



ALCUE NET

Latin America, Caribbean and European Union Network on Research and Innovation

ALCUE Bioeconomy project results: book presentation “Towards a Latin America and Caribbean Knowledge Based Bio-Economy in partnership with Europe”



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ALCUE-KBBE Project Knowledge Based Bio-Economy

Contents

- Towards Bioeconomy Development in Latin America and the Caribbean
- Natural Resources in LAC: a Bioeconomy Perspective
- Policies and Institutional Framework for the Development of Bioeconomy in LAC
- Social, Economic and Environmental Impacts of Bioeconomy in LAC
- Current Status and Potential of Knowledge Based Bio-Economy Related with Research & Innovation in LAC
- Bioeconomy Successful Experiences in LAC
- LAC Bioeconomies: Different Pathways, Preliminary Results and First Best Practices



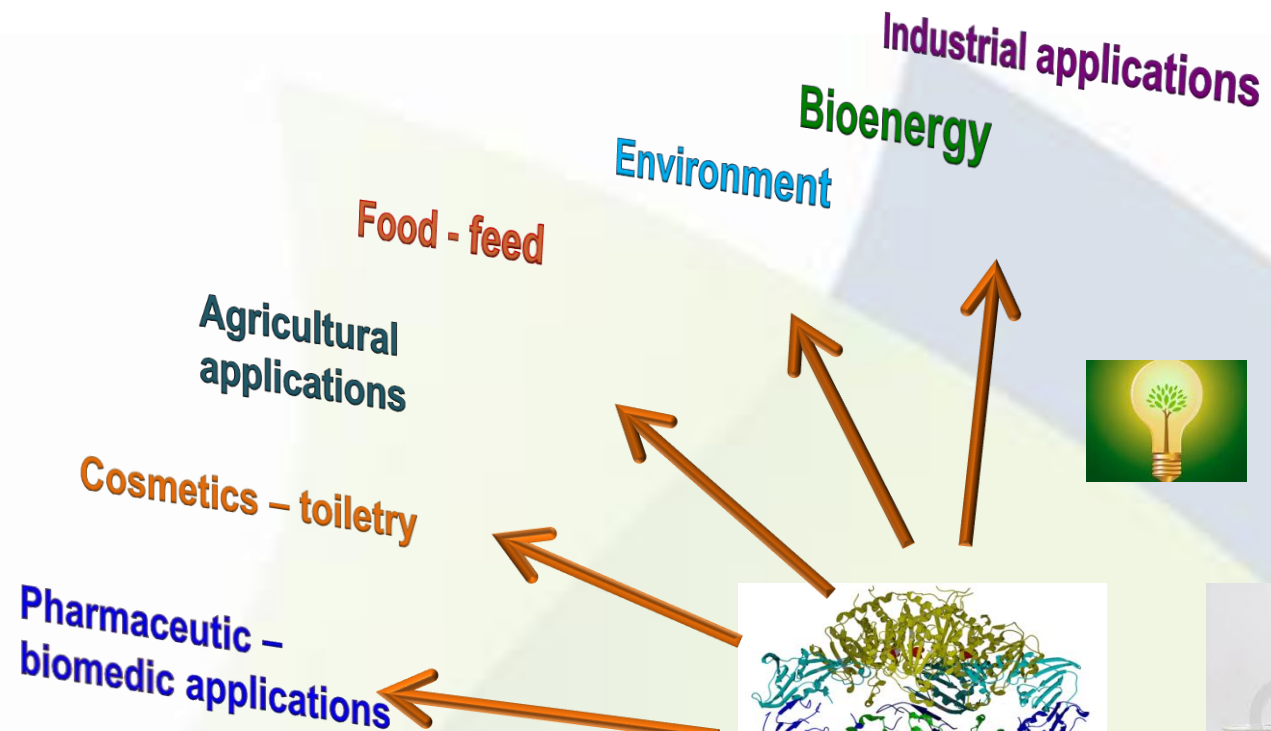
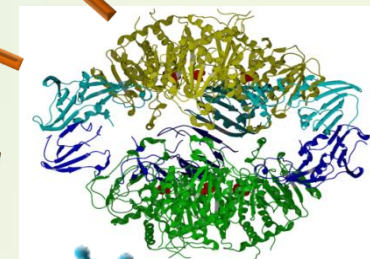
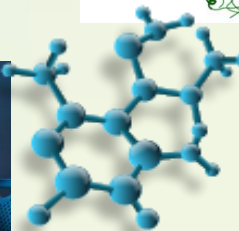
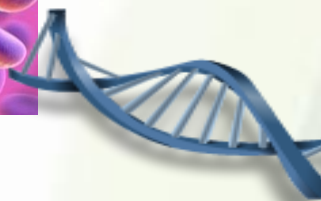
1- Towards Bioeconomy Development in Latin America and the Caribbean

