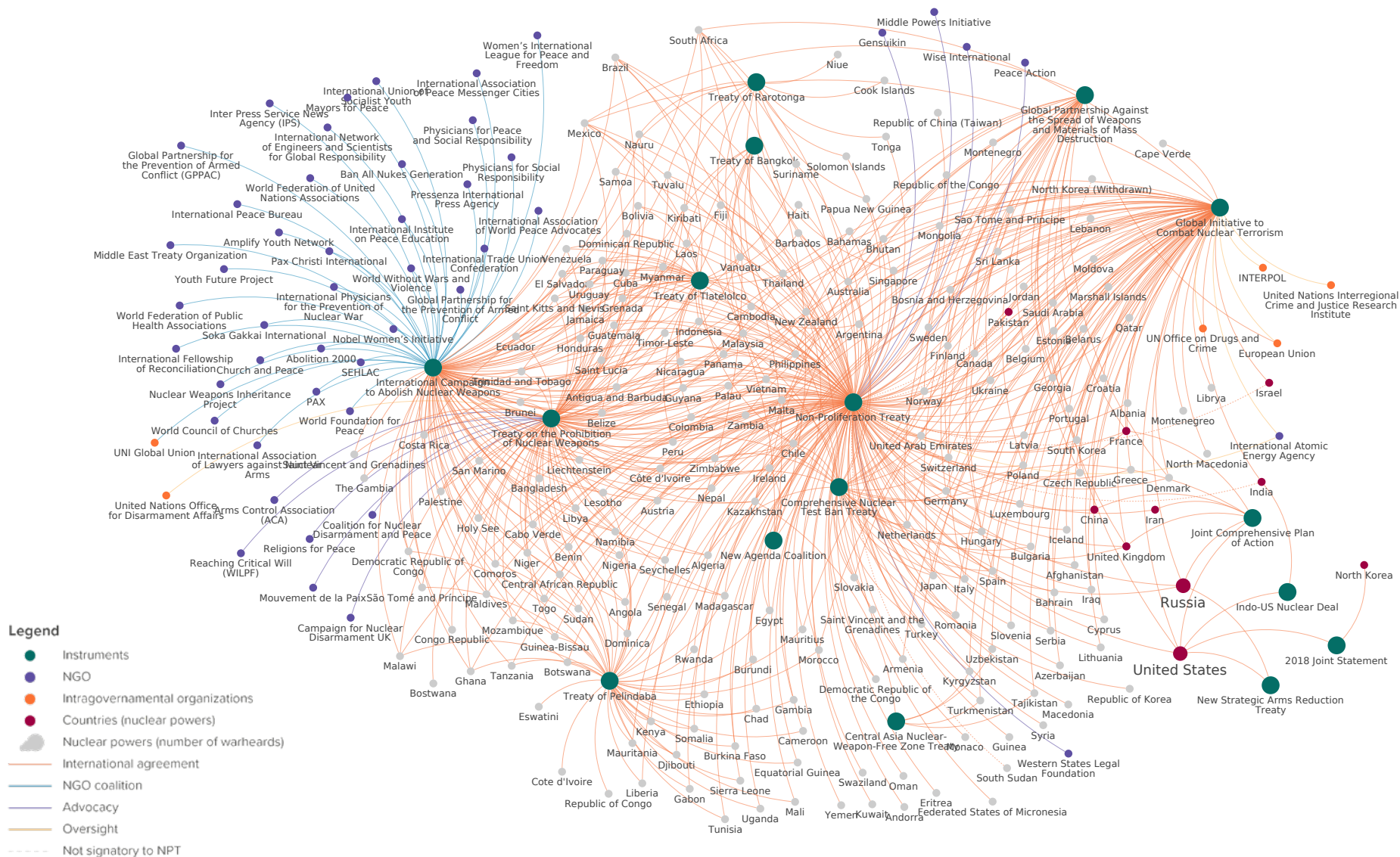
- **Second, relatively powerful non-nuclear countries tend to be the most committed (connected) to nuclear non-proliferation initiatives.**

While the United States has more connections than any other (7), 4 of these connections are strategic bilateral treaties. If we measure a country's connectedness by the number of multilateral instruments it has committed to, not one of the nuclear countries is ranked among the top 64 most connected countries.

- **Third, NGOs tend to work with nuclear countries indirectly.** The instrument with the greatest number of NGO connections is the International Campaign to Abolish Nuclear Weapons (ICAN). Of ICAN's 85 country connections, not one is a nuclear country.

Data for non-state actors were obtained from documents created by the organizations themselves, including their annual reports. The Igarapé Institute also intends to undertake more longitudinal analysis to track the evolution of nuclear non-proliferation initiatives over time, as well as to devise methods of quantifying and representing nuclear countries' respective compliance with non-proliferation and disarmament initiatives. This will involve the use of more advanced metrics and network analysis tools.

