



Thematic Report on Bioeconomy

ALCUE NET

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

Latin America, Caribbean
and European Union

Network on Research and Innovation

EU-CELAC SOM Working Group on Bioeconomy

Argentina – France

**ALCUE NET: Latin America, Caribbean and European Union Network on Research
and Innovation**

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1 Objective of the thematic report

- To inform about progress of activities on the Bioeconomy SOM WG
- To present concrete proposals and action plans on specific initiatives:
 - o Identification of research topics for Joint Calls implementation
 - o CELAC Bioeconomy Observatory (BIO-CELAC)
 - o Capacity Development, including Awareness Rising
- To forward recommendation for SOM deliberations¹

¹ Additionally to the results of the deliberation of the Bioeconomy SOM Working Group, annex III of this report includes the conclusions of the EUCARINET discussion regarding the Caribbean participation on HORIZON 2020. The essence of this work has been fully integrated in the Bioeconomy WG roadmap.

2 Bi-regional Cooperation Activities in the Bioeconomy Area

Thematic area background in Latin America, Caribbean and the European Union²

The Latin America and the Caribbean region is particularly well placed to both contribute and benefit from the emerging bioeconomy. The region is well known for its immense wealth of natural resources, in terms of land, water and biodiversity, all factors of increasing strategic value for a bio-based world. The rapid agricultural transformation occurring in many countries, and the way that the region has rapidly evolved to become a world leader in the exploitation of the new agricultural technologies and in the bio-fuels markets is a clear sign of this potential. A rapid analysis of supply and demand factors clearly points in the direction that, in any possible future scenario, achieving the needed new global equilibriums, has the LAC region playing a critical role. At the same time, the region has a challenge of its own. Hunger and poverty, although not as dramatic as in other parts of the development world, are continuing preoccupations in the region, especially in the rural areas. These are turning agriculture and biomass production into essential components of any hunger and poverty alleviation strategy. In this context, the bioeconomy in LAC has a dual set of objectives. At the global level, the region has a critical role in contributing to global food, fiber and energy balances, while improving environmental sustainability. And within the region's boundaries, the bioeconomy is a new source of opportunities for equitable growth through improved agricultural and biomass production. In a historical context the transition towards a LAC bioeconomy also offers the possibility of moving beyond the dichotomist vision of agricultural vs. industrial development that has dominated development strategy discussions since the 1950s, as agriculture – industry linkages expand beyond the traditional views to include a much more complex and strategic set of input – output relationships.

In this context, the bioeconomy is increasingly seen as an opportunity – while challenging – to coherently address the complex situation, while at the same time creating new sources for equitable economic and social growth.

Advantages for building LAC's bioeconomy in cooperation with Europe

The Latin American and Caribbean region is particularly well placed to both contribute and benefit from the emerging bioeconomy. Its extensive and diverse natural resource base – land, wa-ter, and biodiversity – paired with an emerging economy and growing human resources provides the region with an essential foundation for a solid bioeconomy. As a whole, the region is very well positioned in terms of agricultural land availability with over 50% of its lands classified as having agricultural potential (CEPAL, 2007), a situation only comparable in European dimensions, to East European countries, but more importantly, per capita land availability in the region is significantly above the world average of 0,2 ha/cap³ According to the

² From an European point of view the Bioeconomy encompasses the production of renewable biological resources and their conversion into food, feed, bio-based products and bioenergy. It includes agriculture, forestry, fisheries, food, pulp and paper production, as well as parts of chemical, biotechnological and energy industries

(<http://www.iiasa.ac.at/Research/LUC/GAEZ/index.htm>) Latin America has more than 500 million ha in the “best suitability” categories and the largest expansion potential in the categories “very suitable” and “suitable”, excluding forests. The projection for 2050 highlights that, even considering a significant population increase, more than 300 million ha. could be brought into production without impinging on natural forests, with South and Central America representing about 25% of the land with “very suitable”, “suitable” and “moderately suitable” cropping potential for cereals, more than 25% for the oil crops, about 30% for roots and tubers, and more than 35% for sugar crops (all cases for the intermediate and high input technological scenarios). All these figures highlight resource potential for the development of a bioeconomy contributing both to food security, supply of renewables and energy objectives, and with important income generation opportunities, as there are significant yield gaps across almost all product categories. In both sugar and oil crops current utilization vis-à-vis potential is very low and in most diagnostics a poor technological performance can be identified as the most relevant restriction to tackle for improving resource use efficiency⁴. Beyond this, infrastructure limitations are also a big issue, as most of the new areas are not close to existing markets so reducing their potential value.

At the political level, the LAC bioeconomy concept has found increasing recognition and active support through the CELAC-UE Bi-regional Summit and subsequent Senior Officials Meetings on Science and Technology that ultimately resulted in the adoption of the Bioeconomy as one of the proposed Joint Initiatives for Research & Innovation (JIRI), on which to implement the bi-regional S&T cooperation.

To support the SOM strategic initiative, the bi-regional ALCUE NET project as well as the past ALCUE-KBBE project helped to establish a CELAC-UE platform as the basis for a political and institutional framework that encourages sustainable (non-carbon) and competitive development and strengthens the knowledge based bio-economy concept in the CELAC region.

The Bioeconomy SOM Working Group

The specific objectives of the Bioeconomy working group are (i) to contribute to global supplies while improving agricultural environmental performance and (ii) to exploit new opportunities in agricultural/biomass production for equitable growth.

The working group targets the integration or association of funded CELAC and EU research teams into existing biorefinery (focusing on biomass availability and conversion processes). The WG defines scientific research areas with the aim to explore joint calls implementation and suggest and develops proposal project on Capacity Development and monitoring through the establishment of a CELAC Observatory on Bioeconomy.

Official representatives in the Bioeconomy Working Group:

CELAC members:

- Argentina – Ministerio de Ciencia, Tecnología e Innovación Productiva (MINCYT) - co-lead
- Bolivia - Ministerio de Educación (MINEDU)
- Mexico - Consejo Nacional de Ciencia y Tecnología (CONACYT)
- Chile - Comisión Nacional de Investigación Científica y Tecnológica (CONICYT)
- Costa Rica - Ministerio Ciencia, Tecnología y Telecomunicaciones (MICITT)
- Panama - Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT)

- Peru - CONCYTEC
- Guatemala - Secretaría Nacional de Ciencia y Tecnología (CONCYT/SENACYT)
- Nicaragua - Consejo Nicaragüense de Ciencia y Tecnología (CONICYT)
- Uruguay – Ministerio de Educación y Cultura (MEC)
- Colombia- Departamento Administrativo de Ciencia, Tecnología e Innovación (COLCIENCIAS)

EU members

- France – Ministry of Higher Education and Research (MERS) - co-lead
- Belgium- Universiteit Gent/ VITO
- Germany - Federal Ministry of Education and Research (BMBF)
- Spain - Ministerio de Economía y Competitividad (MINECO)
- Malta - Malta Council for Science and Technology (MCST)
- Austria - Federal Ministry of Science, Research and Economy (BMWF)
- Finland- Academy of Finland (AKA)
- European Commission

Other experts from other EU-CELAC countries have participated in different WG activities.