E Trigo, G Henry, J Sanders, U Schurr, I Ingelbrecht, C Revel, C Santana & P Rocha

- Concepts of Bioeconomy
- Comparative advantages & pertinent experiences in LAC
- Food security and local development opportunities
- Alternative pathways for bioeconomy development in LAC
- Promoting the transition to a bioeconomy model
- Science & Innovation, human resources and social participation
- New markets development

Potential Products / services

Biodiversity



Environment

Industrial applications

LAC's Alternative Pathways for KBBE

Six pathways for more efficient use of biological products and processes -
connected/overlapped in many cases-

- **Biotechnology products and processes:** industrial micropropagation, MAS, GMO seeds, diagnostics tools, molecular animal improvement, “omics”: industrial GM microorganisms & metabolic engineering for bioindustries (biocatalysts –enzymes- for improved production of energy and bioproducts, antibiotics, vitamins, detergents, lactic acid, biopolymers)
- **Bio-refinery and Bio-energy:** bioethanol, biodiesel, biogas, and different green chemistry oriented activities. Second and third generation biofuels
- **Sustainable use of Biodiversity:** Valorization (domestication, transformation, linking to market ...) of distinctive biodiversity (functional traits related to specific uses and sectors, gene Discovery, new products & processes, market development for local products, etc.)
- **Ecological Intensification:** Agronomic practices for sustainability (bio-inoculants and biopesticides, no-till agricultural practices, precision agriculture, integrated pest and nutrient management, clean technologies)
- **Ecosystem services:** development of carbon credit systems, clean air, water, food and materials, eco-tourism strategies and water management pricing and management mechanisms.
- **Value chain efficiency** improvement: reduction of post-harvest losses, market links

2- Natural Resources in LAC: a Bioeconomy Perspective

E Hodson de J (PUJ) & P Chavarriaga (CIAT)

- The LAC region constitutes an important, rich and diversified portfolio of bioeconomy based agro-industrial activities that have been generating significant economic value. In the future these activities will only further deepen, both in terms of their economic importance and geographical coverage.
- The diverse forest types in LAC generates a series of goods and services with high potential for economic exploitation in the food, feed, pharmaceutical & chemical sectors, biomass, non timber forest product NTFP, services such as erosion control, flood and climate regulation and recycling of nutrients.

LAC's Natural Resources



*Latin America and the Caribbean
A Biodiversity Superpower - UNDP*

The Latin America and the Caribbean (LAC) region is well known for its immense wealth of natural resources, which are of increasing strategic value for a bio-based world. The region is among the global leaders who are exploiting the benefits of the new biotechnologies. The Latin American and Caribbean region includes seven of the world's most biodiverse countries (Brazil, Colombia, Ecuador, Mexico, Venezuela, Peru and Bolivia, and additionally Costa Rica, Panama, and Guatemala.) as well as the single most biologically diverse area in the world, the Amazon. South America alone has more than 40% of the Earth's biodiversity, and more than 25% of its forests.



Key topics found with greatest potential in LAC

➤ **Bioenergy**

Bio-refineries and bio-products. A priority is the development of second-generation fuels, from non-edible lignocellulosic (LC) biomass (residues of forest management or food crop production or whole plant biomass grown specifically for biofuel purposes).