**Figure 1. Nuclear Non-Proliferation Initiatives networking map**



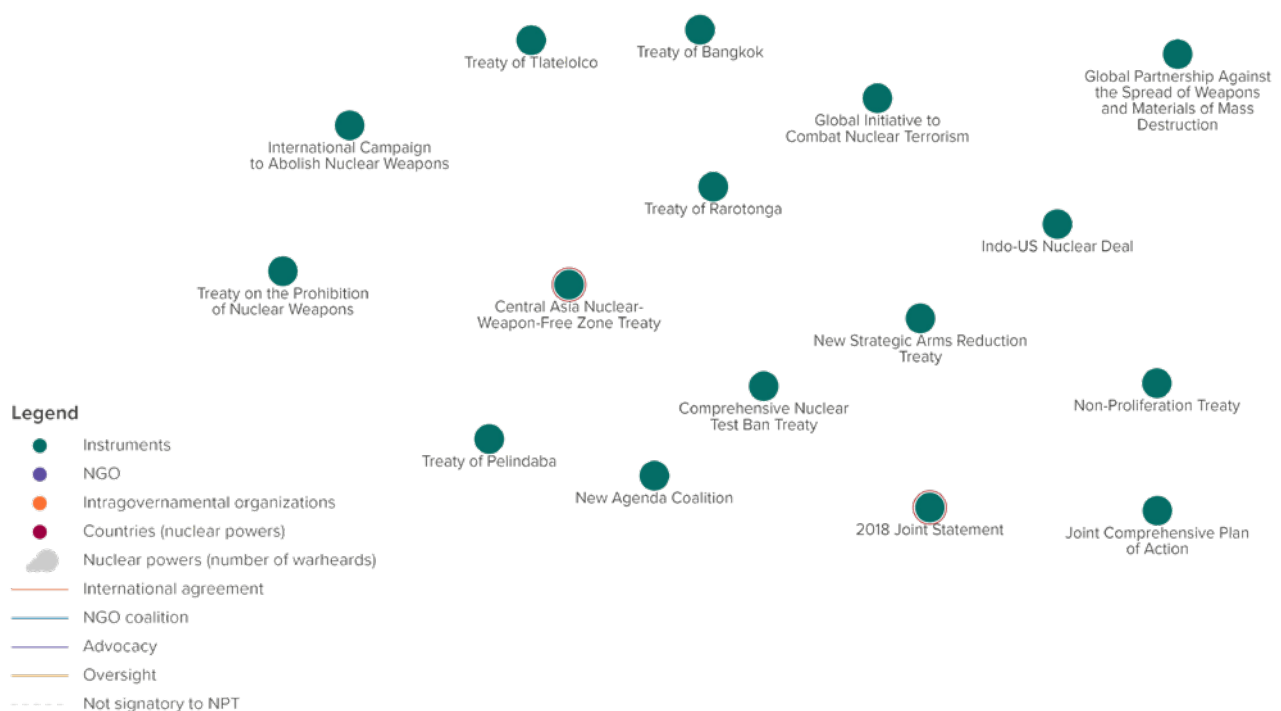
Source: Igarapé Institute 2021. Access the dynamic representation of Nuclear Non-Proliferation at <<https://embed.kumu.io/52524b0d5c3956896b6b888397e9f648#networked-multilateralism-nuclear-non-proliferation-initiatives>>.

The nuclear non-proliferation map helps to measure and visualize the efficacy of global efforts to control the spread of nuclear weapons. By illustrating the relationships between countries and their engagement in current nuclear disarmament treaties and showing how states, NGOs and IGOs are related to international treaties, the map provides an overview of the broader multilateral ecosystem. The intention is to help increase awareness, reduce information asymmetries and incentivize collective action.

## ***Institutions and connections***

The network map is composed of institutions (points) and connections (lines). Institutions include a combination of actors (states, NGOs, IGOs) and instruments representing an institution with an (treaties, coalitions, initiatives). Each point on the map therefore has an active influence on nuclear non-proliferation. The color of the point denotes a given type of entity (instrument, nation, NGO or IGO). States with nuclear weapons (“nuclear nations”) are **red**, while nations without nuclear weapons are **grey**. The size of the points representing nuclear countries denotes the reported or estimated size of that country’s nuclear arsenal. Instruments are represented by a green rhombus.

