



The São Paulo School of Advanced Science for a Sustainable and Inclusive Amazon

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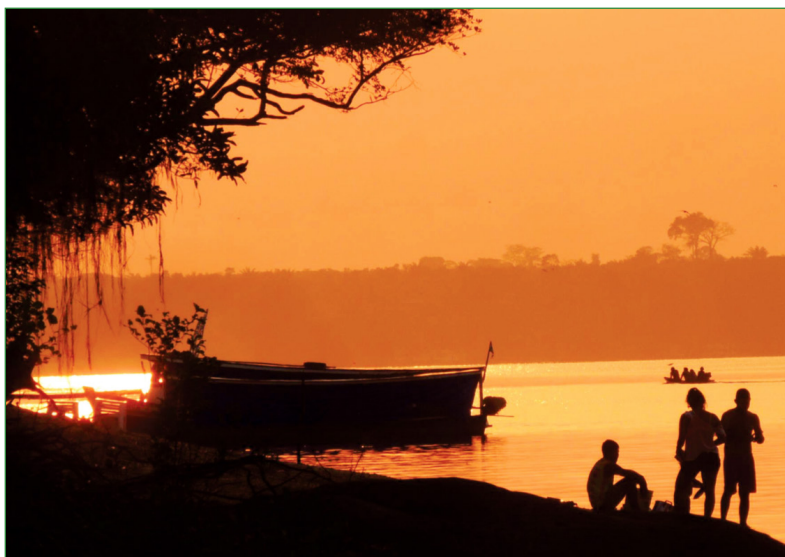
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ABSTRACT

Between November 21 and December 5, 2022, the São Paulo School of Advanced Science for a Sustainable and Inclusive Amazon (SPSAS Amazon) took place in São Pedro, São Paulo, as part of the Amazon Initiative by the São Paulo Research Foundation (FAPESP). The aim of ESPCA Amazon was to contribute to the training and capacity-building of students, researchers, and professionals in the field of Biodiversity and Ecosystem Services who will be leading academic and research centers, government agencies, companies, industries, international organizations, and various other sectors and institutions in the future. The content of the school was organized into three main themes: The Amazonian territory and its sustainability, Amazonians as key players in Biodiversity Conservation and Climate Change Mitigation, and the Amazon and its inhabitants in harmony with their environment and the Sustainable Development Goals (SDGs). The results of the experiences and learning acquired in this process are captured in the works that make up this e-book.

Keywords: Interdisciplinarity; networking; ecosystem services, biodiversity and ecosystem services conservation; social participation

Contextualization

In mid-2021, at the initiative of the then Scientific Director of FAPESP, Prof. Luiz Eugênio Mello, the four Strategic Programs of FAPESP¹ began to discuss the possibility of a major research initiative in the Amazon. At that time, FAPESP had a history of funding around half a billion reais in excellent research on the Amazon theme. However, it was evident that there was a lack of integration among these initiatives and a disconnect with the social and human dimensions of the research.

These internal discussions led to two working meetings in which the main goal was to unite efforts and broaden the discussion of the Strategic Programs with experts in the field, particularly local stakeholders. Furthermore, the purpose was to outline what would be and how to implement an innovative, interdisciplinary research agenda with a focus on socio-biodiversity.

The meetings took place virtually on April 27 and 29, 2022, and brought together 64 participants from different states and sectors (academia, industry, and the third sector). The question, "What scientific research is necessary for a sustainable transition in the Amazon region?" guided the discussions on the first day, with the main objective of defining the priority issues that would be the focus of the first call for research projects. The outcome of this discussion was published as a central table in item 3 of the Proposal Call launched in June 2022, summarizing the main priority research areas for the region.

These discussions were used as input for the second-day debate on arrangements that would facilitate innovative research to advance solutions to the region's problems. The outcome of the discussion was a portfolio of possibilities for each State Research Support Foundation to assess the most suitable arrangements for use in future calls with a focus on innovation.

