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Nexus Network

Nature x Value Webs x Territories



SUMMARY

WORKSHOP NEXUS

Biodiversity-based value webs and territorial bioeconomy systems in Colombia: practice and research perspectives

University of Hohenheim, Dept. Biobased Resources in the Bioeconomy | Alexander von Humboldt
Biological Resources Research Institute, Center for Biodiversity Economics and Finance
16-18 Sep 2024, Bogotá | Stuttgart

WITH THE SUPPORT OF



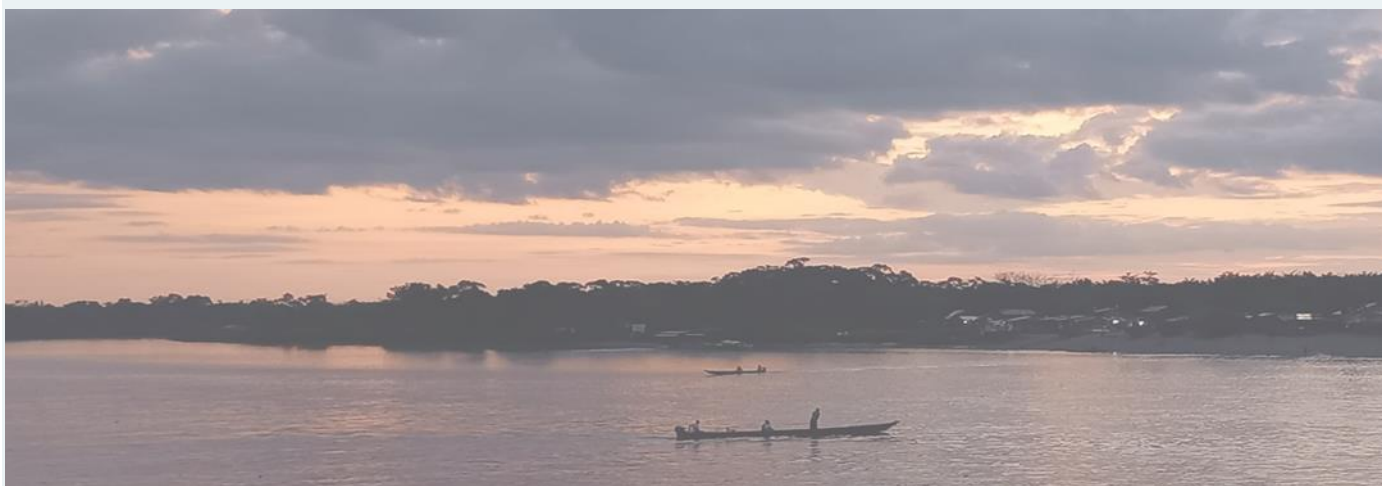
Embajada de
Colombia en Alemania

MOTIVATION

Biobased value chains and webs are key for the transition to the bioeconomy. In regions rich in biodiversity, ethnic diversity and traditional knowledge, such as Colombia, advancing actions towards socio-biodiverse bioeconomies implies to approach research, development and innovation (R&DI) for biobased value webs from a territorial perspective. A top priority corresponds to setting bioeconomies that can serve multiple objectives simultaneously, such as conserving biodiversity, ensuring fair livelihood options in territories and fostering resilience and diversity of agri-food systems.

Numerous examples of biodiversity-based value webs in Latin America exist, ranging from the use of wild plants for local applications and high-added value products, to novel crops for agricultural diversification, ecosystem services provision and landscape restoration. In Colombia, non-timber forest products (NTFP) value webs from native plants such as the palm Naidí (*Euterpe oleracea*) and Corozo (*Bactris guineensis*) have been prioritized, among other plants from native flora such as Seje (*Oenocarpus bataua*), Camu camu (*Myrciaria dubia*), Moriche (*Mauritia flexuosa*), Copoazú (*Theobroma grandiflorum*), Milpesos (*Oenocarpus bataua*) and Cacay (*Caryodendron orinocense*).