EU framework programme and past experiences

Bioeconomy in the framework of the Horizon 2020

The European Commission has adopted a strategy to shift the European economy towards greater and more sustainable use of renewable resources. With the world population approaching 9 billion by 2050 and natural resources finite, Europe needs renewable biological resources for secure and healthy food and feed, as well as for materials, energy, and other products. The Commission's strategy and action plan, "Innovating for Sustainable Growth: a Bioeconomy for Europe", outlines a coherent, cross-sectoral and inter-disciplinary approach to the issue. The goal is a more innovative and low-emissions economy, reconciling demands for sustainable agriculture and fisheries, food security, and the sustainable use of renewable biological resources for industrial purposes, while ensuring biodiversity and environmental protection. The plan therefore focuses on three key aspects: developing new technologies and processes for the bioeconomy; developing markets and competitiveness in bioeconomy sectors; and pushing policymakers and stakeholders to work more closely together.

Horizon 2020 is the biggest EU Research and Innovation programme ever with some €79 billion of funding available over 7 years (2014 to 2020). It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market.

Horizon 2020 will contribute to tackle the major societal challenges identified in Europe 2020 and its flagship initiatives. Funding will be focused on specific societal challenges. Bioeconomy can be found in societal challenge 2, titled "Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the Bioeconomy".

Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the Bioeconomy

A transition is needed towards an optimal and renewable use of biological resources and towards sustainable primary production and processing systems. These systems will need to produce more food,

fibre and other bio-based products with minimised inputs, environmental impact and greenhouse gas emissions, and with enhanced ecosystem services, zero waste and adequate societal value.

Agriculture, forestry, fisheries and aquaculture, together with the bio-based industries, are integral parts of the European economy and society. Relying on the use of limited natural resources, these sectors produce and process biological resources to satisfy the demand of consumers and a wide range of industries for food, feed, bio-energy and bio-based products. While they enhance Europe's self-reliance and provide jobs and business opportunities essential for rural, coastal and marine areas, these sectors are also facing significant challenges which require solutions based on research and innovation.

Activities under Societal Challenge 'Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy' aim at making the best of our biological resources in a sustainable way. The objective is to contribute to securing sufficient supplies of safe, healthy and high quality food and other bio-based products, by developing productive, sustainable and resource-efficient primary production systems, fostering related ecosystem services and the recovery of biological diversity, alongside competitive and low carbon supply chains. This will accelerate the transition to a sustainable European bioeconomy, bridging the gap between new technologies and their implementation.

Past experience: the ALCUE-KBBE Project (Towards a Latin America and Caribbean Knowledge Based Bio-Economy in partnership with Europe)

The project running from June 2011 to November 2013, aimed to establish a EU-CELAC platform bringing together regional and continental organisations involved in research funding and implementation, as well as other relevant stakeholders from the public and private sector and the civil society, in an effort to generate relevant information for the design and implementation of specific plans and projects, included the needed Research and development (R&D) and set the basis for the establishments of an enabling policy and institutional environment, as well as, for the development and consolidation of the Bioeconomy in both the regions. To achieve this aim the project activities were oriented to generate information relevant to Knowledge-based Bioeconomy (KBBE) related issues in Latin American and Caribbean countries, to help establish a strategic reflection and analysis on KBBE opportunities and limitations in the region, to stimulate KBBE related research and development EU-CELAC cooperation, and to insert the KBBE theme in CELAC policy agendas.

The consortium was made up of 12 partners from countries including Member States and third countries.

3 Cooperation Actions and instruments: Road Map for implementation

Action	Activity (since March 2013)	Work progress (since March 2013)	Instruments (since March 2013)	Indicators + Impact (since March 2013)
<p>Scientific areas/topics identification</p> <p><u>Objective:</u> identification of research topics for Joint Calls in ERANet-LAC and H2020</p>	<p>- Identification and elaboration of research topics profiles in the following areas to be presented to the EU-CELAC SOM for a first ERANet-LAC Joint Call (see point 4 of this report):</p> <ul style="list-style-type: none"> • Eco intensification • Biodiversity • Biotechnology • Biorefinery & BIO Products 	<p>4 Working Group Meetings (Buenos Aires, San Jose, Mexico DF, and Cali)</p> <p>4 profiles of research areas</p> <p>5 relative priority (topics)³</p>	<p>Bi Regional Projects: ALCUE KBBE, EUCARINET, ALCUE NET</p> <p>EU-CELAC SOM Working Group on Bioeconomy</p> <p>Potential instruments for future implementation: -ERANet-LAC -H2020</p>	<p>- # of LAC research institutions included in the Joint Calls & H2020 research projects</p>
<p>Bioeconomy Observatory (BIO-CELAC)</p> <p>Support tool for the following objectives:</p> <p>- To support the understanding of the Bioeconomy in the region by</p>	<p><u>Proposal of the Observatory project:</u></p> <p>Pillar 1 - Research & Innovation:</p> <p>Task 1.1: Development of common methodology, work team and main sources</p> <p>Task 1.2: First pilot database implementation (ALCUE NET) & methodological validation</p> <p>Task 1.3: Expansion of the databases by different countries / different topics</p> <p>Task 1.4: White papers</p> <p>Suggested collaborators: RICYT, CIAT</p>	<p>First draft of CELAC Bioeconomy Observatory action plan beyond pilot phase in ALCUE NET (see annex I)</p>	<p>ALCUE NET project: implementation phase</p> <p>Studies</p> <p>Database mapping on CELAC on the three pillars</p> <p>ERANet-LAC Joint Call</p> <p>Bioeconomy SOM Working Group</p>	<p><u>Impact:</u></p> <p>Better evidence base on Bioeconomy in the LAC region</p> <p>More focus on research and development national programmes and bi-regional cooperation projects</p>

³ The WG did not define explicit priorities; however relative emphasis was allotted to some topics/areas during discussion.

<p>providing specific information</p> <ul style="list-style-type: none"> - Establishing a one-point entry to the LAC Bioeconomy - Providing information for policy making decisions 	<p>Pillar 2 - Policy: Task 2.1: Development of common methodology, work team and main sources Task 2.2: First pilot policy inventory (ALCUE NET) & methodological validation Task 2.3: Policy watch (expansion to different countries / different topics) Task 2.4: White papers</p> <p>Suggested collaborators: CEPAL, IICA, FAO</p> <p>Pillar 3 - Market: Task 3.1: Development of common methodology, work team and main sources Task 3.2: First pilot sector value studies in selected countries (ALCUE NET) & methodological validation Task 3.3: Expansion of countries and sectors Task 3.4: White papers</p> <p>Suggested collaborators: Buenos Aires Grain Exchange, Consumers International, CIAT, Latin American Exchange Association, UNICA</p> <p>Management Task 4.1: Communication & dissemination strategy Task 4.2: Technology aspects Task 4.3: Partners coordination Task 4.4: Financial administration Task 4.5: completion of full proposal formulation + funding-negotiation</p>		<p>Cross cutting (funding) SOM Working Group</p>	<p>Improve investment levels in Bioeconomy in LAC region</p> <p>Europe and Latin American synergy en relation to the development of the global Bioeconomy</p> <p><u>Indicators:</u></p> <p>R&D investment; R&D personnel and Human Resources skills; Patents; Research and innovation programmes</p> <p>Number of regional policies & policies that could have an impact on bioeconomy;</p> <p>Define data availability (by sources & specific users); Database management; Bio-based industries and chains.</p>
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	Task 4.6: Direct link to databases from EU and other regions and countries			
Capacity Development (including awareness raising) Objective: advance the awareness on the bioeconomy model in technology market and societal aspects & the capacity development of relevant actors	<p><u>Proposal on Awareness Raising and Capacity Development for the Bioeconomy in LAC:</u></p> <p>Pillar 1: Policy dialogue</p> <p>Pillar 2: CD network: Course work materials (some are already exist, majority has to be prepared). Databases on education / training watch / companies / alumni / professors. Brokerages (grant schemes, coaching / angels).</p> <p>Pillar 3: Media incidence by target audiences</p> <p>Pillar 4: Management & coordination</p>	First draft of Awareness Raising Capacity Development action plan beyond pilot phase in ALCUE NET (see annex II)	<p>Brainstorming</p> <p>Working Group Meeting (Cali, 2014)</p> <p>Awareness Raising activities: mass media rounds</p> <p>Formal Courses, Seminars and Master Degree programmes</p> <p>Report</p>	<p># of informed people by target audiences</p> <p># of mass media response publishing news related to Bioeconomy</p> <p># of people trained graduated from the targeted Bioeconomy Capacity Development events</p>
Formulation of a policy note highlighting Caribbean interest in H2020 participation	The EUCARINET policy brief provides Caribbean specific insights to improve H2020 EU-CAR collaborations as well as inputs into the multi-annual road map for the CELAC region of Horizon2020. The paper highlights clear cross-thematic (transversal) Caribbean specific advantages/assets for collaboration within H2020. Five topics for targeted EU-CAR collaboration have been identified for input in the multi-annual EU-LAC roadmap within the focal areas “Blue Growth (BG): unlocking the potential of seas and oceans” and “Sustainable Food Security (SFS)”. Furthermore, six recommendations for H2020 EU-CAR	EUCARINET Policy note “Securing greater impact through EU-Caribbean collaboration in Horizon 2020” (see annex III)	EUCARINET project	Increase EU-CAR research & innovation collaboration in the H2020

