

Capacity building of young science leaders to empower regional agents of change

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Abstract

There is a pressing need of scientific human capital for SDG engagement and to fully participate in accelerating sustainable development, from data collection to solutions. Scientists must hone competencies, assuming leadership roles and transcending disciplinary and geographical boundaries, to enable the translation of scientific knowledge into actionable policies. For this, related skills are not usually acquired during scientific training although they are critical to integrate scientists as transdisciplinary actors in science-policy-society interfaces. We present capacity-building initiatives that effectively empowered researchers across the globe to take a leadership role on intentional science programs while developing meaningful regional networks. We discuss success elements, focusing on Latin America and the Caribbean, underscoring aspects that lend themselves to broader replication.

The complexity of the current global challenges related to sustainable development require an adaptive, creative and multisectoral response, with research and science as key stakeholders to understand the issues and propose potential solutions. This means that scientists need to develop competency not only in their field of expertise, but also in using their knowledge to impact their communities and policy, taking a leadership role across disciplines and borders. However, these soft skills are not typically part of the learning pathway for scientists, and scientific training is mainly focused on developing scientific knowledge and technical skills (Börner et al., 2018). This is especially true for the Latin America and the Caribbean (LAC) region, where most countries have comparatively younger or smaller science systems. To contribute to change, scientists are therefore expected to know by instinct how to lead, and how to communicate with the community and policy makers. Additionally, research capacity in LAC is increasing rapidly but with marked inequalities between and within countries, with some countries having few researchers per population (OCTS & RICYT, 2023). Likewise, there is a growing need to ensure this human capital can compete in the global knowledge economy in the coming decades to fully participate in the sustainable development of their region (Lopez-Verges et al., 2021).

Science leadership to the Global Young Academy (GYA) is a collaborative, reflective approach to creative thinking and cooperation that can be used to advance science and expand its impact. Science Leadership Programs (SLPs) are capacity-building strategies to

empower new science leaders. The first one, the Africa Science Leadership Program (ASLP) has had yearly cohorts since 2015 (Slippers & Alisic, 2015, 2019). Other regional programs have taken place in regions like ASEAN or MENA (*ASEAN and APEC Science Leadership Programmes*, 2012; GYA news, 2021, 2022), supporting SDG17 and science diplomacy by improving capacity for international partnerships in subcontinental regions. The Latin America and the Caribbean Science Leadership Program (LAC-SLP), builds on previous iterations in other continents to support early- to mid-career researchers (EMCRs) from LAC in basic and applied sciences, engineering, social sciences, and the humanities, providing them with leadership tools for team development, engagement, science communication and advice, and transdisciplinary collaboration. By using the examples of the above-mentioned science leadership programs, we propose to focus on capacity building to motivate knowledge creators to be part of SDG implementation dialogues, platforms, and solutions, as a way to enhance science-policy-society (SPS) interfaces. A scientist that is exposed to the complexity of the challenges to achieve sustainable development and their associated knowledge gaps and is equipped with skills to interact with relevant stakeholders from the science-policy-society interfaces, can effectively contribute to the articulation of such structures.

Capacity-building programs for early career scientists, empowering regional agents of change

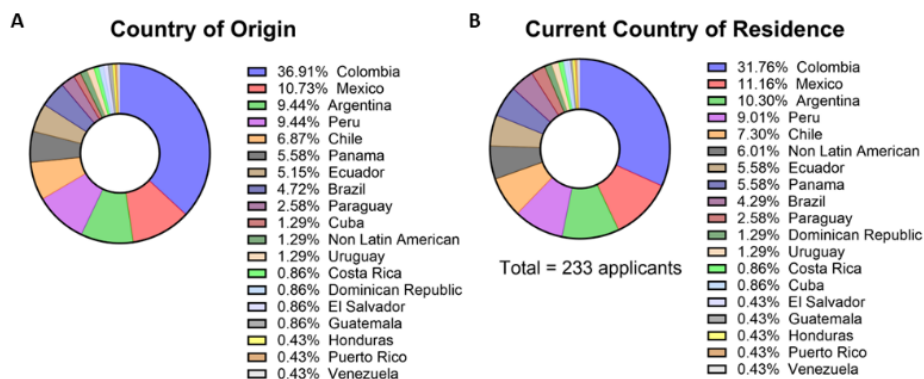
With over 500 SLP alumni, the GYA has organized over 20 SLPs and similar workshops around the world in the past decade. These have included a vast array of partners and co-funders. Programs have been built taking into account the regional context: language, culture, visibility of scientists and level of development of the science, technology and innovation systems. To date, the SLP has demonstrated its versatility and portability, by also being adjusted to a number of themes (such as inclusivity in leadership and using science to achieve SDGs), with stand-alone versions or as part of larger international events. A list of iterations, locations and topics is presented in Annex. Given the scarcity of scientific leadership programs for EMCRs in LAC, the authors of this brief conceptualized the first LAC-SLP (*Science Leadership Latin America and the Caribbean*, 2022), following successful models used in other regions, but tailored to Latin American EMCRs. It included elements of collective leadership, creative and systems thinking for the development of effective networks and stakeholder engagement. The result is a program that empowers young scientists and networks, while impacting regional policy and supporting regional scientific organizations.