The development of biodiversity-based value webs requires the identification of challenges and gaps as basis for R&DI actions through multi-actor collaboration. In this context, it is highly relevant to foster joint inter- and transdisciplinary R&DI to connect the expertise of research groups and practitioners of both countries along biodiversity-based value webs. With this aim, we carried out the workshop **NEXUS (Nature x value webs x territories), 'Biodiversity-based value webs and territorial bioeconomy systems in Colombia: practice and research perspectives'**, a space for connecting and knitting value webs together.



WORKSHOP NEXUS — Nature x Value Webs x Territories

Biodiversity-based value webs and territorial bioeconomy systems in Colombia: practice and research perspectives

The NEXUS workshop was held from September 16-18, 2024 as a space to connect biodiversity-based territorial initiatives, the scientific community and institutional actors of the bioeconomy. During three days of in-person sessions at the Alexander von Humboldt Institute for Biological Resources in Bogotá, Colombia, and in parallel at the University of Hohenheim in Stuttgart, Germany, through hybrid sessions, a practice-oriented collaborative research network for biodiversity-based value webs was initiated.

The workshop was centred on **territorial initiatives** working on bioeconomy in Colombia using natural resources from local biodiversity. We followed an inter- and transdisciplinary approach by facilitating the dialogue among territorial initiatives and researchers from a variety of disciplines related to biodiverse bioeconomies. The workshop included different activities to gain perspectives from practice and research:

Day 1, 16th Sep: Contextualization about bioeconomies of biodiversity and value chains from the territories

Day 2, 17th Sep: Matching research and practice: identification of research lines based on challenges

Day 3, 18th Sep: Building a mission and vision for the NEXUS network

The participants

The **six participating initiatives** represented **multiple regions** of Colombia: The Caribbean region with an initiative based in Chiriguana, Cesar; the Pacific region, represented by a women-based organization located in Quibdó, Chocó; the Orinoco region, with the case of a community-based project based in Tame, Aráuca; and three organizations located in the department of Caquetá, in the Amazon region. Used plants by these



initiatives include native plant species such as the corozo (*Bactris guineensis*), moriche (*Mauritia flexuosa*), milpesos (*Oenocarpus bataua*) and cacay (*Caryodendron orinocense*) for a variety of applications, as beverages, food, cosmetics, animal feed and restoration purposes.

Young and senior researchers from institutions based in Colombia and Germany participated in the workshop and brought their experience in different areas of biodiversity and bioeconomy. **Represented institutions** include the Alexander von Humboldt Institute for Biological Resources, the University of Hohenheim, the University of Passau, the University of Los Llanos, the Universidad Distrital Francisco José



de Caldas, the Colombian Agricultural Research Corporation (Agrosavia), the Wildlife Conservation Society, the Nature Conservancy, Wageningen University & Research, the University of Applied Sciences Weihenstephan-Triesdorf, The German Centre for Integrative

Biodiversity Research (iDiv), the Helmholtz-Centre for Environmental Research, the Colombian-German

Network for Science and Innovation (BioGeCo), the Colombian Ministry of Science, Technology and Innovation, the German Research Foundation (DFG) and the Colombian Embassy in Germany. Entrepreneurs and consultants at the intersection of bioeconomy and biodiversity based in Colombia also participated in the workshop. In Colombia, **28 persons** participated in different workshop sessions, while in Germany **18 persons** were involved.

