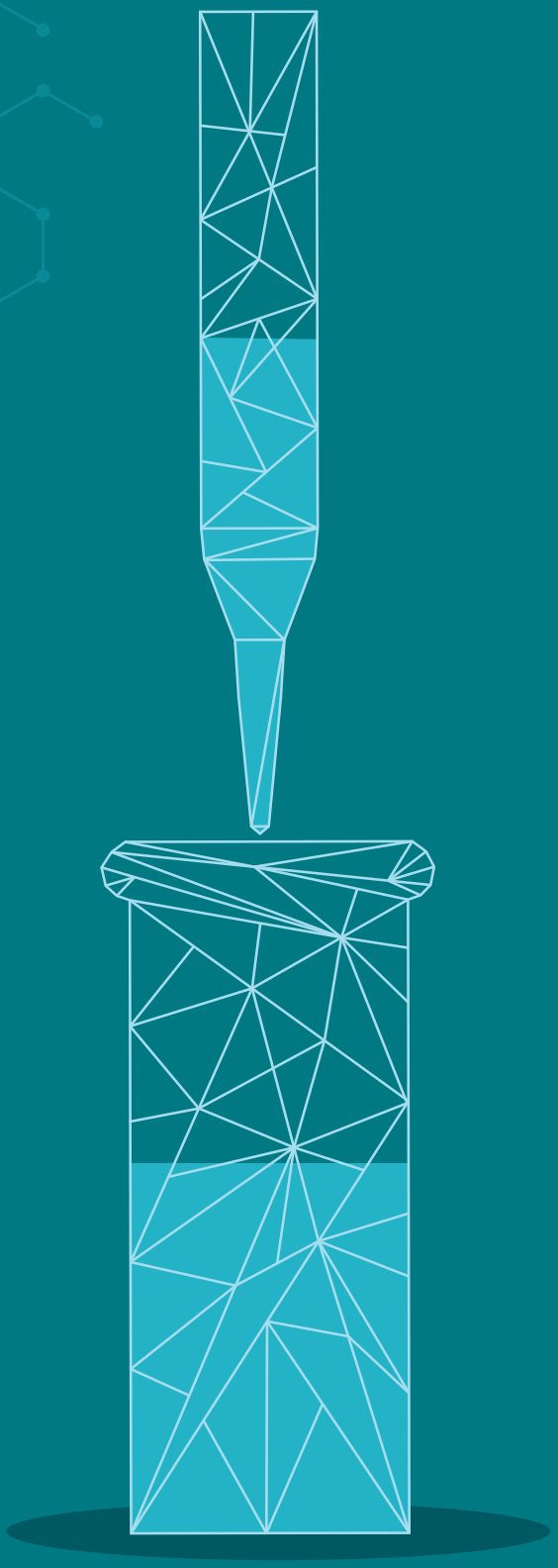

Triangular Cooperation in science and technology networks

Executive summary

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Ibero-American General Secretariat (SEGIB)
Andrés Allamand Zavala, Ibero-American Secretary General
Lorena Larios Rodríguez, Secretary for Ibero-American Cooperation

Coordination:
Martín Rivero Illa y Cristina Santalla González
Area of Social Cohesion and South- South Cooperation, SEGIB

Author:
María del Milagro Barreto

SEGIB South-South Cooperation team:
Cristina Xalma Mellado
Natalia Vargas Talero
Santiago Alonso Álvarez

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ACRONYMS

AECID (by its Spanish acronym)	Spanish Agency for International Development Cooperation
AI	Artificial Intelligence
CARICOM	Caribbean Community
ECLAC	Economic Commission for Latin America and the Caribbean
EU	European Union
GDP	Gross Domestic Product
IAC (by its Spanish acronym)	Canary Islands Institute of Astrophysics
ICTs	Information and Communication Technologies
LAC	Latin America and the Caribbean
MERCOSUR (by its Spanish acronym)	Southern Common Market
OEI	Organisation of Ibero-American States
PROCISUR (by its Spanish acronym)	Cooperative Programme for Technological Development of Agri-food and Agro-industry in the Southern Cone
R&D	Research and Development
R&I	Research and Innovation
SEGIB (by its Spanish acronym)	Ibero-American General Secretariat
STI	Science, Technology and Innovation
STD	Science and Technology for Development
S&T	Science and Technology
TC	Triangular Cooperation
UMALCA (by its Spanish acronym)	Latin American and Caribbean Mathematical Union
UNAH (by its Spanish acronym)	National Autonomous University of Honduras
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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CONTENTS

1 Theoretical framework and research methodology

This research analyses the historical trajectory of scientific networks built through Triangular Cooperation (TC), investigating the potential of the exchange of knowledge, good practices and capacities between the European Union (EU) and Latin America and the Caribbean (LAC) in key areas for human development.