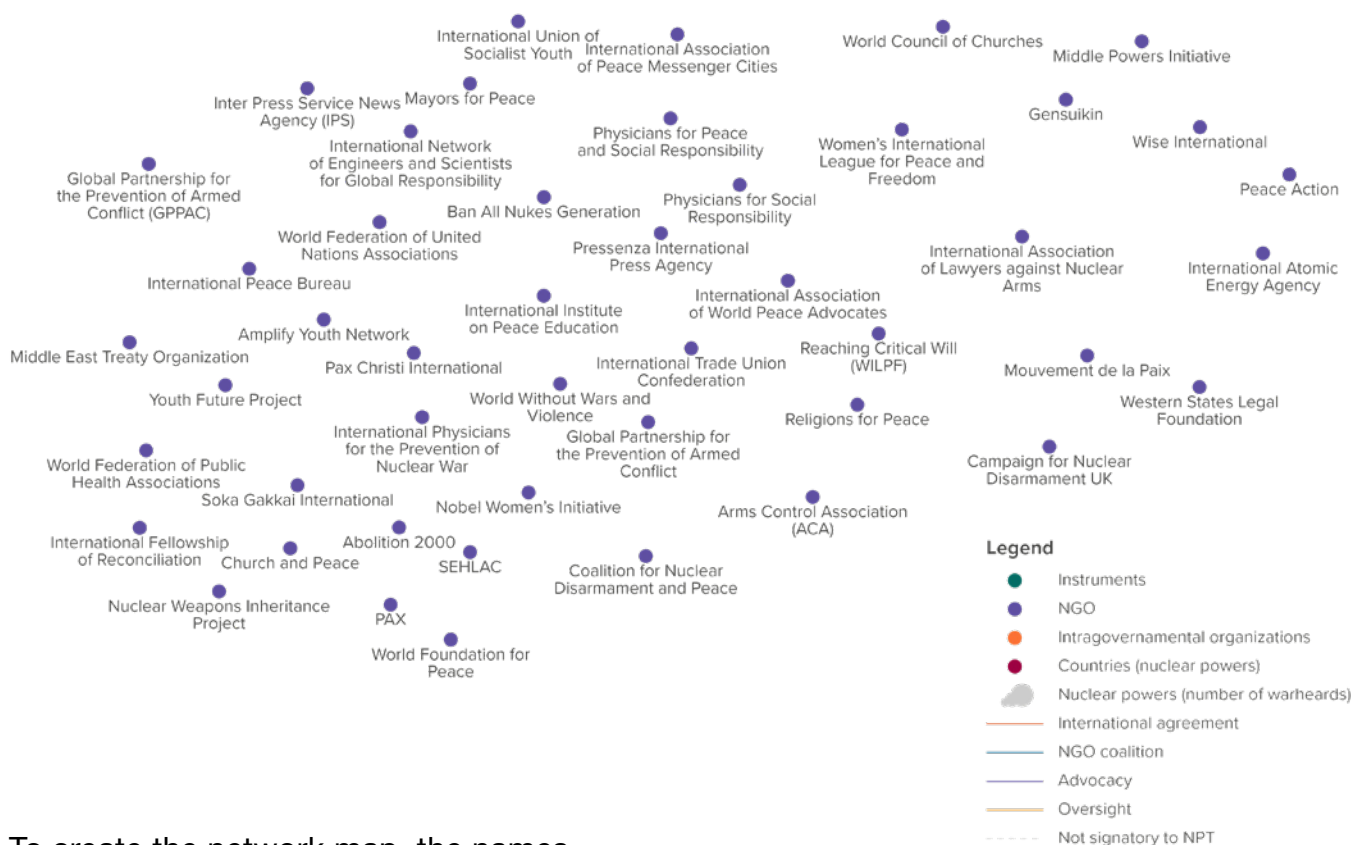
**Figure 2: Visualizing instruments**



The lines represent connections between actors and instruments. The color of the lines denotes different kinds of connections between them. In other words, they show how each actor is contributing to a non-proliferation Instrument, whether by agreeing to that Instrument as a state (International Agreement; orange), forming coalitions of NGOs (NGO Coalition; blue), creating an

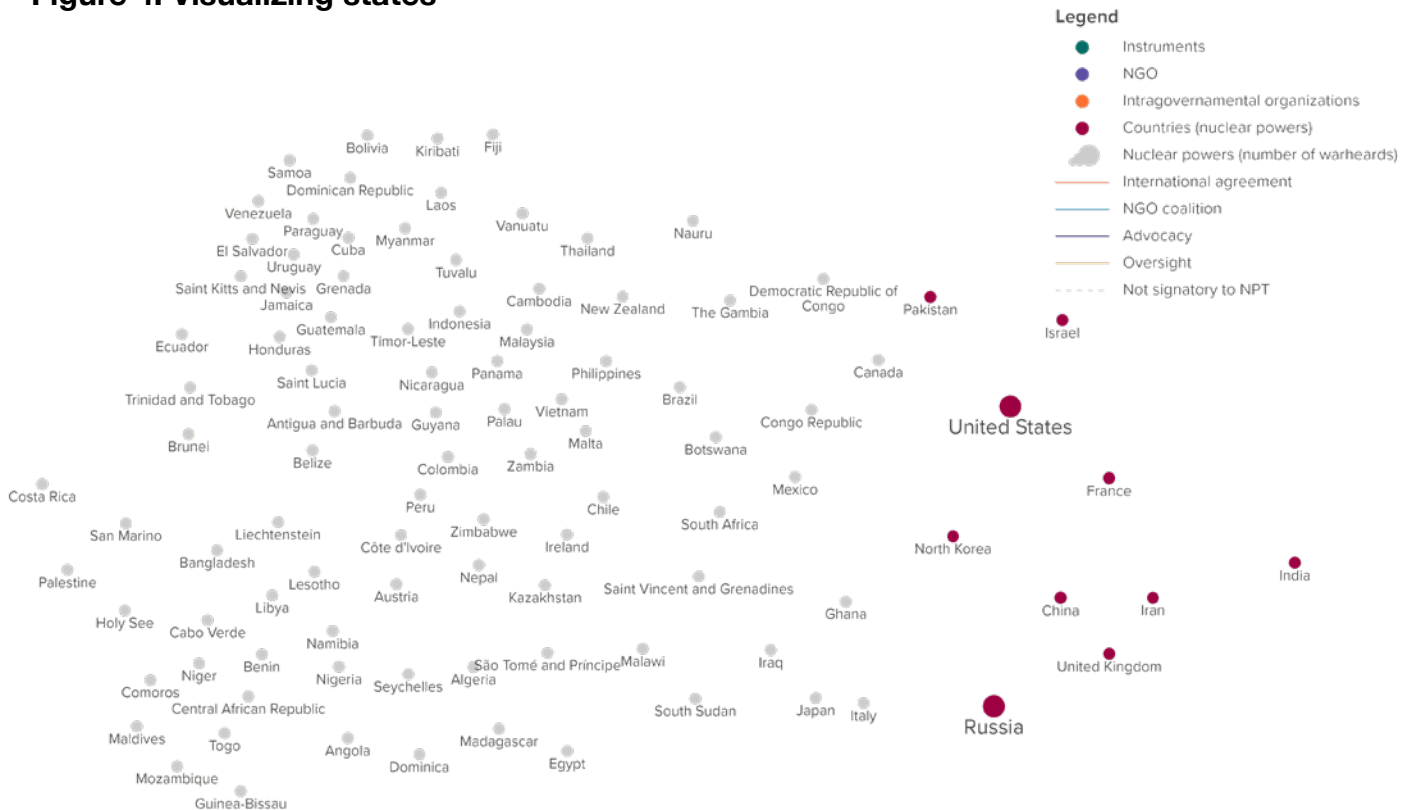
Instrument through advocacy (purple), or through oversight (yellow). Additionally, the size of the nuclear powers which are shown in grey indicate the number of warheads. The lines connecting states to the Non-Proliferation Treaty (NPT; the largest such treaty) also denote each state's level of commitment to the NPT. Full lines denote signatories while dotted lines denote non-signatories.

