TYAN Educational and research program for Sustainable Development in LDCs and S&TLCs (TEACH 4 SD)

Mission: Hands on schools and training courses for students in LDC and S&TLCs.

Document Title: 4nd TYAN Hands on Schools. Bolivia-2025

Date: October, 06-10, 2025

Place: La Paz, Bolivia

Rationale:

This project proposes a collaborative network among Latin American countries and Bolivia, with a focus on connecting Bolivian universities with science, technology, and innovation in the agroindustry and environmental science.
Based on the experience of the 2023 and 2024 hands on Schools, it has been possible to identify the need for the next edition to focus on the agro-industry sector, given the country's food security needs. Food security in Bolivia and the region is a crucial issue, closely linked to the fight against poverty. Recognising it as a fundamental right is an indispensable step towards a more just and equitable society.
On the other hand, it is important to promote a revaluation of food in Bolivia and the region, recognising its importance for health, culture and economic development, through scientific research for the development of new products and production processes that allow improving the quality and competitiveness of food in the region.

This initiative, led by TWAS (The World Academy of Sciences) through its Young Affiliates Network (TYAN), seeks to strengthen scientific collaboration between Bolivian researchers and their counterparts across Latin America. By fostering international scientific programs, the project aligns with UNESCO's mission to promote peace, eradicate poverty, and drive sustainable development through scientific exchange.
Recognizing the transformative power of science in developing countries, TYAN aims to bridge the gap between local science academies and universities, particularly in smaller and least developed countries within Latin America and the Caribbean. To achieve this, the initiative proposes sending representatives to these regions to conduct workshops and courses on broad scientific topics, facilitating communication and fostering collaborative project development.

This new version of the hands-on school is organised within the framework of the Memorandum of Understanding between UMSA and UNESCO, signed in March 2024.

This initiative empowers researchers and professionals with the skills to drive sustainable innovation in Bolivia's agroindustry, positioning it as a regional hub for new food solutions and enhanced food security. By fostering collaboration among participants, educators, and local researchers, the project promotes a shared commitment to a resilient and sustainable food system for the region.

Outcomes of hands of school 2023

- Publication on Nature
- Publication in Catedra (institutional journal)
- Sedenka Moscoso's experience of setting up her own laboratory, inspired by Professor Brown's course

- MEMORANDUM OF UNDERSTANDING (MoU) BETWEEN THE UNIVERSIDAD MAYOR DE SAN ANDRÉS (UMSA) AND THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION (UNESCO)
- Associate Editors of the Annals of the Brazilian Academy of Sciences (Pablo Bolaños, Franco Cabrerizo and Leslie Tejeda)
- Many local notes on the Summer School were published on social media and television.
- Many social media notes from TWAS network
- Visit to the Argentine Ambassador in Bolivia, who facilitates the meeting with the Ministry of Science and Technology, the Bolivian Nuclear Energy Agency and the Bolivian Space Agency.

Hands on school 2024

- "Hands-on Learning for Sustainable Development in the "Global South", special issue of Culture Science (eight articles) from Chinease Academy of Science
- Submitted article of Oca, as collaboration between INTECH and Food Chemistry Department (UMSA), short stay in Argentina
- Submitted article of Lucuma, as collaboration between INTECH and Food Chemistry Department (UMSA), short stay in Argentina
- Jerry Soliz applied for Argentinian funding for a postdoctoral position, support teacher in the photochemistry course.
- Grover Castañeta granted CONICET funding for doctoral studies, student in photochemistry course
- TYAN-TWAS supported IX Bolivian Congress of Soil Science
- Visit to the ambassadors of Brazil and Ecuador in Bolivia, with the possible collaboration of the Brazilian embassy.

Execution:

Three international representatives from TYAN will visit a local university and join local TYAN instructors. They will deliver six parallel hands-on training courses, sharing their knowledge and expertise with the local students and researchers, and fostering a sense of global scientific community.

Budget requested:

Flights and accommodation three TYAN members (speakers). We encourage partnerships with local institutions.