Theoretically, TC in scientific networks was considered to be structured around a minimum of three stakeholders, each one a nucleus representing an individual or multiple stakeholder, with different but dynamic roles, interacting with disparate complex and interdependent economic, political and social systems. Specifically, there is a beneficiary, a pivot in good practice and skills, and a second financial and technical facilitator. On the other hand, partners may be from the public or private sector, international organisations, civil society, philanthropy and others; and they create partnerships of trust and resources to achieve national, regional and/or global goals.

Given the dynamics of scientific-technological knowledge production, scientific networks were seen as configurations that bring together stakeholders that: see science as the endeavour through which phenomena are studied and chains of chance, relationships or interactions between systems are discovered; and see technology as the application of scientific knowledge to create solutions to problems in nature or society.

To shape the scenario in which the scientific networks analysed were developed, first, a qualitative mapping of EU and LAC key issues, policies and stakeholders in science, technology and innovation (STI) was carried out. This approach was complemented by a description of the institutionality in STI in countries that are especially active in TC: Germany, Brazil, Chile, Spain, Mexico and Peru.

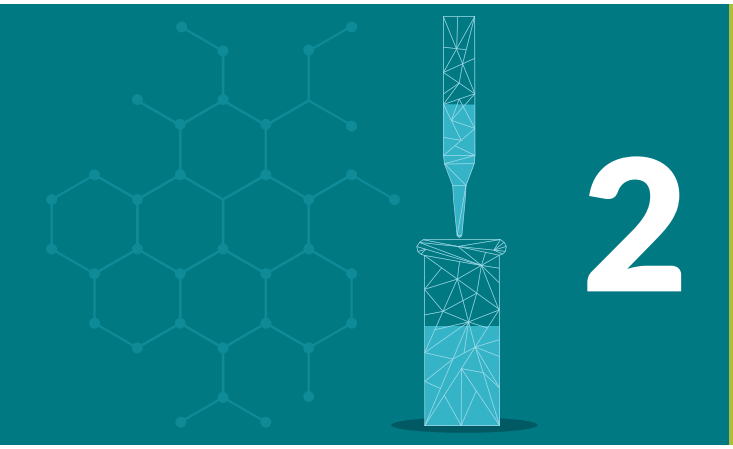
In this context, the challenges of strategic planning along with the pillars of open science and scientific diplomacy were considered through an in-depth analysis of specific cases of scientific networks. The selection of networks followed thematic and situational guidelines, namely: i. associations linked to education in natural and exact sciences (mathematics and astronomy), food (biotechnology in the gene editing of foods) and health (production of medicines and vaccines) given that these are priority topics in EU-LAC cooperation; and ii. existing or potential links in S&T between institutions in EU and LAC countries.

Recovery of ecosystems in high Andean natural grasslands.

SSC Project 'Capacity building for the generation of scientific evidence on the impacts of mountain ecosystem recovery measures on the provision of water services', between the Environmental Fund for Water Protection of Ecuador (FONAG by its Spanish acronym) and the National Institute for Research on Glaciers and Mountain Ecosystems of Peru (INAIGEM by its Spanish acronym). Image bank on South-South and Triangular Cooperation in Ibero-America. SEGIB-PIFCSS. 2024.

On the other hand, this research complements the SEGIB's studies on TC in interaction with topics surrounding indigenous peoples, artificial intelligence (AI), the environment, decentralised associations -focusing on cities-, and opportunities for interregional TC with other regions in the Global South.

This mapping as a means of reviewing the networks included conducting interviews to analyse policies, programming tools and reporting from 2015 to 2025.



2 Results

Mapping of Science, Technology and Innovation in the European Union and Latin America and the Caribbean (2015 to 2025)

The European segment was mainly characterised by reports on EU research and innovation (R&I) policies which, since 2015, have been observing social, economic, political and environmental mega-trends with specific issues in demography, natural resources and energy, climate change and environment, government, growth, employment and productivity, society and health in interaction with technological innovations.

In this representation, wars, as well as geopolitical and commercial instability, were considered counter-currents. In contrast, scientific and technological developments were considered factors that could accelerate, intensify or reverse the dynamics of mega-trends. To address the challenges in STI in Europe, there was a need for flexible and agile approaches to technology governance, encouraging new partnerships between the public sector and businesses, and active international cooperation in S&T.

In STI systems, the COVID-19 crisis accelerated access to data, the use of digital tools and public-private cooperation, but revealed inequities in access to scientific resources, goods and technological benefits. From 2022, EU STI agendas were influenced by international economic and security issues. However, the implementation of projects in climate change, digitisation and health were strengthened through partnerships with like-minded economies.

In addition to bilateral agreements and the EU Cooperation Agencies' S&T project funds, for LAC, the Agenda Global Gateway stood out, which invests in the digital, energy, health, education and transport sectors, with projects such as the EU-LAC Supercomputing Network for AI, linking up with high-performance R&I Centres to strengthen scientific collaborations and build a shared digital future. The EU's flagship programme in TC, ADELANTE, was also highlighted, funding projects and research that increase regional competitiveness by promoting innovation in cities, the transformation of SMEs, health, astronomy and education. One example is the ADELANTE 2 project between Mexico, Cuba and Spain, which promoted genetic engineering and biotechnology research for the development of innovative approaches for cancer treatment. Other areas encouraging the development of bi-regional scientific networks are covered by European Research Council grants; Eramus+; Marie Skłodowska-Curie Actions; services offered by Euraxess and partnerships within Horizon Europe.