**Figure 3: Visualizing NGOs**



To create the network map, the names of states and NGOs associated with every major nuclear arms control treaty were compared in order to determine their status relative to specific treaties. The map reveals countries that are more or less engaged in global nuclear disarmament as well as which treaties have the largest participation. The map also features the most influential NGOs and related coalitions.



**Figure 4: Visualizing states**

## Findings

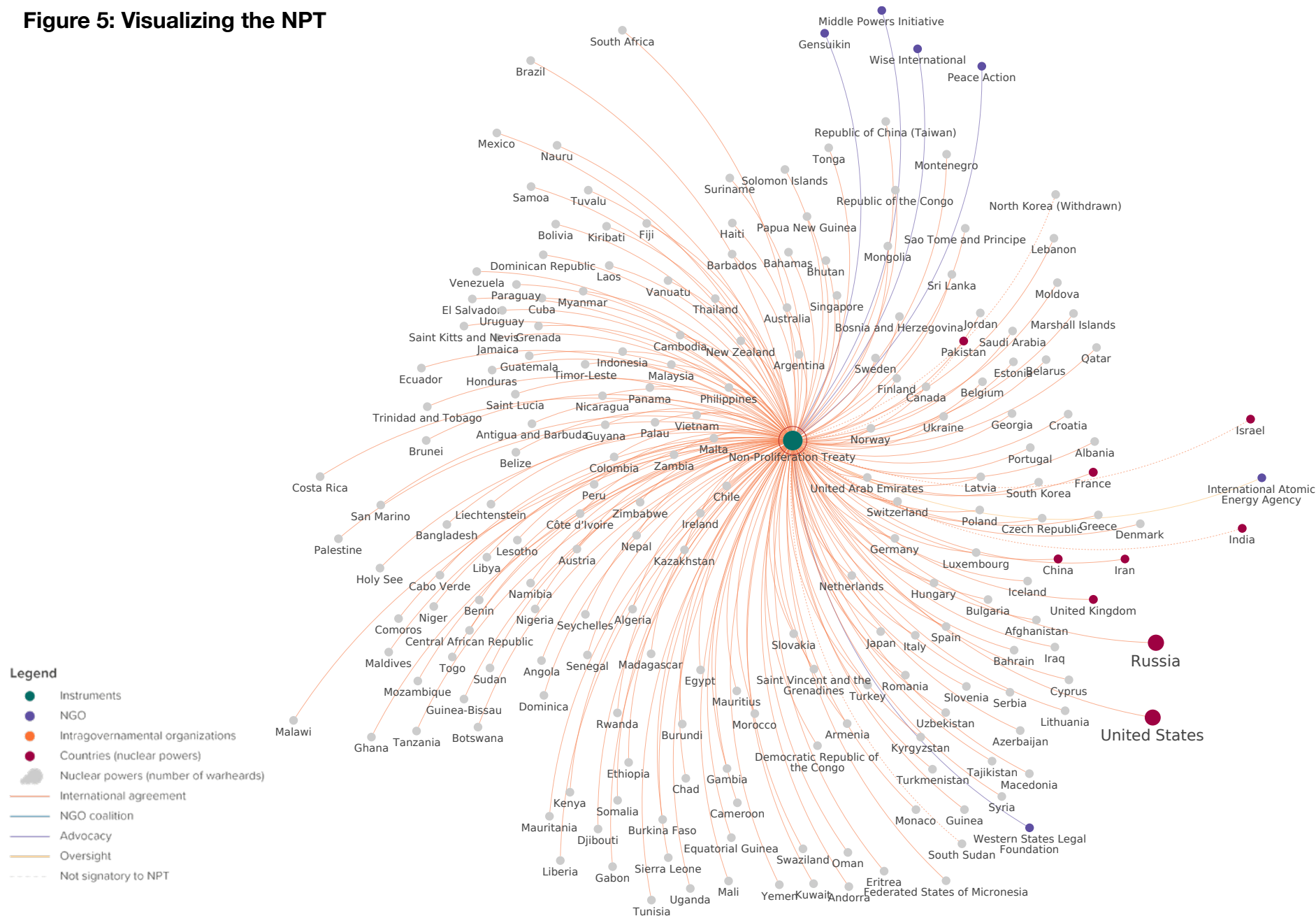
Predictably, the nuclear non-proliferation ecosystem is complex. The Institute mapped just 15 instruments of varying reach. Some have just two parties (Indo-US Nuclear Deal, Joint Comprehensive Plan of Action, Joint Statement, New Strategic Arms Reduction Treaty) while the largest has 202 actors involved (NPT).