Airfare and accommodation for four TYAN members who will act as trainers (Argentina, Nicaragua and Brazil). These requested funds will provide insurance for the organisation, as the organisers will seek additional support from other partners according to the following proposal:

- A stipend for one ticket from Argentina, Nicaragua and Brazil will be requested from TYAN-TWAS.
- Accommodation and local transport will be requested from local institutions, such as the Universidad mayor de San Andrés (UMSA), which has an agreement, Brazilian embassies in Bolivia and other partners in Bolivia.

Benefits to TYAN: The project can provide valuable information about the local scientific environment in each country. The establishment of personal relationships may allow for long-term

contact with TYAN-TWAS. Contact with scientists from other countries may facilitate the creation of young science academies more open to cooperation and scientific exchange.

Expected outcomes:

This hands-on training program, focused on sustainable innovation in Bolivia's agroindustry, aims to:

1. Strengthen Food Security: Equip participants with the skills and knowledge to develop innovative solutions for food production, processing, and distribution, contributing to a more resilient and secure food system in Bolivia and the region.
2. Establish Bolivia as an Innovation Hub: Position Bolivia as a regional leader in sustainable food innovation, attracting international collaboration, investment, and expertise.
3. Boost Research Capacity: Enhance the research capabilities of participants, enabling them to contribute to scientific advancements in the field of agro-innovation.
4. Foster Collaborative Networks: Encourage long-term collaboration between participants, teachers, students, and researchers, creating a dynamic ecosystem for knowledge exchange and development.
5. Promote Sustainable Practices: Cultivate a shared understanding and commitment to sustainable food production practices, reducing environmental impact and promoting resource conservation.
6. Connect with Global Networks: Facilitate long-term engagement with TYAN and TWAS, providing participants with access to global scientific resources and opportunities.
7. Drive International Collaboration: Encourage future collaborative research projects and scientific exchange between Bolivian and international researchers, fostering knowledge transfer and innovation.

Host Institution:

Bolivia ranks in the last places of scientific and innovation development, not only in the region, but also in the world. The Bolivian relation of the investment in R&D with the GDP (0.3%) and expense in science and technology per capita ($us 3.0) are considered low. However, Scientific and innovation activities of the country show a slight improvement in recent years. The Bolivian Plan of Economic and Social Development (PDES) 2016- 2020 establishes the general guidelines for the integral development of the country in the context of living well; these guidelines frame the actions of public, private and community actors. Within this framework, the Bolivian policy of Science, Technology, and Innovation (National Plan of Science and Technology - PNCT, VCyT-MINEDU) takes up three pillars of the PDES: - Scientific and technological sovereignty with its own identity. - Productive sovereignty with diversification and integral development. - Sovereignty over our natural resources with nationalization, industrialization and commercialization in harmony and balance with Mother Earth. In this context, the Bolivian State has strengthened the Bolivian System of Science, Technology, and Innovation (SBCTI) defined as the set of interrelated and complementary actors, which in a coordinated and constructive way contributes to the generation of innovative responses and solutions, with scientific and technological basis, to the current and forecasted challenges and needs of strategic national sectors. Additionally, in accordance with the PNCT, the Executive 2 de 34 Committee of the Bolivian University (CEUB) has elaborated the National University Strategy for Science, Technology and Innovation and the National University

System of Science and Technology. The national science, technology, and innovation plan of Bolivia (PNCTI-2013) is to contribute to the transformation of the country's productive matrix, through the strengthening of the normative and institutional bases related to science, technology, and innovation.

The Universidad Mayor de San Andrés is one of the most prestigious universities in Bolivia and has the moral responsibility to collaborate in the construction National Science, Technology, and Innovation Plan of Bolivia (PNCTI), as part of one of the fundamental pillars of the Bolivian patriotic agenda 2025 and in this way respond to the needs of the region and the country.

The Universidad Mayor de San Andrés, (usually known by the acronym UMSA) is the main public university of the Plurinational State of Bolivia, established in 1830 in the department of La Paz (seat of government) and deployed throughout it, the capital city, and its provinces in 4 Regional University Centers and various Local University Headquarters, currently has 14 faculties and 54 careers. UMSA is the second oldest university in Bolivia, after the Universidad San Francisco Xavier de Chuquisaca (1624), and the most representative of the Bolivian University System.