Day 1- Contextualization about bioeconomies of biodiversity and value chains from the territories

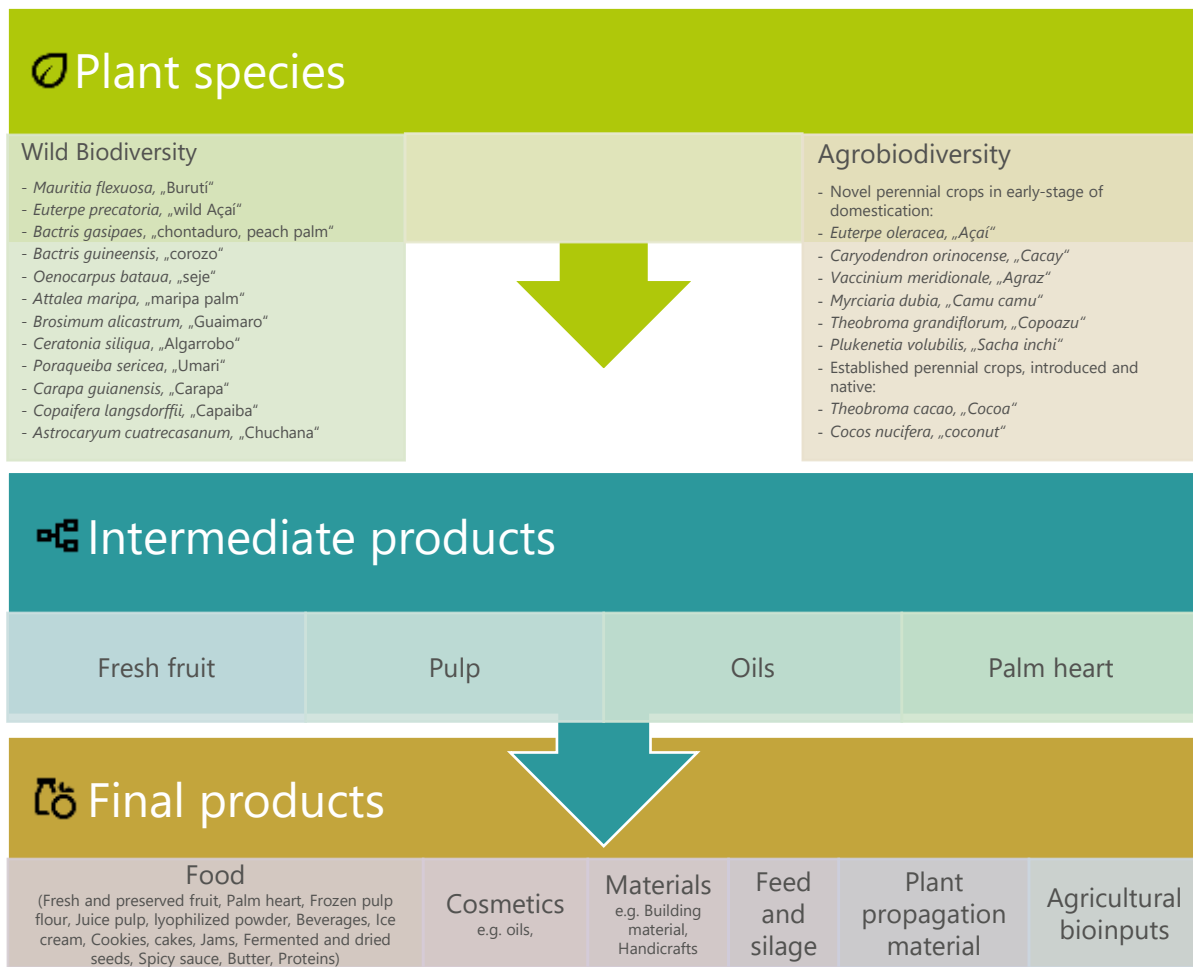
During the first day, the participants of Germany initially set their expectations in an icebreaker session before the joint opening and welcome where participants in Bogota also attended. Ricardo Vargas Carpintero, researcher from the University of Hohenheim, opened the workshop. During this introduction, a video of the Colombian Ambassador in Germany Yadir Salazar Mejía was presented for all attendants, followed by a presentation Dr. Dietrich Halm, from DFG, who presented opportunities of research cooperation between Colombia and Germany. Lastly, Dr. Johana Rengino Vergara from the Colombian Ministry of Science, Technology and Innovation made a presentation of the role of territories and biodiversity in Colombia's bioeconomy strategy.