In order to analyse STI in LAC, policy references and historical findings associated with bi-regional scientific networks were outlined.

Since 2014, according to declarations from Meetings between Ministers and High Authorities in Science, Technology and Innovation in Ibero-America in STI, the priority areas were: energy, water, biotechnology, food, health, ICTs and climate change. Transversally, it was felt that the issues required policies, legislation and financial resources in order to mobilise researchers and generate technology-based platforms, networks and enterprises. In 2020, the endorsement of the Ibero-American Innovation Strategy facilitated the transfer of investments, knowledge and technologies between governments, chambers of commerce and financial institutions. It also highlighted the shared management of strategic assets such as industrial and intellectual property and resources in supercomputing, along with oceanographic and space research. The subsequent meetings implemented missions in food, climate change and environment, digitisation and AI, health and energy. They also noted the creation of an Ibero-American doctoral training programme, the preparation of a scientific career report and the approval of the open science plan.

CARICOM's strategic plans for STI prioritised health technologies, automation, energy and natural resources as well as ICTs for the productive

sector. They also considered improving human capital, climate change-resilient services, along with promoting international cooperation for access to scientific networks and private resources to finance R&I infrastructures.

Recently (2025), the Joint R&I Initiative between the EU and the Community of Latin American and Caribbean States outlined new governance guidelines for bi-regional working groups on health, climate change, environmental sustainability and energy transition, and AI. In parallel, it advocated for open science and the development of emerging technologies.

Operationally, according to the SEGIB, between 2015 and 2023, over 1300 actions and 2400 programmes and projects were reported in Ibero-America, of which 16% were triangular initiatives with 30% scientists. Additionally, bi-regional scientific research also features in the networks of the Ibero-American Programme for Science and Technology for Development (STD), which aids innovations in agro-food, health, industrial development, ICTs, science and society, among others. Fostering, between 2015 and 2025, 229 networks where the majority of stakeholders have leading roles in public universities and R&D centres; and, by September 2025, 22% of its active networks were the main mechanism that systematically registered bi-regional scientific and technological teams. Other platforms that facilitate multi-stakeholder dialogue spaces and science-technology partnerships are the ECLAC, the EU-LAC Foundation and OEI. Finally, the Red Clara, which facilitates connectivity between national research and education networks generating digital transformation processes in LAC in conjunction with EU projects.

In terms of investment in R&D in European countries with the most TC activity, it should be noted that Germany invests around 3% of its GDP in R&D. In addition to this, research is supported by the private sector and further nurtured by internationally-acclaimed universities and knowledge centres. Furthermore, the German Federal Ministry of Education and Research funds projects and research in AI, quantum technologies and fusion, and historical lines in citizen security, technological sovereignty, energy, climate and health.

The Spanish STI system invests 1.49% (2023) of its GDP and is increasing national and international budgets. The Ministry of Science, Innovation and Universities provides strategies, funds R&D projects in all areas of knowledge for the public and private sectors, and fosters EU and third-country R&D promotion programmes. Universities also work as excellent research centres for knowledge transfer and business development.

In terms of STI in LAC, it appears that investment in R&D represents only 2.8% of the global total. Specifically, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) reports the following percentages for the countries under discussion: Brazil, 2020: 1.15%; Chile, 2021: 0.36%; Mexico, 2023: 0.27%; and Peru, 2022: 0.16%.

In Brazil, the Ministry of Science, Technology and Innovation leads the national STI strategy, the priority areas of which are: defence, water, food, biomes and bioeconomy, climate, society, energy, minerals, nuclear technologies, health and AI. These pillars are supported by the promotion of basic S&T, modernisation of infrastructure, expansion of funding, attraction of human resources and technological innovation in enterprises. In this system, there is a tax credit available in R&D for the private sector and the management of multiple scientific-technological issues by public enterprises. Universities also provide funding for innovation.

In Chile, the Ministry of Science, Technology, Knowledge and Innovation steers the way in S&T with a focus on issues related to science and society, management of natural resources and climate change, entrepreneurship, AI and space policy. Since 2025, its priorities have been reinforced with funding for universities, talent development and research centres. To support R&D from the private sector, S&T investment tax credit has been made available and projects are co-funded. In addition, together with public and private universities, the work of government advisory committees on cutting-edge topics such as astronomy and quantum technologies is highlighted.

In Mexico, the National Council of Humanities, Sciences and Technologies leads scientific sovereignty and innovation policies under the principles of humanism, equity, social welfare, environmental care and conservation of biocultural wealth. This approach links existing capacities and the national STI system with international partners. Using the Penta-Helix model, it connects the traditional link between business, academia and government with society and the environment. In addition, it provides fiscal stimulus to private sector R&D and its universities provide scholarships for graduate studies.