	collaboration have been formulated.			
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Annual Work Plan	
Activities	Timeline
First Observatory study on Successful cases (ALCUE NET)	May 2014
Second Observatory study on value quantification of national BE sectors (ALCUE NET)	May 2014
Bioeconomy Observatory pilot phase as part of the ALCUE NET project: Tasks: 1.1; 1.2; 2.1; 2.2; 3.1; 3.2; 4.1-4.5	2014
Capacity development pilot phase as part of the ALCUE NET project	2014
ALCUE NET Workshop on Europe- back-to-back the EU Bioeconomy Observatory meeting	2014
Bioeconomy Observatory Scaling-up phase: 2015-2017 Tasks: 1.3; 1.4; 2.3; 2.4; 3.3; 3.4; 4.6	
Joint Calls	October – November 2014
Bioeconomy Observatory formulation of the expansion phase project + negotiation	End 2014
Capacity development formulation of the expansion phase project + negotiation	End 2014
ALCUE NET Workshop on LAC (Brazil)- Evaluation of the pilot phase of the Bioeconomy Observatory & the Capacity Development	2015

4 Formulation of topics to be considered in the activities of the ERANet-LAC project

Note: the following 4 areas include priority of topics and a reserve list of topics for further consideration

BIOTECHNOLOGY

Short background on the scientific research area

The rapidly growing global demand for food, feed and fuel will require a combination of an increase in crop yields and an efficient and sustainable use of soil and water resources. According to the Intergovernmental Panel on Climate Change, 1.28 Gha of world cropland will remain extra after food production in 2050 and will be available for biomass production. Key issues are the adaptation of crops to climate change and a better tolerance to biotic and abiotic stresses by genetic improvement and by managing diverse cropping systems in a sustainable way. There is also space for further improvement on agricultural practices and the development of sustainable processes for the transformation of biomass in added-value products. The biomass production must follow the sustainable criteria of addressing all the interlinked environment, economic and social concerns.

Added value of EU-CELAC cooperation in this area

Generation and exchange of scientific and technological knowledge between EU and CELAC will contribute to accelerate the transition to an environmentally friendly bioeconomy, by providing high quality bioproducts through a sustainable use of resources. Adaptation of known biotechnological procedures to new impact regions will expand the frontiers of natural resources. A multidisciplinary approach will provide solutions that cut across research and technological fields, with a strong innovation and market driven approach. Positive changes to society, economy and environment will be achieved through a more efficient use of resources by improving the chain-value of natural species. Specifically, the improvement of biological raw material for industrial use, the design of energy crops and seeds for wood production are relevant topics to add value to EU-CELAC bioeconomy. The production of this value-added products will promote the establishment of biotechnology-based companies

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

The development of new resources via biotechnological improvement of genetic traits of multipurpose and energy crops, as well as those of tropical trees, will impact on:

- Valorization of biological raw materials
- Generation of innovative feedstocks for biorefineries.
- Development of optimized crops adapted to industrial needs.
- Satisfaction of market demands with compliance to environmental, social and economic objectives.
- Increased productivity and sustainability in agricultural and forestry practices.

Specific call topic suggestion

TOPIC 1: TITLE Energy crops: genetic improvement and an efficient use of resources

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>The current pattern of energy supply cannot be sustained in the future because of the depletion of fuel reserves and also the environmental impacts of using these fuels. As compared to forest biomass production, energy crops offer higher productivity and shorter time span between plantation and harvest. Energy crops grown on surplus land in a sustainable way can serve energy demand and mitigate many environmental, social and economic challenges.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should focus on the development of crops with optimized dry matter and energy yield per area of land, through the latest biotechnological routes, with or without genetic modification. Environmental aspects (e.g. soil and water needs) should be addressed.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Contribute to satisfaction of energy demand with compliance to environmental, social and economic objectives. - Prevention of deforestation. - Reduce pressure on edible crops utilization for energy production - Economic growth via the use of underutilized soils
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Research projects</p>

Reserve List on BIOTECHNOLOGY

TOPIC 2: TITLE Artificial seed for wood production

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>The production of seeds through normal sexual propagation is challenging for many trees, due to long time for flowering and/or poor seed set. In addition, most trees are heterozygous and therefore, clonal propagation is desirable to maintain original identity. Artificial seeds can make a great contribution to the preservation and extension of biodiversity in general, and forests in particular.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>The proposals should aim at producing artificial seeds of tropical seeds. A viable clonally technology should be proposed to produce high-quality seeds for establishing new plantations in CELAC. This technology is used in Europe (eg Sweden for pine) and can be adapted to tropical trees for establishing plantations and for multi-location phenotyping. Protocols should be developed for tree species of interest to EU and CELAC.</p>

Expected impact for both regions:	<ul style="list-style-type: none"> - Large scale production of plants at low cost. - Germplasm conservation of elite and endangered plant species. - Easy handling of seeds and potential long-term storage - Product uniformity - Trade in exotic timber between CELAC and EU - Use for paper/pulp industry. - Carbon credits
Type of action suggested: Research project, networking activities, mobility etc.	Research projects

TOPIC 3: TITLE Design and screening of multipurpose crops

Specific challenge: Why is this topic relevant and which societal challenges does it address?	Global food, feed and fuel demands have been projected to double in the 21st century, which will further increase the pressure on the use of land, water and nutrients. Multipurpose crops can contribute to an environmentally sound and sustainable use of natural resources, by bringing to the market biodegradable products such as bioplastics, lubricants, paints and/or added value fine chemicals with minimum residue.
Scope: Added value gained from EU-CELAC cooperation for both regions	The proposals should aim at developing crops with a comprehensive use, improving the exploitability of the biomass. Research should combine modern molecular tools of plant breeding, metabolic and genetic engineering and advances in agronomic practices in order to develop crops with a comprehensive use. Proposals should also address the economic potential of the residual biomass and asses environmental sustainability
Expected impact for both regions:	<ul style="list-style-type: none"> - Valorization of biomass resources. - Use of biomass for multiple purposes. - Knowledge generation on metabolic control, route design, metabolic engineering, domestication, breeding, and improved agricultural practices. - Development of optimized crops adapted to industrial needs.
Type of action suggested: Research project, networking activities, mobility etc.	Research projects.