The instrument with the most connections is the NPT, with 195 state signatories (194 countries plus the Holy See) and one non-signatory (Pakistan). It is also connected to four NGOs that actively advocated for the Treaty, as well as to the Middle Powers Initiative, which mediated the promulgation of the treaty, and the International Atomic Energy Agency, which provides oversight functions.

The instrument with the next largest number of connections (123) is the International Campaign to Abolish Nuclear Weapons. Notably, of this instrument's 85 country supporters, not one is a nation with nuclear weapons.<sup>2</sup> It also has the most extensive international NGO network of any of the instruments that we examined on an international scale..

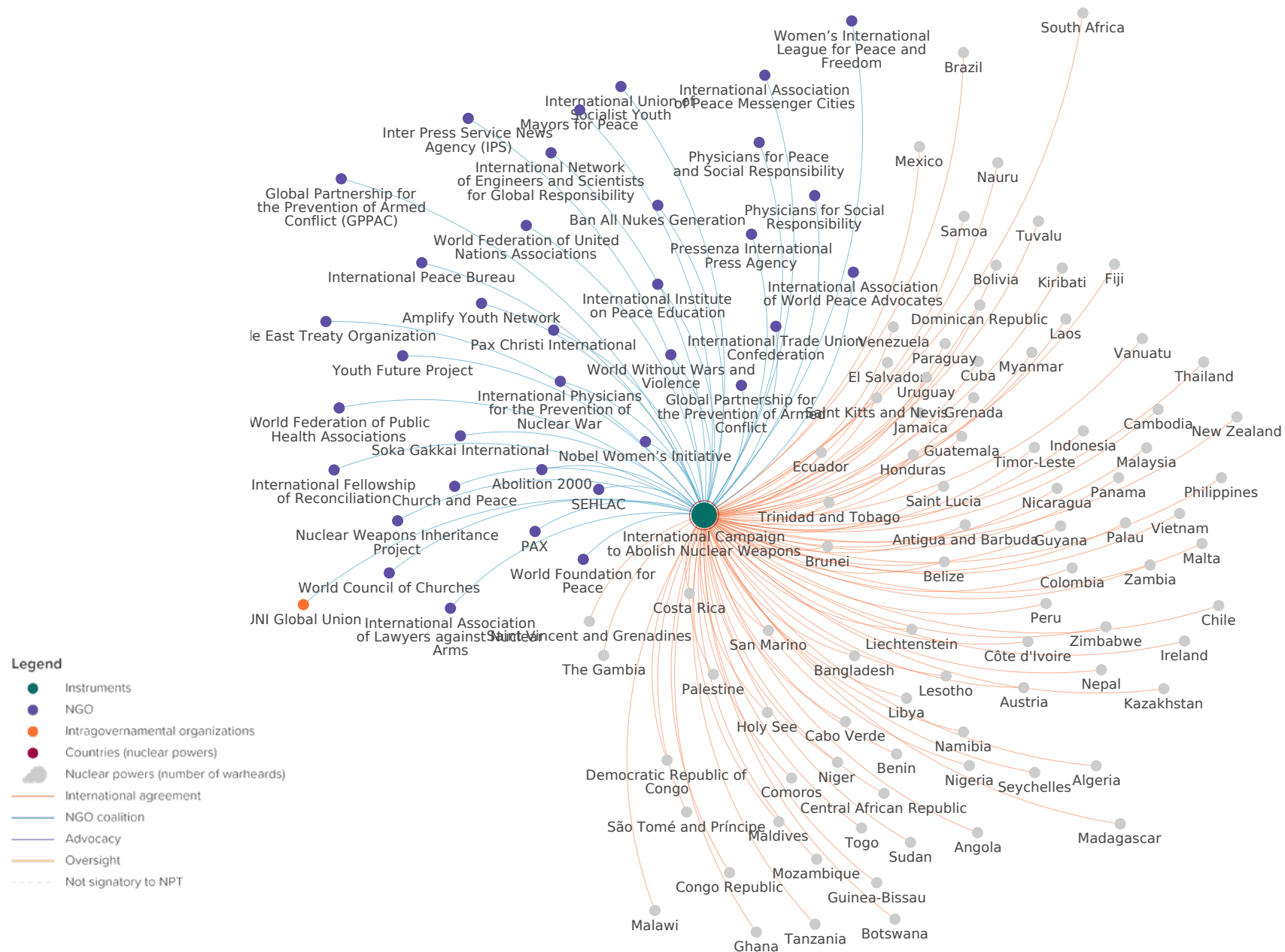
2 "Partner Organizations," International Campaign to Abolish Nuclear Weapons. Available at: <https://www.icanw.org/partners/>