To continue, Prof. Dr. Iris Lewandowski from the University of Hohenheim presented the perspectives from research on bioeconomy and biodiversity with an emphasis in tropical regions. As counterpart, Felipe García from the Center for Biodiversity Economics and Finance of the Alexander von Humboldt Institute presented the status and importance of non-timber products and bioeconomy of biodiversity in Colombia. The representatives of the territorial participating initiatives introduced their organizations and gave a glance on the plants and products they are working with. As final part of the first day for the German-side, all the other attendants introduced themselves.



In Bogota, the workshop continued with a session to set participants' expectations. Then the group was divided into two working tables: biodiversity bioeconomies of wild plants and agrobiodiversity bioeconomies. During this activity, the participants identified, presented and prioritized the challenges they perceive categorizing them into the different links of the value chain. The moderators of each table systematized these results as input for the activities of the day 2 in Germany.

The biodiversity-based value chains and webs



Identified challenges

1. Biodiversity bioeconomies of wild plants

An analysis of the challenges faced within the value chains of wild biodiversity-based products reveals that the most critical bottlenecks occur at the stages of **access to non-timber forest products (NTFPs)** and **processing and post-harvest transformation**. In the **access stage**, key limitations relate to the lack of available ecological and biological knowledge of the species, compounded by the absence of technical advisory services to support sustainable harvesting practices and domestication efforts. Moreover, the

limited development and transfer of technologies aimed at improving the safety and efficiency of NTFP collection—and particularly for addressing the high perishability of these products through basic on-site pre-processing—further compromise the long-term reliability of supply. These issues are compounded by insecure land tenure and regulatory hurdles in delaying the permits for a sustainable harvest.

The **post-harvest and processing** stages are equally constrained by insufficient investment in the industrial development of NTFP value chains. This limits the potential to add value in accordance with the quality standards required by more demanding markets. Additionally, the absence of targeted research on the physicochemical properties and bioprospecting potential of native species hinders innovation and restricts the diversification of product offerings. The lack of incentives to promote local processing discourages value retention in rural territories, while underdeveloped physical infrastructure—such as refrigeration systems—and limited access to essential auxiliary services, including energy provision, further constrain transformation processes.

Regarding **market access and promotion**, significant obstacles include limited knowledge of market dynamics, such as product volumes, pricing structures, client profiles, and emerging trends, alongside low levels of consumer awareness. Most critically, the absence of a comprehensive national strategy to support market access and promotion specifically tailored to NTFP value chains undermines their ability to achieve distinct market positioning. This gap limits their competitiveness in comparison to more established traditional value chains.

2. Agrobiodiversity bioeconomies

The analysis of agrobiodiversity-based value chains also revealed that the most critical and frequently cited challenges were concentrated in the process of cultivation of novel perennial plants for their use as **Non-timber forest products (NTFPs)** and **processing and post-harvest transformation** stages. In the **production stage**, key constraints include the limited availability and accessibility of ecological and agronomic knowledge related to NTFPs within agrobiodiverse systems, such as agroforestry and silvopastoral systems. The negative impacts of land degradation further undermine the viability of these practices. Moreover, the absence of standardized protocols for the production of plant reproductive material remains a significant bottleneck for the conservation, improvement, and promotion of native species. This gap hampers the formulation and implementation of targeted cultivation strategies essential for the sustainable scaling of agrobiodiversity-based production systems.