In parallel, in response to a challenge from the President of FAPESP, the National Council of State Research Support Foundations (Confap) progressed in discussions to create an agenda to identify a broad range of concrete research challenges that would provide solutions to real issues in the Legal Amazon. The maturation of these discussions led to the establishment of the Amazon Initiative +10, which, still in 2022, launched its 1st Research Call, involving the participation of 20 State Research Support Foundations. This call engaged more than

1. Research Program on Characterization, Conservation, Restoration and Sustainable Use of Biodiversity (BIOTA); Research Program on Bioenergy (BIOEN); Research Program on Global Climate Change and Research Program on eScience and Data Science.

500 researchers from 18 states plus the Federal District and resulted in the approval of 39 research projects in three major thematic areas: Territory, Amazon Peoples, and Strengthening Sustainable Productive Chains.

Another relevant parallel action was the event “How can research and research councils contribute to the sustainable development of the Amazon region?” held in 2022 during the annual meeting of the Global Research Council. The event, organized by FAPESP and the NWO (Dutch Research Council), involved the engagement of the Inter-American Institute for Global Change Research/IAI and resulted in the decision to approach the Belmont Forum regarding the possibility of an international call focused on Tropical Forests, particularly the Amazon. These discussions have evolved, and soon the Belmont Forum is expected to launch a call for a Collaborative Research Action (CRA) with this objective.

Returning to the discussions promoted by FAPESP’s Scientific Directorate, in late 2021, there was significant debate about the need to train researchers interested in conducting research in the Amazon region, particularly in transdisciplinary research. This realization led to the development of a proposal for a São Paulo School of Advanced Science (ESPCA) focused on training young researchers from the Amazon, which has always been considered a biome that extends into neighboring countries. The establishment of the São Paulo School of Advanced Science for a Sustainable and Inclusive Amazon emerged from the intersection of all the discussions presented here, which aimed to create a research agenda for the region.

SPSAS Amazon structure

Always in collaboration with researchers and institutions from the Amazon region, the first step was the establishment of the Organizing Committee² to create the program. From the outset, the Committee defined that “The objective of the Sustainable and Inclusive Amazon ESPCA is to provide young postdoctoral researchers (in the final stages of their doctorate) with a multidisciplinary and interdisciplinary perspective, based on science and valuing indigenous and

2. Composition of the Organizing Committee: Carlos Alfredo Joly, Simone Aparecida Vieira (BIOTA), Paulo Artaxo (Mudanças Climáticas), Glaucia Souza (BIOEN), Eduardo Cesar Leão Marques (eScience), Marie-Anne Van Sluys (DC FAPESP), Adalberto Val (INPA), Marluca Bonifacio Martins (MPEG), Helder Lima de Queiroz (MAMIRAUÁ), Ane Alencar (IPAM), Gustavo F. V. Silveira (OPAN), Altigran Soares da Silva (UFAM), Marcella Ohira (Inter-American Institute for Global Change Research/IAI).

traditional knowledge, of the main problems that have historically hindered sustainable development, conservation, and social inclusion in the Amazon Biome. It also aims to discuss the existing alternatives for these fronts and collaboratively build new proposals for solving these issues with these young scientists."

In addition to researchers, the organization had the invaluable support of a group of young researchers who not only collaborated in setting up the school but also volunteered to assist with all ESPCA activities as monitors, as well as organizing essential participant integration activities³. In the discussions for the school's organization, the importance of incorporating the inclusive aspect was strongly emphasized, both in its structure and in relation to the selection of participants and the topics to be addressed throughout the course.

Thus, for the selection of participants, criteria for diversity and inclusion were discussed and implemented, with special attention given to candidates with a direct connection to the Amazon and those with family ties to traditional Amazonian peoples.