ECO-INTENSIFICATION

Short background on the scientific research area

Agricultural intensification is driven by the growth of world population and the limited opportunities to expand agricultural lands. An ecologically efficient agricultural intensification is required to limit environmental degradation and to optimize the efficient use of natural resources. The primary goal of ecological intensification is to increase the efficiency of biomass production per unit of resources used, without increasing environmental impact and production costs. A major constraint for a sustainable agricultural production is the lack of efficient bioproducts to build resilience of crops to biotic and abiotic threats. Also, breeding programs should capture the dynamic interactions between genotypes and the environment. On the other hand, agricultural production and the agro-food industry furnish large volumes of wastes and residues that can be recovered and upgraded to higher value and useful products. New competitive eco-innovative technologies are required to address these problems in order to make bio-economy an appropriate strategy towards achieving social, economic and environmental sustainability.

Added value of EU-CELAC cooperation in this area

It is expected that an action plan will emerge by interactions between EU and CELAC actors from the academic, governmental and production sectors that will address eco-intensification, taking full account of feasibility, strategic priorities as well as present and emerging initiatives at local, regional and global level. Intensive agricultural production can be improved by the application of genetic engineering tools and knowledge on the microorganisms interactions with the agricultural system. This will generate new sustainable farming practices.

New competitive eco-innovative technologies will reduce the use of land, water and non-renewable resources in the production of biomass. In that sense, crop productivity, stability, and protection will contribute to their sustainable production. Moreover, tools for the treatment and remediation of waste derived from intensified practices will also add value to the area.

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

- Environmental protection of intensified agricultural practices
- Development of new agrochemicals from renewable sources
- Creation of opportunities for private sector development
- Setting the basis for the development of a regulatory framework for intensified-farming residues
- Efficient use of research funds through complementarities and synergies between the various actors involved.

Specific call topic suggestion

TOPIC 1: TITLE Crop productivity and stability

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>Crop productivity and stability is determined by genetic variability and by complex genotype/environment interactions, in the context of specific agricultural practices. It is necessary to understand and capture the dynamic of these interactions to develop adequate breeding programs and farm management. Further progress in crop improvement requires addressing the gap between theoretical and real yields and crop resilience to biotic and abiotic threats.</p>
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<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should aim at developing tools to improve identification, prediction and introduction of useful genetic variation in crops, as well as favorable combinations of genotypes and management practices in a range of environments. A holistic approach of crop improvement should be proposed, seeking for novel breeding programs that improve yield, yield stability, quality, tolerance/resistance to biotic/abiotic stress, and environmental benefits.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Increased productivity through improved genotypes and crop management strategies - Development of novel breeding programs - Increased biomass diversity and higher adaptability to particular environments - Increased knowledge on complex plant-environment interactions
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Research and innovation projects</p>

Reserve List on ECO- INTENSIFICATION

TOPIC 2: TITLE Integral crop protection: agricultural diversity

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>A major constraint for a sustainable agricultural production is the lack of efficient bioproducts for pest and disease control. Plants and microorganisms are valuable sources for the development of new and efficient biological control systems. Most microorganisms are very difficult to cultivate; as a consequence, microbial genes and traits are impossible to identify by conventional methods but can be accessible by metagenomic approaches.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should address the identification and characterization of gene/enzymes, microorganisms and compounds, for the promotion of crops through efficient and sustainable phytosanitary management, fertilization and plant growth. The aim should be to provide tools for the development of new biofertilizers and environmentally friendly and cost-effective agronomic management. Focus should be set on bioenergetic crops.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Reduction of agro-chemicals from non-renewable resources. - Reduction of environmental impact - Improved yield and cost reduction for farmers - Increased economic gains by avoiding losses in agriculture and forestry - Development of new entrepreneurial collaborations between the private and public sector, for the production of bioproducts.

<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Research and innovation projects with private sector support</p>
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TOPIC 3: TITLE **Biological processing of agricultural and agro-industrial waste**

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>Agricultural and agro-industrial wastes have a high potential to cause severe pollution problems due to their high nutrient content. Also, they can become a limitation in some agro-industrial value chains, due to current framework regulation. In this context, the development of biological methods of transforming waste and effluents in energy and/or value-added products is a challenge for collaborative research between private and public sectors.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should address bioprospection of microorganisms able to transform agricultural and agro-industrial residues in added-value products in a economically feasible way. Cost-effective treatment units should be projected. Also technologies should be evaluated and specifically adapted to the impact region of interest, taking into account type and amount of residues (assessment of the environmental problem and/or business opportunity).</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Transformation of agricultural and agro-industrial residues into value-added products - Reduction of the environmental impact of intensified farming practices - Development of new knowledge and technology to valorize residues - Assessment of residues and feasible technologies for their treatment will set the basis to elaborate a regulatory framework for residues
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Research and innovation projects with private sector participation (SME instruments, 50%)</p>

BIODIVERSITY

Short background on the scientific research area

Biodiversity represents an economic potential that is closely linked to its valuation and technological use, which can in turn lead to increased agricultural and industrial productivity, as well as to improvements in health and nutrition.

Different countries in Latin America are considered privileged because of their plant diversity, but this can be amplified if microorganisms are included. The biodiversity inhabiting terrestrial and marine environments, explored and unexplored, harbors species whose metabolic processes could have applicability in a broad range of industrial processes.

In order to meet the quality requirements imposed by the market, the gap between the technology needed to elaborate standardized products and the related scientific capacity, needs to be assessed and overcome.

Collaborative CELAC and EU actions should be promoted to stimulate the interaction between different actors in research, policy and development, to optimize the use of renewable resources.

Added value of EU-CELAC cooperation in this area

EU-CELAC cooperation via experts in research, policy and development, will facilitate systematization and exchange of knowledge and expertise in genetic traits of natural resources. Moreover, improvements in field production, harvest, post harvest and processing will contribute to add value to native species. As a consequence, capacities in the exploitation of biodiversity will be strengthened in EU and CELAC and both regions will benefit from synergetic effects.

The cooperation will also facilitate business matchmaking and the establishment of public-private and private-private partnerships for new joint ventures. Moreover, it will avoid duplication of investments in uncoordinated projects of research and development.

Access to new natural resources like terrestrial and marine microbial diversity, standardization of bioactive compounds and their stability are topics that promote the growth of bioeconomy. On the other hand, development of information repositories helps access to and exchange of this knowledge.

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

Access to new biological resources and knowledge on stability of bioproducts are expected to have the following impact:

- Identification/targeting of promising new bioproducts.
- Availability of higher quality products for final consumers in EU-CELAC
- Health and nutritional benefits for EU-CELAC population.
- Promotion of biotechnology-based companies through the production of value-added products.
- Increased income generation and poverty reduction.
- Reduced pressure on natural resources in current production areas.
- Increased availability and lower prices of bioproducts for consumers in EU-CELAC.

Specific call topic suggestion

TOPIC 1: TITLE

Screening for new bioactive metabolites and enzymes from terrestrial and marine microorganisms for industrial use, based on market demand.