Assessing determinants of success, the Latin America and the Caribbean case

The training was conducted in Spanish to be able to include outstanding EMCRs that are generally excluded from international programs in English. The eligibility of the program, was (re) defined based on the educational and socioeconomic context of the LAC region (*Education at a Glance 2023: OECD Indicators*, n.d.; Kreimer & Vessuri, 2018), with a key criteria not commonly found, especially in opportunities developed by the Global North for the Global South: i) a master's or PhD degree or equivalent qualification; ii) under 45 years of age, and/or having obtained their PhD within the last 10 years, and/or holding a non-tenured/non-tenure track position. The selection was based on scientific assessment criteria, as well as community engagement, equilibrated to have gender equity, and diversity in fields and countries represented. With only 20 slots, the success rate of 7% demonstrates that the program responded to a vacant demand in the region (Figure 1, see below). Ten LAC countries were represented by diverse scientists from a similar number of scientific fields.

The collaboration with a variety of LAC partners was instrumental for the program, these included the Argentinian Young Academy (AJA), National University of Colombia (UNAL); Organization for Women in Science for the Developing World-Colombian Chapter (OWSD Colombia); Mexican Association for the Advancement of Science (AMEXAC); Science in Panama Foundation (CEP), and UNESCO Montevideo regional office. The LAC-SLP cohort met in person in December 2022, at the UNAL, Leticia campus in Colombia, for an immersive in-person leadership workshop. Leticia is located in the Amazon rainforest, in the tri-border region between Colombia, Brazil and Peru. Such a location served as a reminder for participants of the need for scientists to also address the challenges faced by marginalized and underserved communities. Far away from capital or big cities, with low accessibility and low connectivity, the LAC-SLP embraced a decentralization approach, with a call to action to consider knowledge dialogues that include indigenous knowledge. The program also included online sessions with outstanding Latin American scientists, representing various organizations that advocate for science and policy in the region. The topics included: policy brief writing, science communication, science diplomacy, science advice, while sharing experiences and challenges from these fields in the region. This training created the conditions for fellows to produce the main deliverable of the program: the Declaration of Leticia (Rondon-Jara et al., 2024), composed by two policy briefs: "Transforming the STEM future: Visibilizing the social responsibility of young academics in Latin American and Caribbean" and "Articulated science to accelerate sustainable development in Latin America and the Caribbean". The drafting of the deliverables involved a peer review process with LAC experts. The Declaration of Leticia advocates for opening spaces for scientists, promoting dialogues among the different types of knowledge, legitimizing the social commitment of scientists, and facilitating networking of scientists working for the benefit of women in STEM, among others (Rondon-Jara et al., 2024).

Figure 1. The number of applications and country diversity of the LAC applicants evidence the need and high demand for such training programs for scientists in the region. Percentages of SLP-LAC applicants (233) categorized by A) country of origin and B) country of current residence. Respondents from 18 countries across Latin America and the Caribbean answered the call to applications. 20 applicants from 10 countries were selected.