➤ **Eco-intensification**

Reduced or non-tillage; Integrated crop management; Bioinoculants: biofertilizers, biopesticides; Precision agriculture

Clean technologies; residues & waste microbial treatment

➤ **Valorization of Biodiversity**

Food & feed from native species; pharmaceuticals; flowers; specific traits

➤ **Biotechnology products and processes.**

Biomaterials: enzyme production for industrial uses, biopolymers, nutraceuticals,

3- Policies and Institutional Framework for Development of Bioeconomy in LAC

P. Rocha, Ph.D. Coordinator Biotechnology and Biosafety, Inter-American Institute for Cooperation on Agriculture (IICA)

- The high degree of heterogeneity between and within countries makes necessary to analyze the situation in each country or region to identify potential areas, specific business actors and institutions
- Institutions and policies should promote investment, generate knowledge and articulate with profitable markets
- Private sector is responsible for taking risks, act responsibly, respond accurately and efficiently in order to generate wealth
- Policies should attract investment through mechanisms such as legal stability (for example, related to access to genetic resources) as well as promote investment in science, technology and innovation, allowing the development of profitable business based on biotechnology and biodiversity
- For Bioeconomy in LAC it is essential to define the role to be played by small producers, and demonstrate a real application of knowledge, enabling the generation of added value

4- Social, Economic and Environmental Impacts of Bioeconomy in LAC

G. Valbuena, Economist M.Sc.

- The vast majority of LAC economies are highly dependent on commodity exports
- Interaction between the public and private sector to promote R, D&I
- Competitiveness of markets for developing a sustainability assessment, to ensure the availability of biomass, the strengthening of integration of supply chains, and the supply of relevant information for the consumers, for example, product's properties
- Integration of policies including the international, national, regional and local communities is needed
- Emerging business models for biotechnology must adapt to the social, economic and environmental conditions

5- Current Status and Potential of Knowledge Based Bio-Economy Related with Research & Innovation in LAC – C González, E Trigo, L Herrera-Estrella & A Farías

- Latin America and the Caribbean is a very heterogeneous region in many aspects, which involves different strategies
- There is high concentration of scientific and research capacities in few countries of the region
- Most of the LAC countries have significant infrastructure and human resources and a good academic level as well as established groups with qualified scientists working in areas such as biotechnology or biofuels, however there is "brain drain" going to developed countries
- In relation to biofuels, the Southern Cone (Brazil and Argentina), have significant research development relying on qualified staff and a regulatory framework
- It is required to increase and consolidate the critical mass and develop novelty processes/techniques to go beyond just to be technology adopters
- There is a need to train researchers in the use of biodiversity and biotechnology

6- Bioeconomy Successful Experiences in LAC

AC Pisón & MA Bentancur

- Different experiences in countries of the region in four pathways:
 - (i) the exploitation of biodiversity resources,
 - (ii) the eco-intensification of agriculture,
 - (iii) biotechnology applications, and
 - (iv) biorefineries and bioproducts

7- LAC Bioeconomies: Different Pathways, Preliminary Results and First Best Practices