In the ranking of the best universities in the world (World University Rankings) LATAM and QS (Quacquarelli Symonds) published in 2021 that the Universidad Mayor de San Andrés ranks first in Bolivia for the fourth interrupted year and is in 128th place in the position of the Latin American Universities (https://www.topuniversities.com/universities/universidad-mayor-de-san-andres-umsa).

In recent years, UMSA has consolidated the culture of research in undergraduate students with the preparation of theses in lines of doctoral training, anticipating future scenarios that require a broad and solid human resource base in research and postgraduate studies.

UMSA currently has 51 Research Institutes from all areas, which support the different strategic lines of research, such as; research management, social interaction and innovation, agri-food, natural resources and biodiversity, technological and productive development, and health.

However, information from 2017 shows that there are 2,402 professors at UMSA between regular, contracted, invited, and interim, of which 1,765 (73%) are men and only 637 (26%) are women. The numbers show that it's necessary to build a solid role model for women, supporting the generation and dissemination of knowledge, which contributes to promoting equitable and sustainable development (Goal 5-SDGs).

In addition, UMSA has the support of two large international cooperation agencies such as the SIDA Program (Swedish International Development Agency) and COSUDE (Swiss Agency for Development and Cooperation). The Swedish cooperation program has supported the training of new doctorates for more than 20 years, with the successful management of several research and social interaction projects. Due to this relationship the UMSA has reached a critical mass of instructors with postgraduate degrees.

MISSION

To train and educate highly qualified professionals, with commitment and social responsibility, with reflection and critical thinking, entrepreneurs, and builders of a fair and inclusive society. Promoting innovation integrated to the State, society, and the international scientific and academic community, promoting the progressive transformation in search of improving the quality of life of the population.

VISION

Research, entrepreneurial and innovative university with international recognition, valued for its contribution to the generation of knowledge and training of leading professionals in the revolution of thought with responsibility and commitment to the service of society.

GENERAL OBJECTIVE

Achieve interdisciplinarity, concurrence, and interaction of the research carried out by the Universidad Mayor de San Andrés to increase the efficiency and effectiveness of teaching, social interaction, research and innovation, and dissemination, as a basis for knowledge management.

Courses

Theoretical-practical courses on topics related to science, technology and innovation in the agro-industry. The theoretical courses are aimed at undergraduate and postgraduate students, and the practical courses are aimed at postgraduate students only, the full programme courses will be covered in five days.

1. Food technology and nutrition (Leslie Tejeda and Maurico Peñarrieta, Bolivia)

2. Animal Models in Food Science: Exploring Developmental Biology & Ecotoxicology (Gloria Rodrigo and Sdenka Moscoso)

3. Photochemistry: A Powerful Tool for Food Science and Technology (Franco M. Cabrerizo, Argentina)

4. Escalation of spray drying techniques in food formulation (Cristian Carrasco)

5. Sustainable production of crop genetic resources, wild and semi-wild relatives (TYAN-TWAS member)

6. Biotechnology for sustainable agriculture (TYAN-TWAS member)

General Budget

The general budget of the cover costs supported by all participating institutions is shown in the table below.

Airfare and accommodation	Managua(Nicaragua)-La Paz (Bolivia)- Managua(Nicaragua Buenos Aires (Argentina)-La Paz (Bolivia)- Buenos Aires (Argentina) Rio de Janeiro (Brazil)-La Paz (Bolivia)- Rio de Janeiro (Brazil)	1.000 **USD** 1.000 USD 1.000 **USD**
Local expenses **Accomodation** **Meals** **Local transportation**	 30 USD/ day, 180 USD/ 6 days 25 USD/day, 150 USD/6 days 500 USD	 540 USD 450 USD 500 USD
Course material **Banners** **Printing handouts** **Certificates**	 100 USD 100 USD 100 USD	 100 USD 100 USD 100 USD
Infraestructure (conference rooms and laboratries)	20.000 USD	20.000 USD
Total		24.790 USD