In Peru, the National Council for Science, Technology and Innovation leads the policy on S&T for the 2025-2030 period, influenced by low economic growth, the effects of the COVID-19 crisis, climate catastrophes and the digital revolution, and has considered the development of highly-skilled human capital, innovation in the productive sectors and the creation of funding mechanisms for STI. With support from international partners, inter-ministerial programmes,

sectoral innovation laboratories and investment in public research institutes, it will promote the importance of STI to academic and business bodies.

It should be noted that Germany has a Regional Fund for TC, Spain has established a TC Programme, and the aforementioned LAC countries have governmental cooperation agencies that have facilitated the implementation of bi-regional S&T projects that have multiplied their return due to the positive impact of their projects.

In reflection, this mapping of the issues that guide bi-regional articulation focuses on a joint approach to global challenges in health, climate change and environment, energy, digitisation and AI. However, joint work for the promotion of specific programmes in the aforementioned topics needs to be deepened, including a cross-cutting examination of critical international security issues. In terms of policies and cooperation mechanisms for strengthening ecosystems in STI, bi-regional inequalities are understood to prevail. In addition, with its different programmes, the EU seems to be leading investment in human capital training due to its internationalisation and the implementation of joint knowledge infrastructures. However, LAC budgets in STI require cross-sectoral reinforcement. At the stakeholder level, on the one hand, the role of Public Universities and Research Centres is highlighted as they foster scientific networks between the EU and LAC. On the other hand, there is a need to improve networking between public sector, business, financial system and academia in order to consolidate a competitive and sustainable scientific base at the bi-regional level.

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SSC Project 'Capacity building for the generation of scientific evidence on the impacts of mountain ecosystem recovery measures on the provision of water services', between the Environmental Fund for Water Protection of Ecuador (FONAG by its Spanish acronym) and the National Institute for Research on Glaciers and Mountain Ecosystems of Peru (INAIGEM by its Spanish acronym). Image bank on South-South and Triangular Cooperation in Ibero-America. SEGIB-PIFCSS. 2024.

Triangular Cooperation in scientific networks

To deepen the value of TC in scientific networks, a case study was carried out covering partnerships in education involving natural and exact sciences (mathematics and astronomy), biotechnology (food gene editing) and health (production of medicines and vaccines) developed with S&T potential between the EU and LAC. The description of each network was based on the documental analysis of the topics of interest to the partners as well as interviews with their leading scientists.

Networks in Education

Women in Astronomy Network

The "Speak to Them: Caribbean Women in Astronomy" initiative is a TC of female astronomers from the Canary Islands Institute of Astrophysics (IAC), Spain; Caribbean Astronomy for Inclusion; the Physics Institute of the Autonomous University of Santo Domingo (IF/UASD) and partner institutions such as the Dominican Astronomical Society for pre-university-level Educational Centres in the Dominican Republic, which organises a pedagogical experience based on astronomy for young people.

The IAC is an international public reference body with the capacity to research, develop and transfer technology, disseminate knowledge and collaborate in specialised university education. The IAC programme "Speak to Them: Women in Astronomy" as a line of education and scientific outreach, was the inspiration for the triangular network. This programme has been carried out every consecutive year since 2019. The activity makes the field of astronomy and astrophysics more visible and promotes female empowerment in S&T. It provides students with professional references to encourage openness towards the discipline and promotes work projection in the exact and natural sciences without gender stereotypes.

For its implementation in the Dominican Republic, the project was mainly driven by IF/UASD and Caribbean Astronomy for Inclusion, pivotal partners in the cooperation. The female astronomers representing the association have over 20 years of experience in the field, have taken part in national and international training sessions, and create inclusive and accessible educational materials on astronomy, promoting the full professional development of people with disabilities.

Following the dynamics of the Spanish programme, but emphasising the possibilities of the discipline as a career for women and Caribbean women, six educational centres took part in the first edition

of the Dominican programme (February 2025) gathering over 100 attendees. In terms of impact, new requests were received from schools to participate in the next edition and it is planned to be extended to Haiti.

The EU and the Ibero-American Astrophysics Network have supported numerous projects that could also be associated with this coordination to motivate bi-regional actions, such as the development of "astrocamps" for university students in physics, mathematics and computing who hope to specialise in astronomy. It is also necessary to coordinate with citizens, decision-makers, academia and companies to boost prosperity from this field.

Mathematics Network

Historically, teachers from the EU and LAC have collaborated to strengthen careers associated with mathematics. In this century, the OEI, with the Spanish Federation of Mathematical Education Societies and its counterpart in Ibero-America, multiplied training actions for students and teachers from both regions. What is more, the Mathematical Union of LAC, which originally benefitted from financial collaboration with France and UNESCO, also accounts for the bi-regional link in the subject, and provides a framework for the scientific network of the Schools in Mathematics programme for LAC (EMALCA).