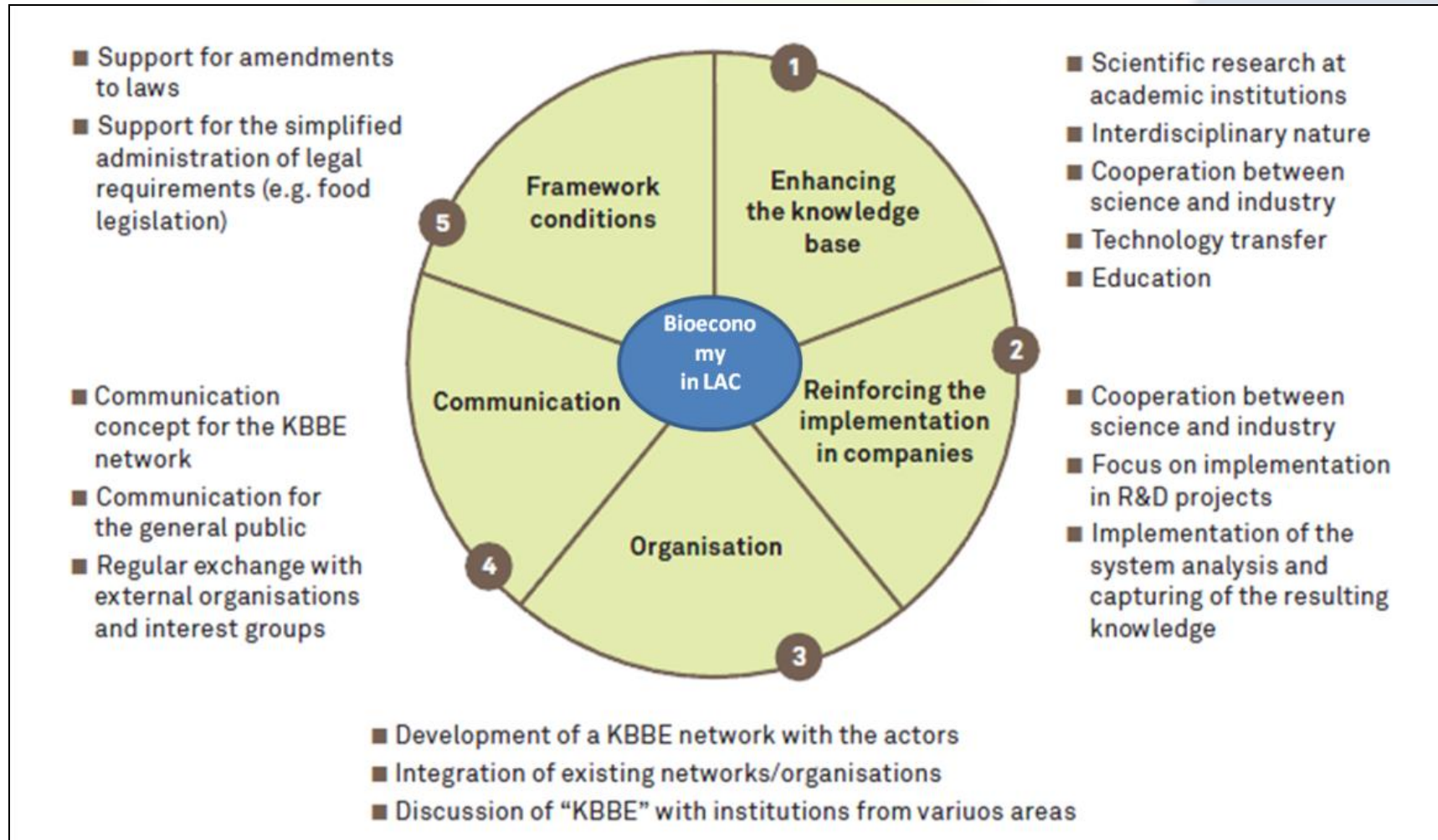
G Henry, E Trigo & E Hodson de J.

- Bioeconomy is a reality already underway in LAC, with many strong platforms on which to build upon