The **post-harvest and processing** stages are similarly constrained by the lack of scientific research on the functional characteristics and bioprospecting potential of native crops. In parallel, the absence of dedicated programs and initiatives to promote value addition through processing limits the development of

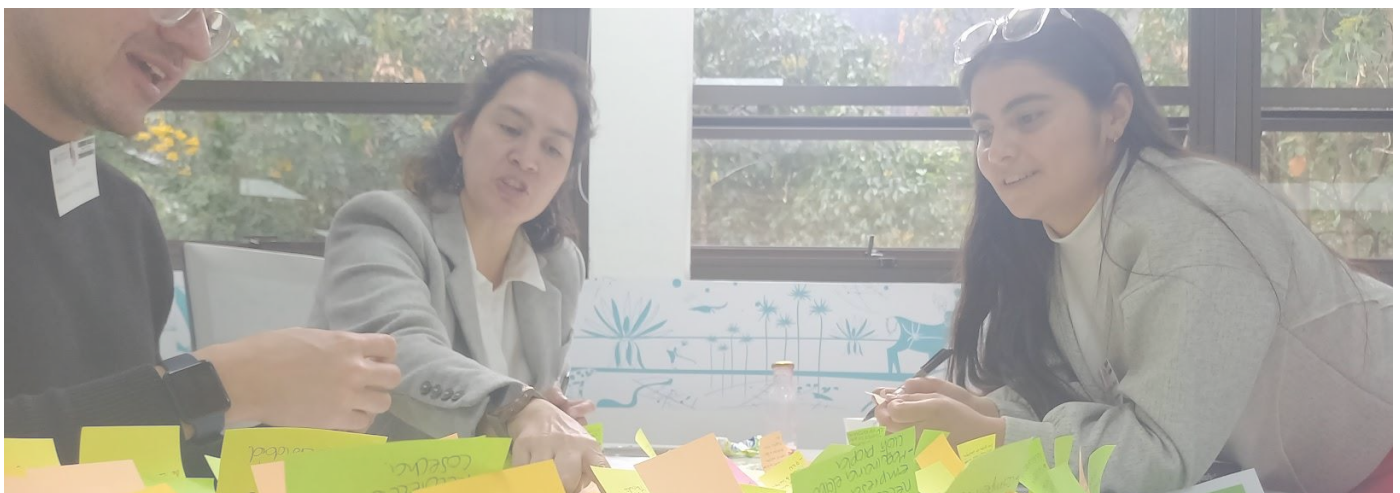
agrobiodiversity-based products beyond the pilot or experimental scale. Furthermore, the insufficient development of technologies and methods for the use of agricultural residues impedes efforts to enhance circular resource use and processing efficiency. While less frequently addressed, the **distribution and marketing and cross-cutting components** also exhibit relevant challenges. These include limited access to market intelligence, weak coordination among stakeholders and across governance levels, and the persistent absence of diverse, high-quality, and nutritious food options derived from agrobiodiversity, all of which constrain the broader systemic integration and promotion of these value chains.

Day 2 - Matching research and practice: identification of research lines based on challenges

During the second day, the results of the afternoon session Colombia were shared with the participants in Germany as an input for the first activity of the day. The attendants defined research interests that fit to the challenges prioritized by the Colombian team and presented the capabilities and required resources for potential prioritized research lines.

After this session, there was a poster presentation session with 4 posters on different topics related to biodiverse bioeconomies:

1. Finding opportunities for rewilding from a pluralistic value perspective
2. What factors enable the transition to successional agroforestry with cacao?
3. Towards territorial forest-based bioeconomies through value webs from native palms in Colombia
4. Information, influence and innovation in Latin America's bioeconomy transition: a Social network analysis



During the joint and online session in which the teams in Germany and Colombia were together, the participants in Germany presented the results of the morning activity (the prioritized research lines). This presentation is the baseline for a joint session in which participants defined the research lines with potential actors and organizations and specific objectives for each line.

Research areas

The identified challenges were the basis for the definition of preliminary lines of research.

1. Biodiversity bioeconomies of wild plants

This area covers production systems, value chains and webs based on the use of wild plants from local biodiversity. Within this category are non-timber forest products (NTFP) systems, which are highly rich in traditional knowledge and in the multi-purpose use of native plants.