For the EMALCA 2025 edition in Honduras, a triangular case study, a consortium was formed with students and teachers from universities in Central America; the pivot partners being the National Autonomous University of Honduras (UNAH) and the Mathematical Association of Honduras; and the facilitator partner a node of scientists, centres and international mathematicians organisations from Europe and LAC, the Spanish Agency for International Cooperation for Development, the Spanish Cultural Centre in Tegucigalpa and teachers from universities in the United States, Spain, Mexico and Argentina.

For the UNAH, which organised a second EMALCA, this cooperation was a success shared with over 90 participants as it included courses in pure and applied mathematics in S&T focusing on solving complex control theory problems, statistics and data analysis applied to humanitarian logistics of interest to Central America. It also facilitated the exchange of knowledge between prestigious scientists and new generations on cutting-edge subjects, courses, projects and scholarships for training programmes, academic mobility and access to the networks of international research centres.

These EMALCAS, while implying logistical challenges and highlighting the economic limitations to obtaining a technological infrastructure for the use of mathematics and advancing in the training of doctorates, is an investment with impact because it boosts motivation to make the exact sciences a mechanism for achieving professional and social achievements on a national and international scale.

Given the key role played by universities in promoting scientific vocations and inclusive science without gender stereotypes, to sustain ecosystems in strategic development disciplines, EU programmes that fund international mobility opportunities for youth could be intensively promoted and new bi-regional projects developed.

Biotechnology Network

Food Gene Editing Network

Biotechnology as an interdisciplinary branch of biology, engineering, physics, chemistry and medicine, through technology applications, uses biological systems and living organisms, or parts of them, to develop solutions for society. Within this framework, among the new genetic improvement techniques, gene editing is coming forward as a specific tool that makes it possible to intervene with the DNA of an organism to add, eliminate, replace or change specific genes.

Gene editing is currently enabling researchers to improve crops by promoting the plant varieties that have increased their resistance to disease, pests and environmental stress. Innovations in vaccines and disease diagnostic kits are also expected in veterinary medicine.

In this context, there is no legislative consensus at the international level on the regulatory framework for new genetic improvement techniques, their processes and products. Some countries have conventional treatment regulations for new genetic improvement techniques in line with the Cartagena Protocol, others are conservative or even restrictive. There are even countries that have not yet promulgated legally on the topic. Biotechnology science networks contribute to the debate.

The framework for the first scientific network in agricultural gene editing in LAC is the Declaration of the Southern Agricultural Council in favour of technology (2018); the International Declaration on Agricultural Applications of Precision Biotechnology (2018) and multiple initiatives of the REDBIO, international civil association of institutions and enterprises to generate and transfer agricultural biotechnology for food production and conservation of genetic resources.

In addition, the Cooperative Programme for Technological Development of Agri-food and Agro-industry in the Southern Cone (PROCISUR) is also

highlighted, an instrument that funded the initial meetings of the Centre for Studies of New Genetic Improvement Techniques in LAC, which carried out the first regional conceptual analysis on the regulation of developments and the prospect of gene editing to improve productivity. In 2019, workshops such as "Gene editing in crops and livestock" organised by the Regional Fund for Agricultural Technology (FONTAGRO) and PROCISUR's "Myths and realities of gene editing" served to strengthen genetic improvement programmes in LAC.

Post pandemic, the implementation of the project "Gene editing for improvement in plant and animal species" (2021-2024) which benefited from funding of 230,000 USD from FONTAGRO, and funding valued at 900,000 USD from PROCISUR with institutions in Colombia and Ecuador, enabled training and scientific papers on new genetic improvement techniques for crops and animals whose products are key to food safety.

These achievements and the history of cooperation between Peru and Argentina on biotechnology regulation led to a scientific network that implemented the trilateral project "Capacity building with new genetic improvement techniques, including gene editing in Peru" (2022-2024) with the National Institute for Agricultural Innovation, officials and decision-makers from the private sector of Peru as beneficiaries, and the Inter-American Institute for Cooperation in Agriculture, the Argentine Fund for International Cooperation, the then-Ministry of Agriculture, Livestock and Fisheries, and the National Institute of Agricultural Technology of Argentina, as financial backers of exchanges on the use of biotechnologies.

As MERCOSUR biotechnology initiatives progress towards other LAC partners, the relationship between the EU and LAC in agricultural biotechnology is going through several stages. Between 2005 and 2015, biotechnology projects were funded in different production chains (meat, oilseeds and forestry) and in renewable energies by the EU-BIOTECSUR and MERCOSUR platform, which also made it possible to fuse the network of professionals and the MERCOSUR biotechnology-related library.

In 2015, in the EU, regulations on new genetic improvement techniques brought about the formation of scientific advisory teams and conferences on gene editing, in turn leading to discussions with LAC. By 2017, the EU had reports on the processes and products of new genetic improvement techniques in correlation with health and environmental protection. The EU also made progress in formulating recommendations and approved international projects with an impact on the regulation of new biotechnologies.

Currently, EU-LAC dialogues on agricultural biotechnology are being developed from forums based on scientific advice to discuss food safety, antimicrobial resistance and sustainable food systems. One prime example is the trilateral dialogue between the EU, MERCOSUR and Chile.