Figure 5: Visualizing the NPT





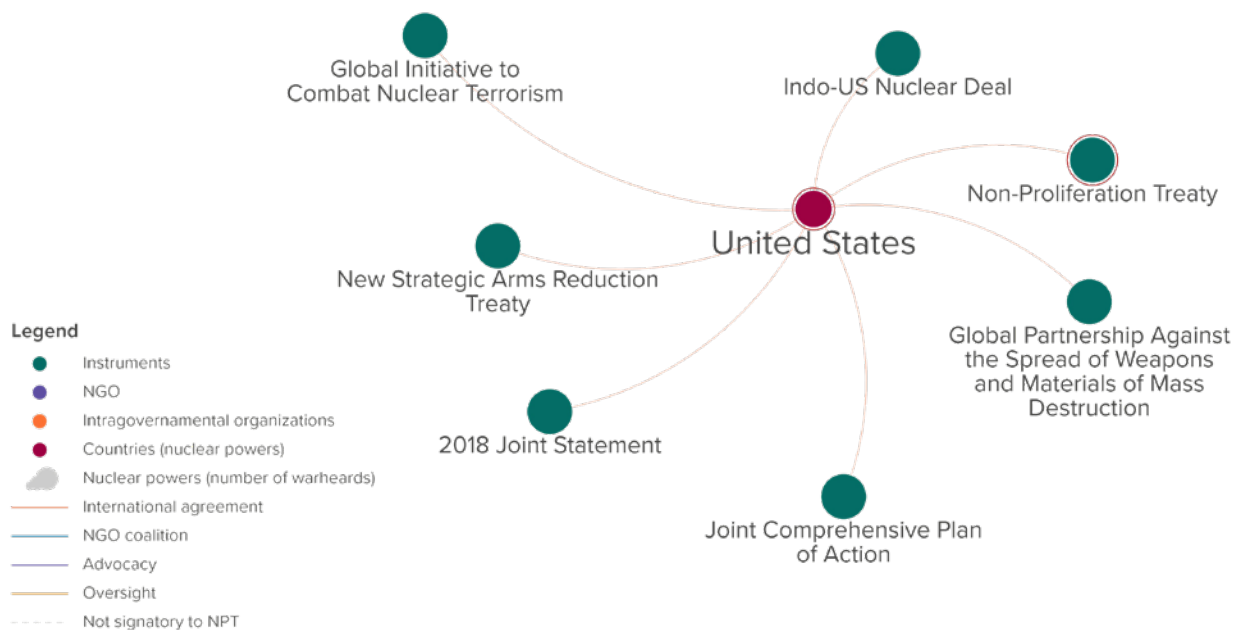
### Figure 6: Visualizing the International Campaign to Abolish Nuclear Weapons



The Institute found that the country with the greatest number of connections was the United States, with connections to 7 instruments. However, of these 7 instruments, 4 were bilateral (New Strategic Arms Reduction Treaty, Joint Comprehensive Plan of Action, Indo-US Nuclear Deal and the Joint Statement), meaning that they were signed by only one other country (Russia, Iran, India and North Korea, respectively). The countries with the next-highest number of connections were Mexico, New Zealand and South Africa, all with six connections. None of these countries have nuclear weapons. These countries are all members of the New Agenda Coalition, which also contains Ireland, Brazil and Egypt.

Meanwhile, nuclear countries have varying numbers of connections. The United States has 7, while India, France, Russia and the United Kingdom feature 3; China, Iran and Israel with 2; North Korea and Pakistan with 1 respectively. Although the NPT is the instrument with the greatest number of signatories on a global scale, the Global Initiative to Combat Nuclear Terrorism is the instrument with the greatest number of nuclear nation signatories (7, including Israel, China, Pakistan, United States, United Kingdom, France, India).

**Figure 7: Visualizing the United States**



# Data challenges

There are invariable limits to any kind of network analysis of complex issue sets such as nuclear non-proliferation. For one, there is often a data availability gap, which makes it difficult to effectively model the extent of adherence and compliance to treaties and conventions. Indeed, the IAEA Board of Governors - which is responsible for enforcing the NPT - has detected only five occasions when states were found to be in noncompliance with NPT safeguards<sup>3</sup>. Confusingly, however, there is still no official definition of what constitutes non-compliance. The lack of clarity in definitions may in fact be design, and not default. The point is that without more clarity on what constitutes non-compliance, it may be challenging to apply network maps to measure such issues.

There is also comparatively limited information about the extent to which non-state actors are influential in shaping action on nuclear non-proliferation. For example, it is hard to discern whether an NGO acting as a “mediator” or “advocate” genuinely influences the decisions made by states, or indeed whether a given NGO is meaningfully involved at all. The Institute determined an NGO’s role as an “advocate” for a given treaty by searching the organization’s platform for publications (papers, bulletins, endorsements) addressing a given instrument. It was decided that an NGO’s public endorsement of an instrument constituted a connection. One of the many shortcomings of this approach is that it represents all connected NGO’s equally, and thus runs the risk of obscuring the organizations’ varying degrees of influence.