- New cropping systems for NTFPs and harvesting technologies
- Use of renewable energy in NTFPs systems for post-harvest and transformation pathways
- Marketing strategies, demand drivers and consumer awareness
- Identification of actors and exploratory scenarios based on pluralistic values of biodiversity for land-use change

2. Agrobiodiversity bioeconomies

This area embraces production systems, value chains and webs based on agrobiodiversity that promote integrated agricultural practices such as agroforestry making use of local biodiversity, generating benefits for the resilience and multi-functionality of agricultural systems.

- Classification of agroforestry systems and identification of sustainable farm-business models
- Comparison of regional biodiverse agroforestry bioeconomies
- Evaluation of agroforestry systems performance under sustainability criteria → integrated to previous one

The second day for the participants in Germany ended here while in Colombia, there were two additional activities. Firstly, there was a brainstorming session for important aspects in the mission and vision of a common network (NEXUS) and secondly, successful experiences of Colombian companies that have promoted productive linkages around the use of plants from biodiversity for the food, cosmetic and pharmaceutical sectors were presented. For the territorial initiatives, this connection was a valuable input to understand conditions, challenges and strategies for them to participate in established value chains of products from biodiversity.

Day 3 - Building a mission and vision for the NEXUS network

During the third day, the participants in Germany had a first brainstorming session for the mission and vision of NEXUS by answering some trigger questions. All the ideas from both teams were contrasted and revised to identify similarities. From these similarities and with the support of AI, we had an initial Mission and Vision statements that were then revised and adapted by the Colombian team.

Mission



Promote the biodiversity bioeconomy through research, development, innovation and social appropriation of knowledge to generate practical and specific solutions to the territorial needs associated with production systems based on non-timber forest products (NTFPs) and agrobiodiverse systems.

Vision



Nexus will be a leading platform for research, development, innovation and social appropriation of knowledge that facilitates the articulation of stakeholders and the generation of shared value in the transition to a bioeconomy based on socio-biodiversity through sustainable value chains and webs of non-timber forest products and agrobiodiverse systems. In this way, NEXUS is projected as a space for the co-creation of knowledge and information to guide the bioeconomies of the territories and public policies.

After the mission and vision activity, the participants in both sites finished the workshop with a final exercise to identify further steps to build the network.

USE OF RESULTS AND OUTLOOK

The NEXUS network is moving forward, through specific actions:

- Poster presentation of the NEXUS approach in the 26th IUFRO World Congress “Forests and Society towards 2050” held in Stockholm in 2024. Poster title: Towards territorial forest bioeconomies through native palm value webs in Colombia.
- Presentation of the results of the NEXUS workshop in the workshop “The economics and governance of the global bioeconomy: the road to sustainable development?”, organized by the BioEcon Network at the University of Passau in 2024.
- Preparation of a research paper based on the workshop results (submission planned in 2025).

- Launch of NEXUS website as a strategy to communicate the workshop results and promote further activities (<http://en.rednexus.co>).
- Formalization of research cooperation between the University of Hohenheim and the Alexander von Humboldt Biological Resources Research Institute through a cooperation agreement.
- Representation in the task force "[Building an Integrated Vision of the Forest-Based Sector within a Bioeconomy](#)" as part of the International Union of Forest Research Organization (IUFRO) to advance the non-timber forest product sector in the bioeconomy (2025-2029).

During the workshop, the participants proposed short- and mid-term activities such as webinars, involvement of bachelor and master students and the use of communication tools to maintain the engagement of participants and facilitate the exchange of information and ideas. In the long-term, we plan to operationalize and continue growing the NEXUS network through activities such as mobilization of researchers, the development of collaborative research projects that involve research organizations, entrepreneurs and territorial initiatives from Colombia and Germany, the identification of funding sources and mechanisms, and the exchange of knowledge, data and experiences.

Video: the Workshop NEXUS



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