Bi-regional dialogue on biotechnology for food production while also protecting the environment, natural resources and health, reveals transferable scientific and technological resources, ranging from specialist networks to infrastructure for the joint development of new technologies.

The challenges of agricultural biotechnology networks revolve around multiple questions. While public Universities and Research Centres are making progress with workshops, reports, projects and training sessions that, due to their great precision, are transforming academic networks into epistemic communities with the power to influence decision-makers within the framework of legislation and protocols, from a multi-stakeholder perspective, new collaborations must be forged, the horizon being articulations that promote convergence between public-private research groups, the financial system and civil society. In terms of funding, future projects face challenges in attracting investment and the high costs of patent use. Fair, equitable and sustainable trade relations therefore need to be considered.

Health Network

Network for the production of medicines and vaccines

Health systems in LAC show major regional variability between systems in terms of access and quality. To achieve equitable levels of access to health coverage and make progress in the design and manufacture of medicines and vaccines, institutions in Cuba, the EU and United Nations bodies initiated the BIOTEC CUBA programme.

This alliance is to be developed around two triangular projects representing scientific networks as a case study, reflecting international commitment, with strong financial support from the EU, through Global Gateway, to strengthen the research infrastructure and knowledge in the field of biotechnology for health. The projects mentioned are: I. "Strengthening the R&D and innovation capacities of the biotechnology and pharmaceutical industry in Cuba", to be implemented by BioCubaFarma, the United Nations Development Programme and the University of Havana, with funding of 6,625,000 euros from the EU to train specialists in biotechnological research and strengthen the Centre for Genetic Engineering and Biotechnology Mariel SA to produce inputs and conduct clinical trials on innovative therapies; and II. "Strengthening the capacities of the National

Regulatory Authority of Cuba", to be implemented by the Ministry of Public Health of Cuba in collaboration with the Pan-American Health Organisation, with funding from the EU amounting to 1,875,000 euros. The facilitating partners will provide access to inputs, technologies and infrastructure for the National Quality Laboratory of the Centre for State Control of Medicines, Equipment and Medical Devices in Cuba. Training on global standards for regulatory authorities will also be implemented.

The articulation of partnerships between the aforementioned health networks, with active participation and funding from the Global Gateway agenda and European teams in Cuba, on the one hand, reflects international commitment to promoting competitiveness and innovation in an area of special development by generating synergies for access to funds, research infrastructure (laboratories, pilot facilities, etc.) and knowledge in the field of biotechnology for health. It also highlights the role played by Universities and Research Centres focused on human capital specialised in S&T as a facilitator for the development of technology-based businesses. But it also stresses that the sustainability of the network depends on solid research and technological productions which support the very policies that gave rise to it and the expected global impact (health services, medicines and vaccines that are safe, effective and affordable).

Mapping viral diseases in agriculture

Project: 'Development and use of biotechnological tools in animal health for the creation of a research network on viral diseases affecting commercial poultry farming', between Mexico and Uruguay. CSS and Triangular Image Bank in Latin America. SEGIB-PIFCSS. 2021.

Lessons learned for the consolidation of science and technology networks between the European Union and Latin America and the Caribbean

The mapping of problems, policies and stakeholders that form the framework of bi-regional cooperation spaces, and especially the analysis of the TC cases selected, shows that the EU and LAC have deep ties in terms of their values and policies, and are interrelated by the construction, from a multilateral perspective, of a sustainable future despite global tensions in the face of economic, social, political, technological and environmental challenges.

On the other hand, given that research and innovation, together with education, are key pillars for multi-sectoral investments in Ibero-American priorities, recommendations for strengthening TC around scientific networks that foster strategic alliances between the EU and LAC were examined versus the planning challenges therein; the UNESCO Recommendation on Open Science (2021) and the active involvement of scientific diplomacy in correspondence with key indicators for the internationalisation of S&T.

The aforementioned challenges questioned networks on the articulation of times and dynamics of coordination with the different levels of government, stakeholders, resources, systems, instruments, practices and learning that allow them to operate. Consequently, they elaborated on their strengths and weaknesses to implement research, train and mobilise researchers, foster

collaborative infrastructures and develop scientific and technological products.

In this respect, it was noted that the triangular partnerships described required pre-existing links between stakeholders who share a vision for the construction of a sustainable future at regional or global level for their initial action, and that they need to consolidate the combination of multiple partners, new expectations or alternative approaches, plans, skills, resources and solid actions in times of crisis.

The networks' triangular partnership is based on their strong professional links, especially between researchers - with post-graduates -, and academics and public sector STI managers. This showed that it will be essential to extend CT towards a greater number of scientists and decision-makers on external relations, and integrate the private sector and Development Banks, providing economic impact approaches that facilitate specialised knowledge transfer. On the other hand, civil society must be mobilised to add value to network governance. When exploring the action of networks in the face of limitations caused by scenarios such as the COVID-19 pandemic, it will be essential to expand the new ICTs infrastructures.