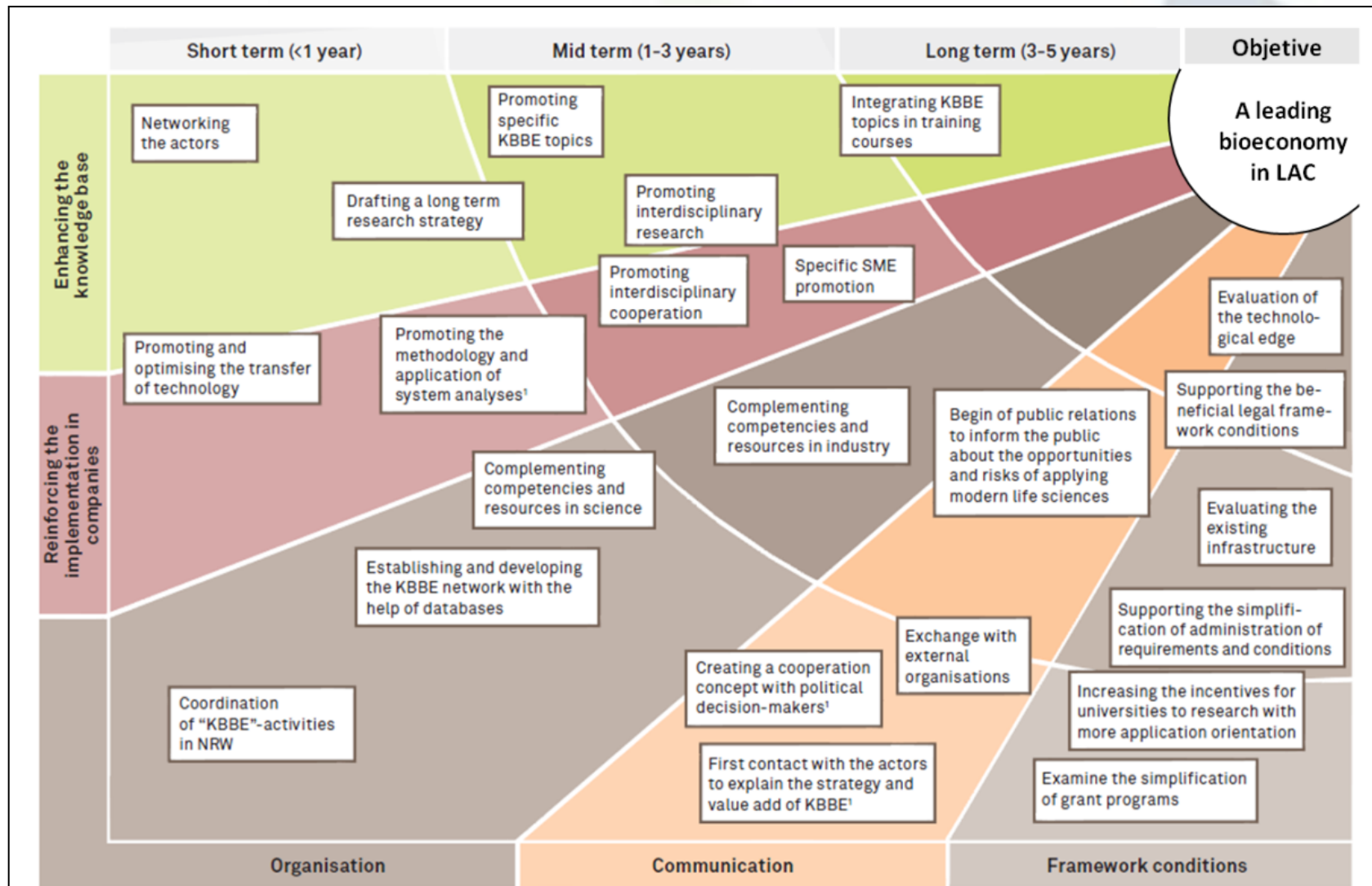
Some high priority issues for R&D efforts in bioeconomy include:

- Biorefineries and bioproducts including green biorefinery, lignocellulose biorefinery and production of high value bio-based products and oil based biorefinery.
- Sustainable commercial use of prioritized native plant species and microorganisms as well as screening for new bioactive metabolites/enzymes and standardization of valuable functional components in food, cosmetic and pharmaceutical ingredients.
- Bioreactors for the production of health promoting compounds and development of innovative production of bioplastics.
- In terms of ecological intensification the development of bio-inoculants and bio-products for plant nutrition and phytosanitary management using metagenomics as a valuable tool.
- Agricultural and agroindustrial waste treatments are also considered a high priority in the LAC region.

The five fields of action for establishing Bioeconomy in LAC



Schematic example of action plan for bioeconomy development in LAC



¹Similar goals assigned to different fields of action have been consolidated into a common box in this depiction



■ Thank you very much!!

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