Diversity and inclusion criteria were discussed and implemented to select the participants, with special attention to candidates with a direct relationship to the Amazon and kinship with traditional Amazonian peoples. A total of 88 out of 121 candidates were selected, giving priority to participants linked to the Amazon region as a whole, i.e., from all the countries that share this biome. At the end of the process, 60% of the participants were Brazilian and 40% from Amazonian countries such as Bolivia, Colombia, Ecuador, Peru, Suriname and Venezuela, and non-Amazonian countries such as Guatemala, Mexico, the United States, Italy, and the Netherlands.

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3. Team of monitors: Alice Ramos de Moraes (Pós doutoranda no Centro de Síntese em Biodiversidade e Serviços Ecossistêmicos/SinBio e à época, atualmente pós-doutoranda no Núcleo de Estudos e Pesquisas Ambientais da Universidade Estadual de Campinas/NEPAM-UNICAMP e jovem pesquisadora da Plataforma Brasileira de Biodiversidade e Serviços Ecossistêmicos/BPBES); Gabriela Braschi Berro (Doutoranda do Programa de Pós-Graduação em Ecologia da Universidade Estadual de Campinas/UNICAMP); Laura Barbon de Abreu (Mestranda do Programa de Pós-Graduação em Ecologia da Universidade Estadual de Campinas/UNICAMP); Henrique Simões de Carvalho Costa (Doutorando do Núcleo de Estudos e Pesquisas Ambientais da Universidade Estadual de Campinas/NEPAM-UNICAMP); Rafael Flora Ramos (Doutorando do Programa de Pós-Graduação em Ecologia da Universidade Estadual de Campinas/UNICAMP); Luis Carlos Quimbayo Guzmán (Doutorando do Programa de Pós-Graduação em Ecologia da Universidade Estadual de Campinas/UNICAMP); Victor Campos Khuriyeh (Bacharel em Ciências Biológicas pela Universidade Estadual de Campinas/UNICAMP, vinculado ao Laboratório de Ecologia e Manejo de Ecossistemas/LEME, do Núcleo de Estudos e Pesquisas Ambientais / NEPAM-UNICAMP).

The focus on inclusivity at SPSAS led to the provision of simultaneous translation services for the lectures held throughout the entire period. This allowed for presentations and contributions from participants in three languages – English, Spanish, and Portuguese. As a result, everyone felt more comfortable absorbing the content and making their contributions in their preferred language. In activities where simultaneous translation services were not possible, such as technical visits or integration dynamics conducted in other spaces, the participants themselves assisted one another, contributing to a collaborative, attentive, and respectful environment.

Taking into consideration the ongoing COVID-19 pandemic and the fact that SPSAS is an event with a large number of participants coming from various parts of the world, there was a concern regarding the sanitary protocols to be followed. The support of the Health Department of the city of São Pedro/SP (where ESPCA was held) was requested, and all those involved were tested on the first day. Furthermore, the use of masks in indoor spaces was consistent, and rapid tests were available in case any participant displayed symptoms.

Regarding the course structure, the focus on sustainability and inclusion led to the definition of the three modules of ESPCA Amazon: 1) The Amazonian territory and its sustainability; 2) Amazonians as key players in Biodiversity Conservation and Climate Change Mitigation; and 3) The Amazon and its inhabitants in harmony with their environment and the Sustainable Development Goals (SDGs).

In the first module, the following topics were presented:

- ◆ *Vision of inter and transdisciplinary research – decolonizing methods*, by Anita Hardon (NWO).
- ◆ *Characterization of the geological evolution of Amazonian ecosystems*, by Paulo Eduardo de Oliveira (USP);
- ◆ *The Amazon hydroclimatic system, water recycling, and climate regulation in the Amazon*, by Marcos H. Costa (UFV);
- ◆ *The carbon cycle in the Amazon*, by Luiz Eduardo O. C. Aragão (INPE);
- ◆ *Atlantic Forest: an unexpected forest*, by Simone A. Vieira (UNICAMP);
- ◆ *The changing Amazon in the context of our new climate*, by Paulo Artaxo (USP);
- ◆ *Evolution of the Amazonian biota*, by Alexandre Aleixo (Natural History Museum of Finland);
- ◆ *Impacts of climate change on amazon fish*, by Adalberto Val (INPA);
- ◆ *The evolution of Amazonian flora and the effects of human domestication*, by Mônica Moraes (UMSA);