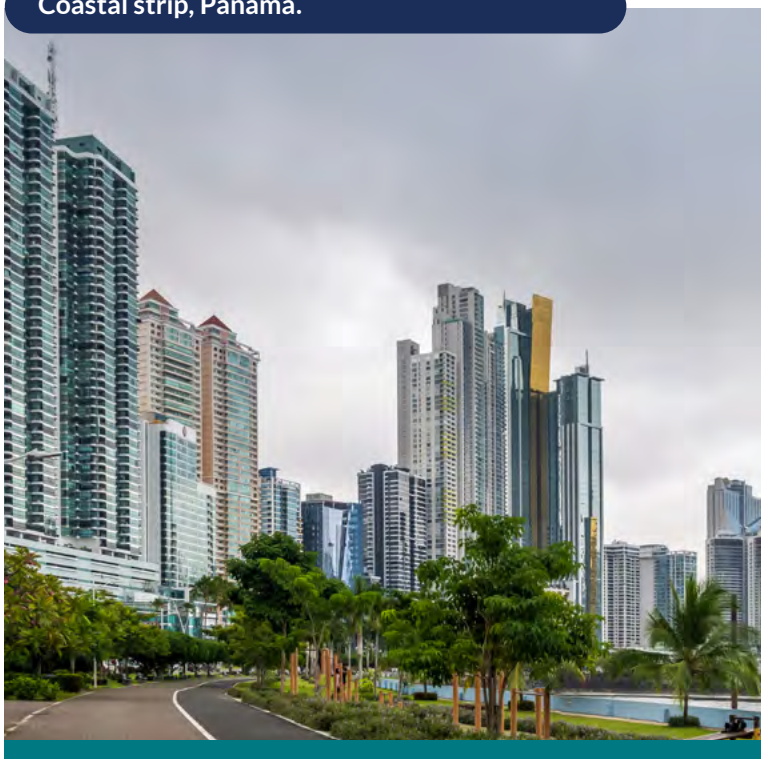
Given the challenge of pluritemporality, initiatives must be contemplated where the relationship between policies, plans, funding and actions that facilitate the operation of networks is observed from the continuous improvement of human capital and infrastructure in S&T. In the short term, they must scale in interaction with ongoing government programmes and foster spaces for knowledge management; in the medium term, they can foster academic and/or scientific-technological agreements to complement resources. In the long term, they must consolidate foresight analysis units for the development of goals, plans and projects that transcend the current economic situation and focus on innovation for human development.

On the other hand, in CT spaces, scientific networks are inherently multi-scale, and by contemplating topics such as equality, inclusion, trade and social welfare they move towards a cross-sectoral collaboration. Transnational coordination of a regional or global nature predominates, with different management challenges in terms of maximising resources and interacting with the different levels of government. The coordination dynamics need to strengthen their links with national and provincial or state governments, especially in the area of partners benefiting from said cooperation. The new bi-regional, multi-level roadmaps could cover everything from updating the nature of partnerships to defining joint investments between public and/or private research centres for product development as well as competitive services and technology-based enterprises. Transversally, all networks require formal monitoring and evaluation systems with specific tools for measuring impact indicators.

On the other hand, to strengthen TC around scientific networks, it has been observed that promoting the open science paradigm (scientific knowledge and open infrastructure, active participation of social partners and dialogue between different knowledge systems) will increase capacities among researchers and countries; deepen strategies for access to knowledge with quality and integrity; achieve maximum levels of equity and justice by promoting fairness between partners; and, through diversity and inclusion, lead to open dialogue with the knowledge of multiple social agents.

In another area, in order for the bridges spanning the epistemic communities in STI and diplomacy in TC to strengthen the bi-regional strategic partnership, stakeholders, agreements and cooperation mechanisms and articulation with a forward-looking approach need to be consolidated. While TC and S&T as an active challenge to scientific diplomacy facilitates the articulation between different partners and even improves international relations, in the field of education, it indicates that resources must be made visible and mobilised to value good science and technology teaching practices, given their transformative potential in the face of problems that are detrimental to sustainable development. Cutting-edge S&T topics with links in production systems and markets, such as biotechnology innovations, generally encourage regulatory science diplomacy that, to thrive at the bi-regional level, will have to explore new spaces for dialogue and collaborative agendas and even create bi-regional foresight analysis units in STI. Humanitarian science diplomacy, which promotes global public goods such as health, urgently needs to create stable partnerships to anticipate the strategic management of STI.

Coastal strip, Panama.



3 Recommendations

Given that TC, in scientific networks, drives part of the bi-regional innovation engine, bi-regional research teams should be encouraged to participate actively in the elaboration and implementation of future agendas for R&I cooperation as well as investment strategies promoted by instruments such as EU Global Gateway-LAC.

In order to position education and research stakeholders in the definition of strategic policies and investments, actions supported by government directorates for traditional EU and LAC international partnerships need to be promoted given their experience in the management of development policies that promote competitive products, processes and services.