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>Microorganisms are the most prolific producers of enzymes and secondary metabolites. Microbial diversity inhabiting terrestrial and marine environments can expand the frontiers of biomass sources, contributing with new bioactive compounds having biotechnological, pharmaceutical and other industrial applications.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>The proposals should specifically address the identification and characterization of enzymes and new natural bioactive compounds from microbial diversity in CELAC and EU. The proposals should include the industrial applications, on the basis of previous diagnosis and identification of market needs.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Contribute to expand the frontiers of biological resources. - Facilitate the identification/targeting of promising new products to satisfy market demands. - New enzymes can contribute to reduce unwanted by-products in industrial processes. - Promote the creation of biotechnology-based companies through the production of value-added products with applications in many sectors (pharmaceutical, agricultural, health, etc).
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Interdisciplinary research projects</p>

Reserve List on Biodiversity

TOPIC 2: TITLE Health promoting compounds from plants

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>To elaborate final products that meet the quality requirements imposed by the market, it is necessary to standardize the contents of valuable health promoting components extracted from native biodiversity. Moreover, research is needed in order to identify and better understand the main factors that influence fluctuations in the content of active compounds in the final product.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should address the factors that influence stability of functional compounds found in promising plant species from CELAC. Best practices should allow reaching more efficient value chains (genetics, collection, harvest, postharvest, and manufacturing) through holistic quality management.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Availability of new quality products (health benefit) for final consumers in CELAC and EU - Value addition to the final products and increased income for actors involved in every segment of the production chain. - Enhanced conservation of biodiversity, through a sustainable use of selected target species.

<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Interdisciplinary research projects, with SME instruments (20%)</p>
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TOPIC 3: TITLE Integrated open access LAC databases on native organisms and their functionalities

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>Research on commercially valuable traits of native plant species (cultivated and collected from the wild) and microorganisms is often scattered, poorly documented and difficult to access. A collaborative platform of experts in research, policy and development is required to facilitate systematization and exchange of knowledge and experience in biological characterization, agricultural production and processing for value addition to native species.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>The proposals should aim at establishing a CELAC-EU facilitation unit to enhance the sustainable commercial use of prioritized native species from CELAC. The proposed facilitation should provide an open access database including systematized information on distribution, biological characteristics, best cultivation, harvest and post harvest practices, commercially valuable functional traits, current and potential uses and market opportunities for selected native species.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Identification/targeting of promising new products. - Identification of new potential to under-utilized plant species and microorganisms. - Avoid duplication of research and development investment. - Generation of product-specific register of institutions and companies involved in research, production, trade and development.
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Coordination and support actions Experts group from different participating countries to establish systematization procedures.</p>

BIOREFINARY & BIO PRODUCTS

Short background on the scientific research area

A biorefinery is, by definition, the integrated production of food, fodder, chemicals, materials, goods, and fuels by means of bio- or physicochemical processing of biomass. In that sense, humans are a good example of biomass processing to recover energy and chemicals to produce materials; however, the atomic efficiency of modern societies is quite low. Even worse, as seen in big cities, the richer the population is, more residues it produces. Losses in the feed chain have not yet been seriously examined. In summary, second-generation biorefineries not only should process non edible biomass, but should also push forward the gain of edible biomass resources. In this sense, new technologies for biomass recycling and residues processing are needed to enhance the bio-economy matrix. It is important to look at current food processing industrial centers and urban residues.

Added value of EU-CELAC cooperation in this area

Different value chains are competing for biomass feedstocks, not only for energy production but also for other uses. The topics proposed in this area will enhance innovations on biomass supply and logistics that can be learned and tested in each region (EU and CELAC). In addition, all the proposed topics consider raw materials that do not compete with food production (i.e. lignocellulosic, green crops or residues). The recycling of the leftover biomass after population consumption is also considered. The development of these topics not only will contribute positively to the bio-economy but to the reduction of the environmental impact of human activities

Development in this area will improve cooperation between scientists, farmers associations and agro-industry of EU and CELAC, making the whole process more sustainable. Moreover, positive results can be applied in cities through political actions to enhance the recovery of added value compounds from organic residues.

Expected long-term impact (5-10 years) impact of EU-CELAC cooperation in this area

- Development of the biorefinery concept in current biomass processing sites
- Boost of integral use of the biomass consumed in big cities to produce energy and added-value products
- Production of energy and compounds from non-edible renewable sources
- Energy intensification in current biomass processing sites and in new self-sustainable processing modules
- Valorization of residues

Specific call topic suggestion

TOPIC 1: TITLE

Valorization of agro-industrial and urban residues at current biomass processing and consumption sites.

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>A sustainable use of biomass sources requires re-thinking the current biomass processing chain in a more efficient manner. The development of self-sustainable plants with minimum production of residues and minimum consumption of fossil energy is an important challenge from an economical and environmental point of view. The development of modular units for the treatment of similar residues from different sources will contribute to the debottlenecking of biorefineries development</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposal should aim at assessing agro-industrial waste, characterizing and evaluating the potential uses of bio-based residues. The call will focus on process intensification and development of new technologies that contribute to the establishment of self-sustainable biomass processing sites. The development of small scale units to be integrated to current processing sites is expected. The units should have flexibility to treat similar residues from different sources.</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Valorization of agro-industrial and urban residues - Energy intensification through efficient integration in a single site. - Environmental benefits at current biomass processing sites - Assessment of losses in the feed and industrial chain, to help establishing regulatory frameworks. - Development of new technology-based business
<p>Type of action suggested: Research project, networking activities, mobility etc.</p>	<p>Collaborative research projects</p>

TOPIC 2: TITLE Lignocellulosic biorefinery platform: production of high-value bio-based products

<p>Specific challenge: Why is this topic relevant and which societal challenges does it address?</p>	<p>Lignocellulosic biomass feedstock consists mainly of C6 and C5 sugars (cellulose, hemi-cellulose) and lignin. This renewable feedstock can be used for the production of sugar-based or phenolic-based bulk chemicals. Due to the high stability of lignocellulosic material, economically feasible production of bio-based chemicals is still a major challenge.</p>
<p>Scope: Added value gained from EU-CELAC cooperation for both regions</p>	<p>Proposals should aim at the conversion of C5 and C6 sugars. The evaluation of lignin chemistry and conversion, as well as the use of lignocellulosic sources to produce chemical building-blocks for the chemical industry, are also important. Proposals should include environmental, economic and social sustainability assessment along the whole value chain (support activity)</p>
<p>Expected impact for both regions:</p>	<ul style="list-style-type: none"> - Reduced pressure on edible renewable biomass for energy and chemicals production - Reduced dependency on petrochemical products, such as furfural or phenol resin. - New synthesis routes of renewable chemicals

Type of action suggested: Research project, networking activities, mobility etc.	Research and innovation projects
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Reserve List on BIOREFINERY & BIO PRODUCTS

TOPIC 3: TITLE Green Biorefinery: Energy intensification and new bioproducts from wet biomass

Specific challenge: Why is this topic relevant and which societal challenges does it address?	Green 'nature-wet' raw materials (green grass, alfalfa, immature cereals, as well as microalgae) contain in general over 80% water, which makes transportation costly. Pre-processing green plants, proteins and carbohydrates at the place of harvest (i.e. prior to translocation), would be a solution to this problem. Green harvests show high potential, since they generate more biomass and proteins per hectare and year than mature harvests, forests or grain crops.
Scope: Added value gained from EU-CELAC cooperation for both regions	Proposals should address alternative biorefinery routes, focusing on small scale (pre) processing units. The use of energy to remove water from the wet biomass should be avoided or lowered, aiming at achieving a self-sufficient energy supply unit. The call also focuses on upgrading green-wet biomass for the production of fibers and protein valorization. Proposals should be supported by assessment of environmental, economic and social sustainability along the whole value chain.
Expected impact for both regions:	<ul style="list-style-type: none"> - New routes for bio-based production of fuel and products from wet biomass - Reduced pressure on edible biomass in a sustainable global bioeconomy - Reduced use of fossil fuels to transport nutrients that should be left in the field -Development of decentralized small-scale biorefineries, using the largest possible feedstock flexibility.
Type of action suggested: Research project, networking activities, mobility etc.	Collaborative research projects

5 Summary of EU-CELAC SOM decisions-making issues

- Recommendation 1: Joint Calls proposal analyzed and prioritized for the financing and implementation.
- Recommendation 2: Interested countries contributed to joint call budget.
- Recommendation 3: Bioeconomy Observatory (BIO-CELAC) proposal analyzed and approved for additional funding according to specific interest by countries. Senior Officials support to the scaling up phase and funding requirements
- Recommendation 4: Capacity Development proposal analyzed and approved for additional funding according to specific interest by countries.