- ◆ *The ancient history of the Amazon and its connections with cultural and biological diversity*, by Eduardo G. Neves (USP);
- ◆ *The historical depletion of Amazonian bioculturality*, by Nicolás Cuví (FLACSO Ecuador);
- ◆ *Characterization of the main drivers of climate change and loss of biodiversity and socio-diversity*, by Philip Fearnside (INPA);
- ◆ *Conservation policies for protected areas and indigenous territories in the amazon from the past to the present*, by Thiago Mota Cardoso (UFAM);
- ◆ *Impacts of deforestation on infectious diseases and public health in the Amazon*, by Marcus V. G. Lacerda (FIOCRUZ Manaus);
- ◆ *Amazon + 10 Initiative*, by Luiz Eugênio Mello (DC FAPESP).

In the second module, the presentations were:

- ◆ *Bioeconomy: a future for the Amazon*, by Lauro Barata (UFOPA);
- ◆ *The fishing management of the Paumari indigenous people seen from other perspectives*, by Gustavo F. V. Silveira (OPAN);
- ◆ *Biocultural diversity and governance in the amazon: knowledge exchange and socio-environmental justice*, by Simone Athayde (Florida International University);
- ◆ *The contribution of Amazonian populations to ecosystem services*, by Helder L. Queiroz (Mamirauá Sustainable Development Institute);
- ◆ *The Amazonian Institute for Scientific Research – SINCHI Colombia*, by Juan Felipe Guhl Samudio (SINCHI);
- ◆ *Conservation measures to address the main threats to biodiversity, ecosystem services, and carbon stocks in the Amazon*, by Ane Alencar (IPAM);
- ◆ *Geospatial databases on the Amazon*, by Carlos M. de Souza Junior (IMAZON);
- ◆ *What can AI do for socio-environmental research?*, by Thiago Santos Gouvea (DFKI);
- ◆ *Initiatives to synthesize existing knowledge to advance governance for sustainability issues*, by Andrea Carolina Encalada Romero (USFQ).

In module 3, the program included:

- ◆ *The contributions and role of the third sector for conservation and sustainable use of biodiversity and in climate change in the Amazon*, by Paulo Moutinho (IPAM);
- ◆ *Models and options for ecological restoration of Amazonian formations*, by Ricardo Ribeiro Rodrigues (ESALQ-USP);

- ◆ Contemporary urbanization in the Amazon: territorial systems and the Parintins micro-region, by Estevan Bartoli (UEA).

In the third module, the lectures *Organizational Processes and social technologies that drive sustainable development, including cultural development and Tourism in the Amazon* (by Nelissa Peralta, Institute of Philosophy and Human Sciences-UFPA); and *Connecting and sharing diverse knowledge to support sustainable pathways in the Amazon* (by Francisca Arara, Regional Committee for Partnerships with Indigenous Peoples and Other Traditional Populations) were planned. Unfortunately, the speakers were unable to attend.

In addition to these presentations, we had an opening lecture entitled *The Amazon near a point of no return: the urgent need for a new bioeconomy of standing forest*, by Carlos A. Nobre (IEA/USP), and the closing lecture *Decolonizing Futures: Amazon beyond sustainability*, by Fábio Scarano (UNESCO Chair of Futures Literacy & UFRJ).

SPSAS dynamics

At the end of Modules 1 and 2, moments of discussion were organized involving all the speakers. Initially, they briefly presented their respective institutions, and then, collectively (including participants), they focused on specific issues. Some topics addressed included: the allocation of human resources for research in the region; the need for training in transdisciplinary research; difficulties in organizing productive chains, especially for seasonal products; the lack of integration among multiple actions and the respective databases generated; and the new problems brought about by the rapid expansion of organized crime and its impact on traditional communities and indigenous areas.