On the other hand, from metatheory to praxis, the development of a project to create bi-regional, intersectoral and multi-stakeholder collaborating centres on strategic issues for Ibero-America has been proposed. While this study was being carried out, a multiplicity of scientific networks of south-south and/or triangular cooperation on issues of interest to the EU and LAC were observed with potential for scaling up (triangular or multilateral) to a bi-regional level and even with other continents. In order to further examine these networks, it was proposed to form the aforementioned centres around a sequence of specific actions. To evaluate the priority areas of these devices, first, a mobile application could be designed and launched with specialised digital tools and a user guide disseminated by the government units of Ibero-American cooperation to public and private Universities and Research Centres in order to build capacities and resources to propose new bi-regional partnerships.

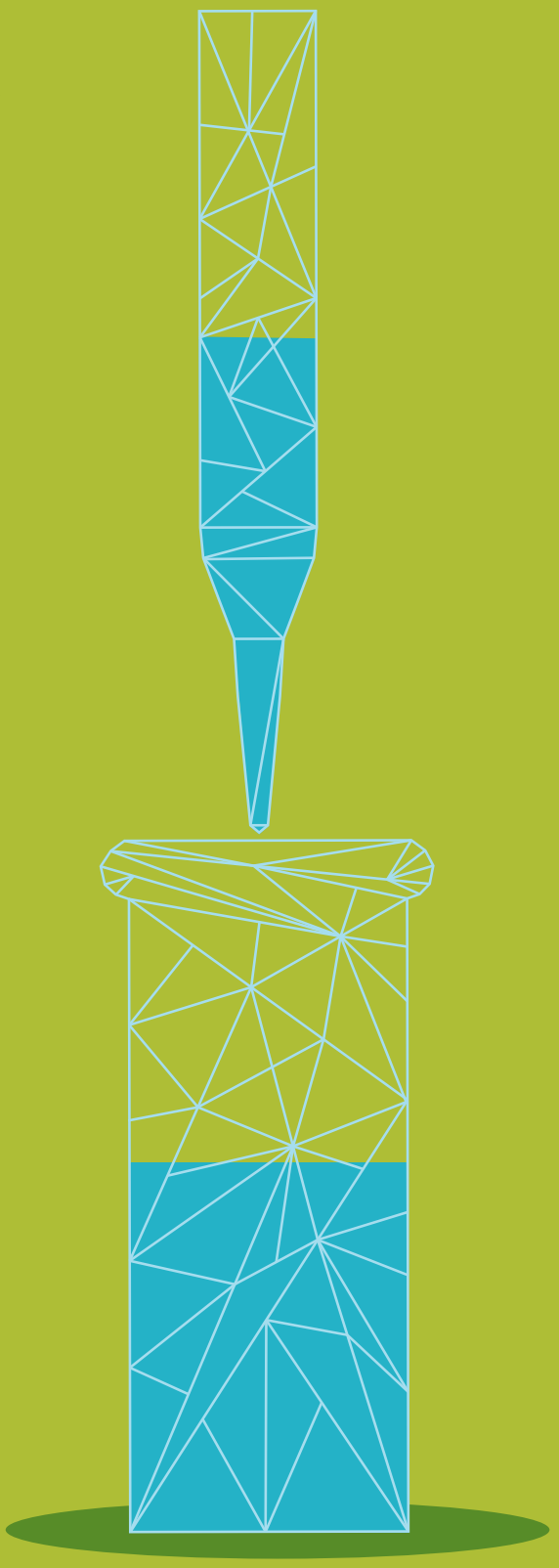
After identifying the new networks that could be developed and evaluating their competitiveness with a committee of experts, from the Ibero-American area, in a consensual way, the priority associations would be selected for presentation to a hybrid forum before chambers from the private sector, the financial system, non-governmental organisations and stakeholders developing products or providing services complementary to the networks. The forum should create an exchange environment that allows participants to establish contacts, share problems and find joint solutions, with financial contributions to encourage knowledge transfer, the mobility of researchers and training of specialists, and the promotion of shared intellectual property. This proposal would be monitored by a bi-regional team of specialists in S&T public-private partnerships management and international relations.

The ratio between the cost of developing the partnership centre, the application for capacity mapping, setting up the forum and putting together the monitoring team in correlation with the negative consequences of disinformation and disarticulation provides sufficient justification to find funds for the implementation of a pilot project initiative.

In conclusion, promoting triangular links of scientific and technological cooperation between the EU and LAC, maximising the value of the resources made available by Universities and Research Centres in order to enhance the actions of epistemic communities with multi-stakeholder knowledge ecosystems and investments in innovations on strategic issues of bi-regional interest all has a positive impact on global development governance.

Conservation of endangered species and ecosystems.

Technicians and scientists from Brazil and Colombia exchanged experiences on animal welfare, environmental education and participatory conservation. Through SSC, these countries also aim to strengthen the social role of zoos as a key element to raise awareness of biodiversity and the importance of existing ecosystems, contributing to environmental preservation. Image bank on South-South and Triangular Cooperation in Ibero-America. SEGIB-PIFCSS. 2022.



Triangular Cooperation in science and technology networks

Executive summary

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