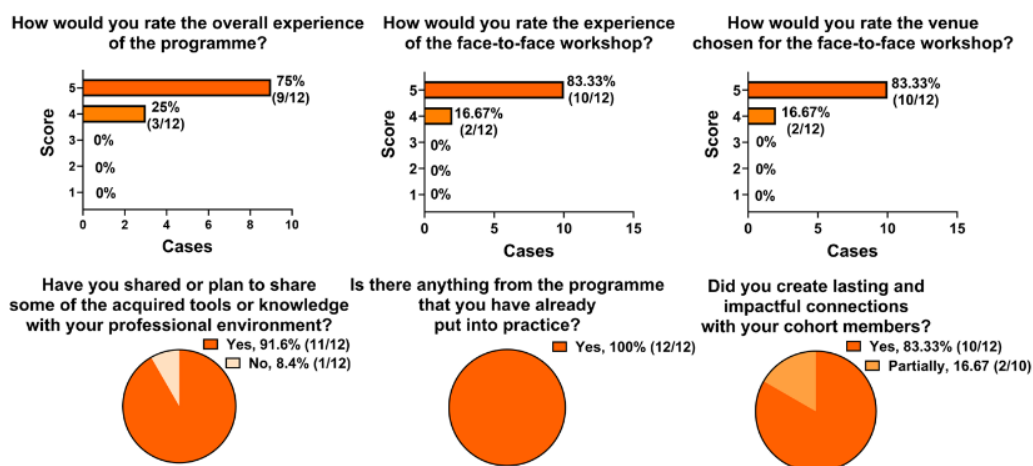


Data source: Application forms LAC-SLP 2022, provided by the authors.

Outcomes

At the end of the program, the participants were surveyed to assess medium-term impacts (improved networking, active use of tools, among other key expected outcomes). Some questions were in narrative form and others utilized a 5-point Likert scale from poor to excellent (Figure 2). By acquiring skills to collaborate in diverse groups across disciplines and borders in order to address complex questions, the program inspired young LAC scientists to take a leadership role. It also generated concrete products for the advancement of science in the region. The participants finished the program with a toolkit that is transferable and scalable, with several fellows reportedly sharing learned strategies outside the program, with their students, institutions, or peers. A program to empower science leaders like the outlined here, with iterations in diverse world regions, demonstrates the replicability and adaptability of the program content and specific goals, to different topics and settings. For the LAC-SLP, it is also important to remark that human connection and social commitment were enhanced because of the in-person workshop in the Amazon, highlighting that where the training takes place can be as important as the content.

Figure 2. Summary of the final evaluation of the first SLP-LAC cohort, showing the connection between the design of the program and the immediate outcomes. Twelve fellows participated in the survey, the results for 6 non-narrative questions are shown. The fellows rated their overall program experience as a 4 (25%) or a 5 (75%). Furthermore, 83% of participants rated the face-to-face workshop experience at the selected venue, the Amazonia campus, with a score of 5, while 17% rated it a 4. More than 91% of the surveyed fellows expressed their intention to share or had already shared some of the tools or knowledge they acquired. All fellows indicated that they were able to establish enduring and impactful connections with their cohort partners to varying extents: 17% to a partial extent and 83% to a full extent. Additionally, all participants reported implementing insights gained from the program during their time in the cohort.



Data source: Anonymous program completion surveys to fellows LAC-SLP 2022-23, provided by the authors.

Policy recommendations / conclusions

The lessons learned and key success factors on the capacity-building program presented, can be considered by any institutions that creates, administers, or support EMCRs world-wide, along with science organizations, government agencies and/or international entities that can benefit from working together with scientists for specific goals.

- Develop tailored capacity building programs for scientists, or improve existing instances with an SDG focus, to empower scientific capacity for SDG implementation and to enhance participation in SPS interfaces.
- Eligibility in context: Often, programs designed by the Global North for the Global South do not consider differences in career trajectories or higher education systems. An earlier set age limit may not consider factors that are related to a higher age for reaching a certain career stage, length of undergraduate programs, language barriers or socioeconomic reasons.
- Context matters: Decentralizing activities to unexpected locations connects professionals with their territories and communities and empowers them to find strategies to serve through their work.
- Representation matters: A balance of disciplines, gender, and countries of origin is needed, for participants, and for trainers.
- Portability/adaptability: Adapt the content to the pressing issues to target that can benefit from an interdisciplinary approach (i.e.: a river ecosystem, a forest; or a theme, like plastic pollution, women in STEM, indigenous knowledge integration, etc.). Deliverables can also adapt; they could be science communication and advice outputs or community projects.