Integrative activities

The schedule of SPSAS Amazon included integration activities among participants, carefully designed and executed to incorporate lectures and other intellectual activities. The initial integration activities primarily focused on breaking the ice and fostering connections—after all, SPSAS brought together a diverse constellation of participants from 12 different nationalities, with professional and personal affinities, who would live and work together for the following two weeks. Subsequent activities were developed to permeate issues addressed during the lectures and, in this way, create opportunities for subjects to be revisited and deepened in a context alternative to conventional academic presentations and discussions.

In summary, the integration activities aimed to foster conditions for creating a welcoming and relaxed environment that encouraged participants to get to know and connect with each other beyond names, home institutions, and academic backgrounds. With this spirit, the broadcasts of the Brazilian men's national football team's matches in the FIFA World Cup were accommodated in the schedule as moments of integration among the attendees. The poster sessions were also designed to contribute to establishing connections among participants.

Poster session

In the SPSAS schedule, two moments were allocated for poster presentations early in the first module, with 40 participants in each session. Each participant provided a brief introduction to their interests and recent research lines, as well as the main motivations, questions, and challenges they identified regarding a sustainable and inclusive Amazon. Participants were also encouraged to share their expectations for SPSAS, possible suggestions for collaborative work, and how this collaboration could contribute to their own research agendas.

Participants whose current research topics were similar or complementary were placed in the same session, facilitating the exchange of information and experiences. Everyone in attendance visited the presentations, making it one of the initial moments of integration and networking, which intensified over the course of the days. It is worth mentioning that one of the lecturers said, at the end of the second poster session, that this was one of the best presentations he has participated in, due to the lively discussion among participants.

Technical visit to Natura Cosmetics

During Module 2, there was also a visit to the Natura Cosméticos factory in the municipality of Cajamar/SP. The purpose of this visit was to showcase, on-site, the effective viability of having an industry based on the active principles of Amazonian biodiversity in a sustainable manner. As preparation for this visit, starting from the beginning of Module 2, biologist Camila Brás Costa, Scientific Manager of plant species bioprospecting with cosmetic potential, began accompanying SPSAS Amazon to understand the focus on the sustainable development of the Amazon and to connect with the participants, addressing various questions from the participants about Natura's activities.

During the visit, Natura professionals discussed the company's activities specifically related to the use of Amazonian bio-ingredients extracted in partnership with traditional communities through the Natura Amazônia Program, and how this currently contributes to the conservation of two million hectares of

standing forest. Optionally, Natura also offered the opportunity to participate in a workshop aimed at encouraging potential project proposals in collaboration with the company through the Natura Campus Hard Life Science.

Group work

In addition to lectures, posters, integration activities, and the visit to Natura, over the first ten days of SPSAS Amazon, participants engaged in various group activities as part of the dynamics used in each module. At the end of Module 2, with guidance from the faculty team and monitors, participants organized themselves into groups of up to ten people. Each group consisted of participants with backgrounds in both natural sciences and social sciences and humanities, coming from different countries.

This dynamic resulted in the formation of ten groups that worked intensively throughout the second half of the SPSAS to define their respective work themes. In this process, they could rely on the support of monitors and presenters for refining ideas, defining and refining the scope, as well as engaging in exchanges and receiving feedback from other participants.

Final remarks

SPSAS Amazon was a unique experience that brought together speakers and participants from various Amazonian countries, with backgrounds in both natural sciences and social sciences and humanities, and with vastly different previous experiences. They set out and achieved the goal of working in an interdisciplinary manner. Although the choices of topics by the groups were not unanimous, naturally leading to tensions at the beginning of the work, everyone committed to producing a rich and unprecedented contribution that could serve as a reference in the future. The works produced, compiled and organized in this e-book, result from the combination of previous experiences, knowledge, and lessons learned – individually and collectively. They, therefore, reflect the participants' learning and maturation.

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Ethics – This study does not involve human subjects and/or clinical trials that should be approved by the Institutional Ethics Committee.

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