Finally, there is also remarkably limited information available about the extent a given state’s economic commitment or investment to nuclear non-proliferation. While an assessment of the extent to which states invest to fulfill their commitments - either in relation to meeting the standards set out in specific instruments or supporting other states and non-state actors to fulfill their obligations - may be desirable, there is virtually no comparative financial information available on these topics in the public domain. Thus far, the Institute has yet to identify any credible or time-series data on spending related to non-proliferation efforts or on the mediation and diplomacy required to sustain instruments such as the NPT.

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3 “Defining noncompliance: NPT Safeguards Agreements,” Arms Control Association. Available at: <https://www.armscontrol.org/act/2009-05/iran-nuclear-briefs/defining-noncompliance-npt-safeguards-agreements>



# Annex 1. Variable definition and sources

Variable	Definition	Visual	Example of Source
<b>Actor Type</b>	Instrument (non-proliferation treaties, coalitions, initiatives) nation, non-governmental organization or inter-governmental organization	<b>Green</b> rhombus for instruments; <b>Grey</b> for non-nuclear states; <b>Red</b> for nuclear states; <b>Orange</b> for IGO; <b>Blue</b> for NGO	Reports including: UNSC Reinforces Taboo Against Nuclear Testing, Increases Pressure on CTBT Hold-Outs to Ratify <sup>4</sup>  ICAN ANNUAL REPORT 2020 <sup>5</sup>  Nuclear disarmament after the NPT and the role of NGOs <sup>6</sup>
<b>Nuclear Warhead Possession</b>	Countries that are known or widely suspected to possess nuclear warheads	<b>Grey</b> for non-nuclear states; <b>Red</b> for nuclear nations	Arms Control Association <sup>7</sup>
<b>Number of Nuclear Warheads</b>	As estimated by international watchdog organizations	The nation's bubble size corresponds proportionately to its warhead stock	El Orden Mundial <sup>8</sup>
<b>Connection Type</b>	International Agreement (treaties, agreements or coalitions between nations), NGO Coalitions, Advocacy (convening and managing negotiations) and Oversight	<b>Orange</b> for International Agreement; <b>Green</b> for NGO Coalition; <b>Purple</b> for Advocacy; <b>Yellow</b> for Oversight	Nuclear disarmament after the NPT and the role of NGOs <sup>9</sup>
<b>"Commitment" to Non-Proliferation Treaty</b>	Distinguishing signatories and non-signatories of the treaty	<b>Solid</b> Line for signatories; <b>Dotted</b> Line for non-signatories	UN Office for Disarmament Affairs <sup>10</sup>

4 "UNSC Reinforces Taboo Against Nuclear Testing, Increases Pressure on CTBT Hold-Outs to Ratify," Arms Control Association (2016).

5 "Annual Report 2020," International Campaign to Abolish Nuclear Weapons (2020). Available at [https://d3n8a8pro7vhmx.cloudfront.net/ican/pages/2039/attachments/original/1614336667/Ican\\_Annual\\_Report\\_2020\\_web.pdf?1614336667](https://d3n8a8pro7vhmx.cloudfront.net/ican/pages/2039/attachments/original/1614336667/Ican_Annual_Report_2020_web.pdf?1614336667).

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10 "UN Office for Disarmament Affairs," [treaties.unoda.org](https://treaties.unoda.org)

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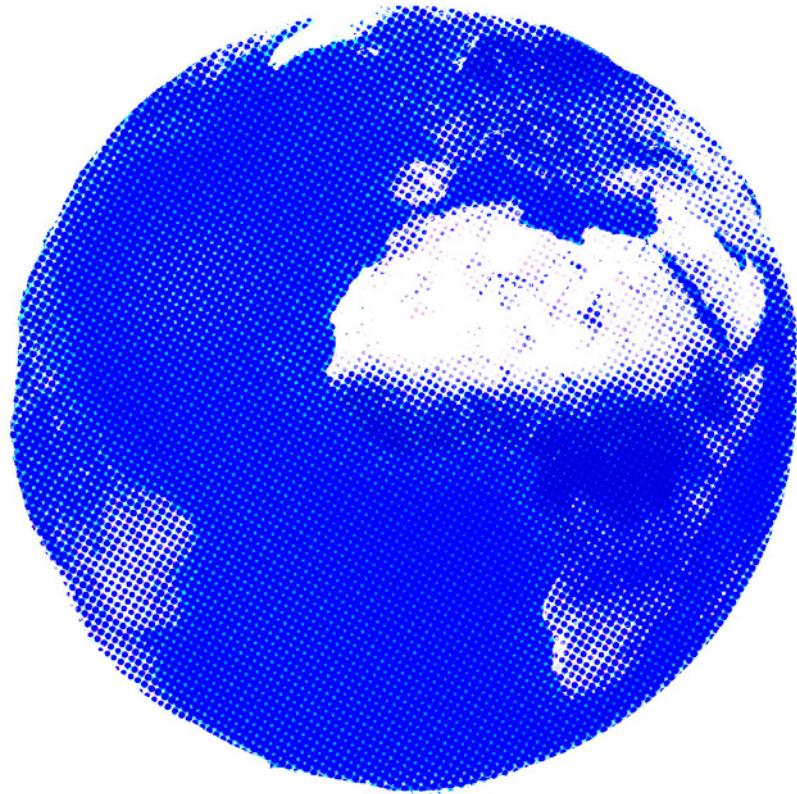
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# ***Our Common Agenda***

The world is contending with multiple interconnected challenges ranging from global health threats and geopolitical tensions to massive digital transformation and accelerating climate change. These complex risks threaten to overwhelm existing multilateral institutions. New thinking is required. To this end, the Igarapé Institute is supporting the United Nations Secretary-General craft [\*Our Common Agenda\*](#). The Agenda is committed to delivering on the promise of the United Nations Charter by refocusing investment in international cooperation.