6 Annex I

Roadmap for the development of a Latin America and the Caribbean Bioeconomy Observatory (BIO-CELAC)

Introduction: setting the scene

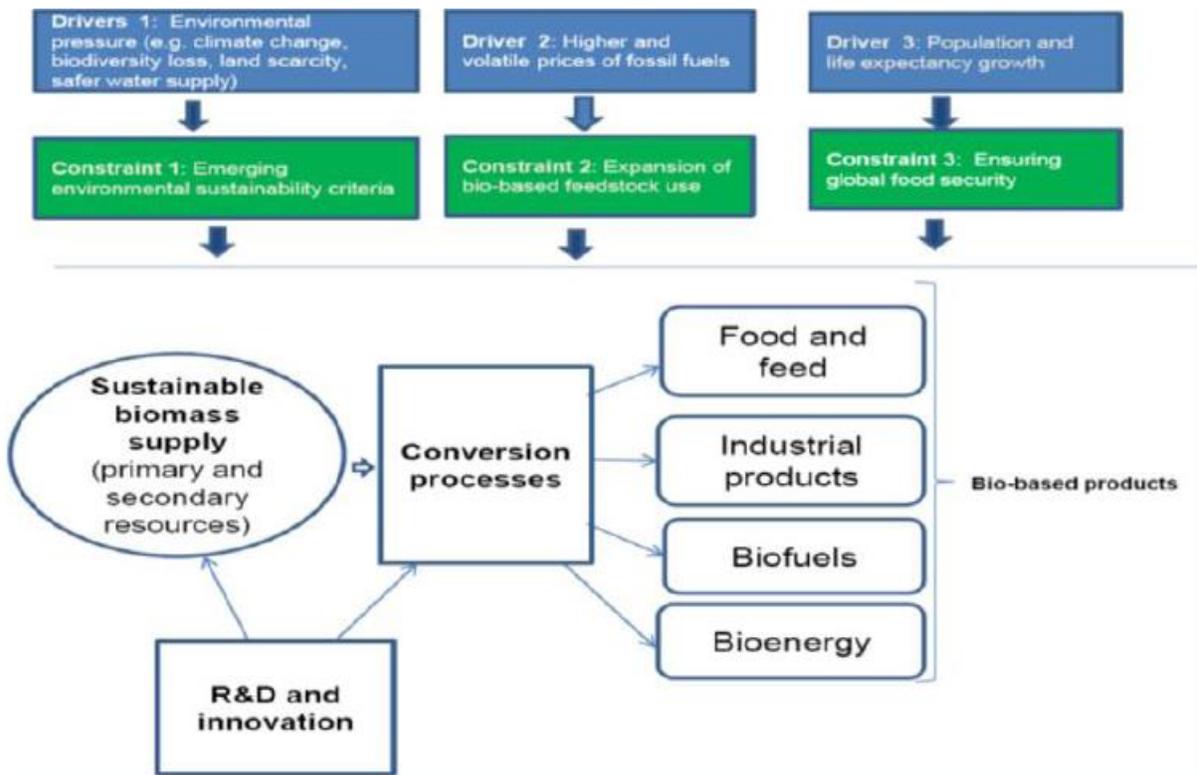
The emerging bio-economy is a dynamic and complex phenomenon.⁴ Since the bio-economy is cross-sectoral in nature and influenced by a wide range of inter-connected global drivers and constraints, understanding and managing the bio-economy requires an integrated multi-dimensional approach. Existence of interrelated, multi-scale effects, feedback loops, limitations in estimating both the multiple relationships between the bio-economy sector and the rest of the economy and its overall impact call for an integrated assessment and monitoring of bio-economy development.

In this context, several questions are of immediate interest, including: i) how best to characterize bio-economy's structure, scope and relationships with the rest of the economy; ii) what data, methods and models are to be used for its measurement and modelling and what are their application limitations; iii) what is its (current and future) global impact on environmental and development processes - i.e. to some extent, similar to the debate on the effects of first generation biofuels production on food prices and indirect land use changes; and iv) what will be its long-term aggregated impacts on society? For answering these questions a systematic approach for collecting specific information is essential.

Today, the transition from a fossil-based economy to a bio-economy is justified by the need for an integrated response to several global mega-trends such as: i) food security concerns induced by the fast-growing global (increasingly urban) population, diet dynamics and higher life expectancy, and the consequent rise of food and feed production and demand (according to Food and Agriculture Organization, plus 60% by 2050); ii) high dependence on fossil-based resources and the need for strengthening energy security, which call for a more diversified supply option range; iii) increasing demand of biological resources for bio-based products; iv) increasing sustainability concerns (e.g. GHG emission reduction, moving towards a zero-waste society, environmental sustainability of primary production systems, increasing land use competition, etc.). Figure 1, highlights the essential relationships of the bioeconomy with these challenges.

⁴ For the purpose of this document the "bioeconomy" it is understood as *the production of renewable resources and the conversion of these resources and waste streams into value-added products, such as food, feed, bio-based products and bioenergy.*

Figure 1: Global drivers and constraints conducive to bio-economy transition



The LAC Bioeconomy Observatory as a tool to support the development of the LAC bioeconomy

The EC financed bioregional network project ALCUE NET⁵ project has a specific task to develop a Bioeconomy Observatory in close collaboration with existing regional and national information systems to regularly assess the progress and impact of the bioeconomy and develop forward-looking and modeling tools for cooperation activities especially in but not restricted to R&I.