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Annex

Table. Summary of Science Leadership Programs (SLPs) supported by GYA. The diversity of partnerships in all the iterations show their importance to achieve reach, wealth of perspectives, and variety of outcomes. Abbreviations: GYA: Global Young Academy; LAC: Latin America and the Caribbean; MENA: Middle East and North Africa; ASEAN: Association of Southeast Asian Nations; APEC: Asia-Pacific Economic Cooperation; IAP: Inter Academy Partnership; AJA: Argentinian Young Academy; AMEXAC: Mexican Association for the Advancement of Science; CEP: Science in Panama; OWSD: Organization for Women in Science for the Developing World ; UNAL: National University of Colombia; CILAC: Latin America and the Caribbean Open Science Forum; EYAS: Egyptian Young Academy of Sciences; INGSA: International Network for Government Science Advice; WSF: World Science Forum; WAYS: World Association of Young Scientists, ICORSA: International Consortium of Research Staff Associations; NSTDA: Thai National Science and Technology Development Agency; YSN-ASM: Young Scientists Network–Academy of Sciences Malaysia; AKEPT: Higher Education Leadership Academy, TYAN: The World Academy of Sciences Young Affiliates Network; MOSTI: Ministry of Science, Technology and Innovation Malaysia; MOHE: Ministry of Higher Education Malaysia; ASEAN YSN: ASEAN Young Scientists Network; CYDECO: Center for Youth Development and International Cooperation; MHESI: Ministry of Higher Education, Science, Research, and Innovation; NEF: Next Einstein Forum; CIFAR: Canadian Institute for Advanced Research. All iterations include facilitation by Know Innovation/Inclusive Innovation.

SLP iteration	Location	Theme	Organizers and Partners	Deliverables/Outcomes
Latin America and the Caribbean SLP (2022-23)	Colombia and online	Science for sustainable development and a transformation for LAC	GYA, AJA, AMEXAC, CEP, UNAL, OWSD Colombia, UNESCO	Declaration of Leticia: a manifesto for science with social impact in Latin America and the Caribbean (Rondon-Jara et al., 2024)
Africa SLP (ASLP) (2015-present)	South Africa	Varies, includes effective networking and SDGs, collaboration, science communication, science advice	GYA, University of Pretoria	Diverse thematic projects in the region
ASEAN SLP (2016-2019)	Thailand, Malaysia, Vietnam	Varies, includes effective networking and SDGs, collaboration	GYA, NSTDA, YSN-ASM, AKEPT, TYAN, MOSTI, MOHE, ASEAN YSN, CYDECO, Ministry of Science and Technology Viet Nam, Phenikaa University, Young Scientists Network-Academy of Sciences Malaysia	Diverse thematic projects in the region, representation of EMCRs at High Level Panels
MENA SLP	Online	The Role of Collective Leadership for Achieving SDGs	ASLP, EYAS	Capacity building
APEC SLP (2021-22)	Online, Thailand	Inclusive leadership and bio-circular-green economy	GYA, APEC, NSTDA, Sunway University; MHESI, Chiangmai Rajabhat University, ASEAN YSN, Thai Young Scientists Academy	Development of bio-circular-green economy and women empowerment projects, presentation at APEC meeting
Southern Africa (2021)	Online	Resilience in Science Leadership during the COVID era	ASLP, Young Academy in Mauritius initiative, OWSD Mauritius, University of Mauritius	Capacity building
WSF (2019)	Hungary	Science, ethics and responsibility	GYA, IAP, Hungarian Academy of Sciences	"S.O.S. Booklet for Young Global Scholars: Facing the Scientific and Ethical Challenges of the Modern Age"
INGSA conference (2018)	Japan	Science advice for scientists and policy makers	GYA, INGSA, Young Academy of Japan	Participants were introduced to the use of scientific evidence in informing policy; development of a personal strategy for science advice engagement
NEF (2018)	Rwanda	Fostering diverse and inclusive leadership in academia	GYA Women in Science working group, CIFAR	Capacity building
CILAC (2018)	Panama	Using science to meet the 20230 Sustainable Development Goals	GYA, IAP, SENACYT-Panama	Participants were introduced to collective work and the use of scientific evidence in informing policy, and the use of science communication for public engagement for projects with SDGs. At the end of the workshop, participants represented EMCRs at CILAC High level panels.
WSF (2017)	Jordan	Avoiding the Weaponization of Research, science diplomacy	GYA, IAP, WAYS, ICORSA, UNESCO	Pitches to High Level Panel

Data source: Narrative reports from <https://globalyoungacademy.net/activities/strategic-project-science-leadership/>