*Our Common Agenda* is intended to accelerate a new kind of multilateralism. It is mandated by a UN Member States Declaration commemorating the 75th anniversary of the United Nations. The Secretary-General was explicitly requested to report back to Member States with recommendations to address current and future challenges to the UN General Assembly before the end of the 75th session in September 2021. 1,759 participants from 147 countries.



*Our Common Agenda* is informed by consultations with Member States, thought leaders, young people, civil society, and the UN system. It is led by the Executive Office of the Secretary-General with support from the [UN Foundation](#) and [Igarapé Institute](#), along with a network of partners from around the world, including ACCORD (South Africa), [Southern Voice](#) (a network of 50 think tanks from Africa, Asia, and Latin America) and the [Lee Kuan Yew School of Public Policy](#) of the National University of Singapore.

*Our Common Agenda* proposes a series of very practical measures to advance the 12 themes set out in the [UN75 Declaration](#). Among other things, it calls for a reimagined social contract, greater solidarity across generations, reinvigorated protection of the global commons and more rapid and inclusive delivery of global public goods.

During 2020 and 2021, the Igarapé Institute helped backstop the Executive Office of the Secretary-General in its development of *Our Common Agenda*. The Institute conducted research, reviewed recommendations and coordinated a global digital consultation with support from a diverse range of partners.

**Research:** The Institute produced analytical papers on ways to accelerate inclusive and networked multilateralism and developed data visualizations of international cooperation on issues such as global vaccination, nuclear non-proliferation, and climate finance.

**Consultations:** The Institute led a global consultation involving non-governmental organizations, impact investors, philanthropists, parliamentarians, city leaders, academic institutions, and under-represented groups. The process generated 523 proposals from 1,759 participants from 147 countries.



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The Igarapé Institute is an independent think and do tank focused on public, climate and digital security and their consequences for democracy. Its objective is to propose solutions and partnerships for global challenges through research, new technologies, communication and influence on public policymaking. The Institute works with governments, the private sector and civil society to design data-based solutions. Prospect Magazine named Igarapé Institute the best Human Rights NGO in 2018 and the best think tank on social policy in 2019.

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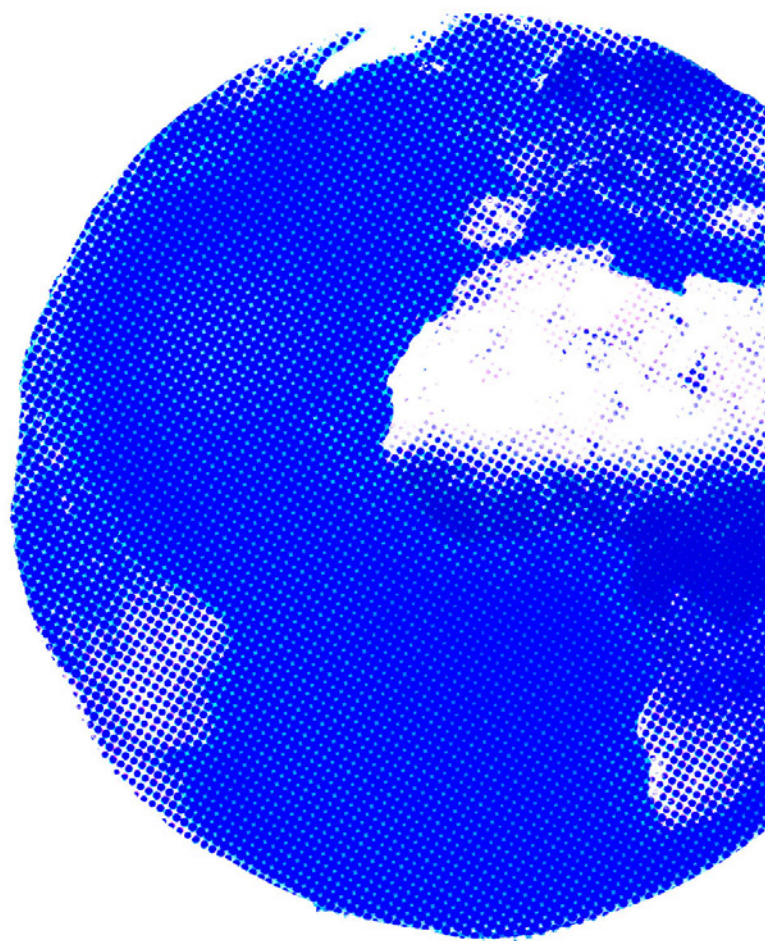
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