The specific objectives of this initiative are to contribute to:

- A better understanding of the bioeconomy by the general public and stakeholders
- Provide specific information to those actors who drive bioeconomy development within the region
- Establishing a one-point entry to the LAC Bioeconomy and Bi-regional cooperation

⁵ For details of this EU FP7 INCO-Net project see www.alcuenet.eu

- Provide information support for decision making and policy development
- To promote business development and support investment decisions in the related sectors
- To promote and increase the levels of social acceptance of the Bioeconomy principles, sectors and products
- Offering a platform for ALCUE Bioeconomy stakeholders to exchange information

A three pillar approach

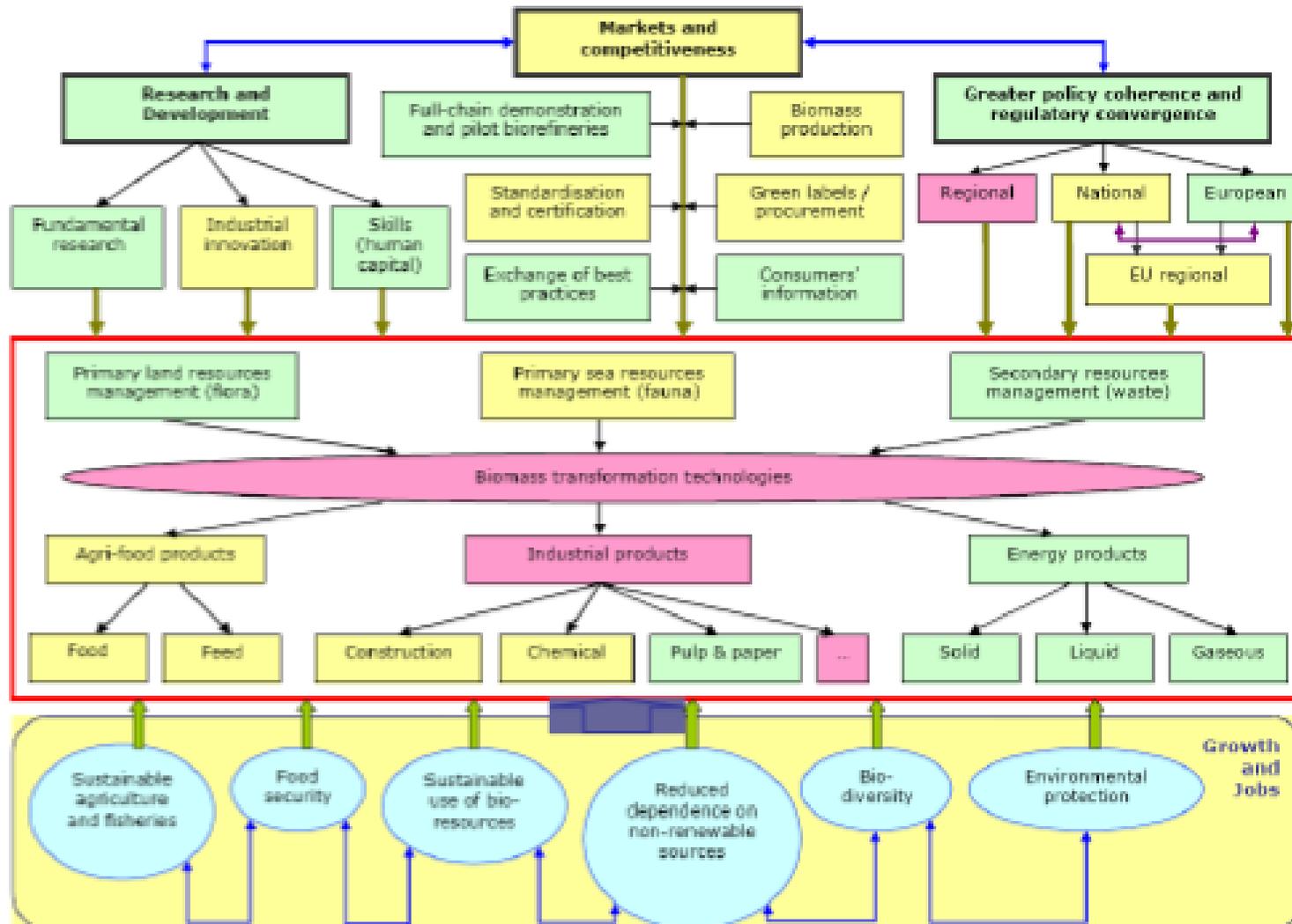
Experiences to date indicate that the bioeconomy is (i) highly dependent on the availability of new knowledge generating new options for linking natural resources to products and services, (ii) policy dependent, as it implies in many cases, the “creation” of new markets and for that public regulatory and policy interventions are essential, and (iii) creating investment opportunities in many sector of the economy (new value chains, new products, etc.).

Reflecting upon this reality the observatory will be organized around three main information pillars (i) research, development and information, (ii) bioeconomy related policies, and (iii) markets and investment opportunities.

Operationally, the observatory will be developed in a decentralized fashion seeking to take advantage – in as much as possible – of efforts already underway in relation to the collection and dissemination of relevant key information. Following this approach each of the pillars will be developed by an organization (or a group of organizations) already working in that field, with ALCUE-NET providing – during the initial phase – an “umbrella” entry point for all three pillars. This decentralized networking approach will also facilitate (i) to better reflect the diversity existing within the region, and (ii) the long term sustainability of the mechanism.

From the conceptual point of view (basis for the identification of the specific information to be included in each pillar), the organization of the observatory will follow a similar conceptual framework as the one currently being constructed for the development, monitoring and evaluation of the European Bioeconomy Observatory (see Figure 2).

Figure 2: Conceptual and analytical framework for the LAC bioeconomy



Construction and organization of the work plan

The Observatory is constructed around the aforementioned 3 pillars and complemented by a Management & coordination activity.

Pillar 1- Research & Innovation:

Task 1.1: Development of a common methodology, work team and main sources

Task 1.2: First pilot database implementation (ALCUE NET) & methodological validation

Task 1.3: Expansion of the database by different countries / different topics

Task 1.4: White papers

Suggested collaborators: RICYT, CIAT

Outcomes:

- Quantitative data (publication of key facts and figures on R&I on bioeconomy).
- Qualitative information (mapping of various initiatives on R&I on bioeconomy).

Pillar 2 - Policy:

Task 2.1: Development of a common methodology, work team and main sources

Task 2.2: First pilot policy inventory (ALCUE NET) & methodological validation

Task 2.3: Policy watch (expansion to different countries / different topics)

Task 2.4: White papers

Suggested collaborators: CEPAL, IICA, FAO

Outcomes:

- Comprehensive collection of qualitative policy information (in form of news), relevant to the bioeconomy to interact with policy-makers, dissemination, visibility at the international level

Pillar 3: Market:

Task 3.1: Development of a common methodology, work team and main sources

Task 3.2: First pilot sector value studies in selected countries (ALCUE NET) & methodological validation

Task 3.3: Expansion of countries and sectors

Task 3.4: White papers

Suggested collaborators: Buenos Aires Grain Exchange, Consumers International, CIAT, Latin American Exchange Association, UNICA

Outcomes:

- Collection of data to estimate economic impact and opportunities to make visible the LAC bio-based industries

Pillar 4: Management

Task 4.1: Communication & dissemination strategy

Task 4.2: Technology aspects

Task 4.3: Partners coordination

Task 4.4: Financial administration

Task 4.5: Completion of full proposal formulation + funding-negotiation

Task 4.6: Direct link to Observatories from EU and other regions and countries

Tentative timeline:

Pilot phase as part of the FP7 ALCUE NET project: 2014

Tasks: 1.1; 1.2; 2.1; 2.2; 3.1; 3.2; 4.1-4.5

Scaling-up phase: 2015-2017

Tasks: 1.3; 1.4; 2.3; 2.4; 3.3; 3.4; 4.6

7 Annex II

“Awareness Raising & Capacity Development to advance the Bioeconomy in Latin America and the Caribbean”

ALCUE – KBBE identified six pathways for the development of the bioeconomy in the Latin American and Caribbean region: (i) biodiversity resources exploitation; (ii) eco intensification; (iii) biotechnology applications; (iv) biorefineries and bio products; (v) value chain improved efficiencies; and (vi) ecosystems services.

Potential and drawbacks for the development of the paths have been identified. In biodiversity resources exploitation the main potential lies in the condition of the region as one of the most bio-diverse regions in the world; however, many of the most bio-diverse countries (except Brazil) lack scientific capacities to go beyond the screening segment in the development of bio-diversity related value chains.

The region has also made significant progress in the area of eco-intensification, but mainly related to the development of no-till and precision agricultural practices in commercial agriculture in the southern cone; small scale family agriculture has not benefited yet, but promising small scale developments are going in Chile, for example in the automatization of processes (e.g. crop monitoring, variable dosing, yield monitoring) in fruit production. It must be recognized, however, that as long as we do not reach the small holder farmers as well, we cannot speak about eco-intensification making a contribution to rural development.

A similar situation can be identified regarding biotechnology applications, with the main developments related to the development of GMOs, as part of a technological package that goes along with no-till and precision agriculture large-scale commercial models of production. Most of the knowledge in this field has come from outside the region and developments have been driven by large companies usually in the seed and fertilizers chains (e.g. Monsanto); however, there are promising developments at some NARDs such as Embrapa in Brazil (development of a virus resistant bean variety, in collaboration with Monsanto) INTA in Argentina (sunflower and wheat drought tolerant/resistant varieties). As in other cases, scientific capacities are restricted to a few countries (Brazil, Argentina, Chile, Mexico and Colombia) and INIFAP/CIMYT (breeding to draught, salinity and heat resistance in wheat).

In the area of biorefineries and bio products the main experiences relate to biofuels, with the most important developments in Brazil in sugar-cane ethanol. Argentina also has become recently an important global player in the soybean-based biodiesel market. Many countries have passed blending legislation, but because of scale the main potential is restricted to a few countries, such as Brazil (sugarcane bioethanol), Argentina (soybean biodiesel) and Colombia (sugarcane ethanol and palm oil biodiesel). The short-value and transitional nature of these biofuel chains is a shortcoming yet to be overcome with the development of longer-value added transformational bio-product chains. Also, the potential for small-scale biofuel developments oriented to energy intensification in remote rural areas has not yet been exploited sufficiently.

In value chain improved efficiencies, given the characteristic of the region as agricultural producer, the main potentials are in reducing post-harvest losses. Recent discussions on the future of food-systems in a context of global change also provide space for improving efficiencies, for example by reducing environmental footprints (carbon, water). This also relates to the full biorefinery principle where every molecule is used, as well as the cascading principle, which gives an order to use biomass for different applications based on environmental, and societal considerations. According to this principle biomass will

first be used as food and feed, further it can be used as a feedstock for the conversion into chemicals and materials, finally the residues or dirty fractions can be turned into energy sources.

Finally, there are important developments in the field of ecosystems services, such as the creation payments for environmental services and participation in forestry-related carbon markets; however, these developments have been part of the climate change architecture and not seen as part of a bio-economic driven strategy for sustainable development.

It must be recognized that at the national level, given specific resource endowments, capacities and societal priorities, other pathways can be identified in the development of National Bioeconomy Strategies. This can be an important result of awareness raising & capacity development, which can contribute to provide societal support for bioeconomy policy development at the national level.

Raising awareness about the bio-economy potential for the region and capacity development is therefore central for the development of the bioeconomy in the region. Four target groups are identified: politicians and policy makers, the scientific and academic community, the private sector, and consumers (including NGOs).

The main hurdles to overcome by the Awareness Raising Initiative (ARI LAC-BIOeconomy) include: (a) politicians and policymakers: overcome the lack of a bioeconomy policy perspective and the lack of institutional recognition of the bioeconomy as a model for sustainable and inclusive sustainable development; (b) scientific and academic community: overcoming the lack of scientific capacities and technical resources; (c) private sector: providing evidence of the market opportunities for profitable business development; and (d) consumers: playing a key role in the acceptance of bio-economy products.

The type of information to be communicated and the level of training differs in scope and depth among the different groups. The table in the Appendix provides a first approximation about the key messages that will be provided to each of the groups and the instruments that will be used to provide that information and knowledge.

In line with the Plan of Action CELAC 2014, which calls for strengthening the intra-CELAC coordination for the participation of Latin American and Caribbean Countries in the JIRI initiative of the UE-CELAC, and given the short awareness diagnostic provided, this proposal seeks to raise awareness and capacity among the target groups by communicating relevant information and offering training modules for the development of strong bioeconomy clusters in countries of the region that are policy and scientifically supported, business driven, and socially accepted.

The objectives of the ARI – LAC BIOeconomy include:

- To promote a better understanding of the bioeconomy concept with special focus on the biobased economy
- To promote policy dialogue, exchange and understanding among public and private bioeconomy stakeholders.
- To strengthen understanding of the potential of the bioeconomy and bioeconomic growth for inclusive, competitive and sustainable development.
- To systematize successful bioeconomy experiences in the region, especially on market and business development, public-private collaboration, university-business collaboration.
- To promote exchange of successful bioeconomy experiences from the region at local, national and regional levels.
- To promote the integration of value chains and the cascading approach (food/feed – Materials/chemicals – Energy) in the biorefinery approach.
- To explore other bioeconomy pathways that could be of interest at national levels, in addition to the six pathways identified in ALCU-KBBE.

The initiative is composed of three pillars:

1. Policy dialogue
2. Capacity development network
3. Media incidence

Following is a summary of the content structure in three pillars or work packages:

Pillar 1- Policy Dialogue:

Task 1.1: Bioeconomy policy conference LAC 2015 (2016) (ALCUE NET support)

Task 1.2: Regional bioeconomy policy dialogues (the first following the Bioeconomy Policy Conference).

Task 1.3: National conferences and issue specific workshops in interested countries (drawing from ALCUE-KBBE experience).

Task 1.4: Workshops with targeted audiences (e.g. Legislators, journalist).

Task 1.5: Policy position papers

Suggested collaborators: CEPAL, IICA, Consumers International

Outcomes:

- An enabling policy context for the development of a policy supported bioeconomy.
- At least three countries have on-going initiatives towards the development of National Bioeconomy Strategies.

Pillar 2 – Capacity development network:

T2.1 - Updated & dynamic data base of bioeconomy related courses – but offer a link with categorized courses (specialties), pilot installations available

T 2.2 - Course material - Library of bioeconomy courses and professors

- a. Shorter-courses
- b. Undergraduate
- c. Graduate

T 2.3 - Help desk/ match maker with EU-LAC universities in the field

- a. Brokerage events
- b. TGS
- c. Education angels – coaches

T2.4 - Private sector and industry related to bioeconomy for internships data base

T 2.5 - Alumni network of bioeconomy

- d. Diaspora network

Suggested collaborators: (academic and private sector actors): CIRAD, CIAT, ICESI,

Outcomes:

- An enabling context for the development of a business driven and scientifically supported bioeconomy clusters in LAC region.
- Increased public-private, business-academia collaboration on bioeconomy issues.
- Better informed and trained Bioeconomy related actors

Pillar 3 – Media incidence

Task 3.1: LAC bioeconomy website

Task 3.2: Development of educational materials aimed at middle school students

Task 3.3: A series of info-graphs negotiated and published with major popular newspapers with bioeconomy related information.

Task 3.4: A survey on the public perception and knowledge of the bioeconomy.

Task 3.5: Focus groups to explore public perceptions of the bioeconomy (to support the elaboration of communication strategies at the national level in support of National Bioeconomy Strategies).

Suggested collaborators: MENON, NGO in Communication, Consumers International

Outcomes:

- Increased public knowledge about the bioeconomy concept, its potentials and requirements.

Pillar 4: Management

Task 4.1: Communication & dissemination strategy

Task 4.2: Technology aspects

Task 4.3: Partners coordination

Task 4.4: Financial administration

Task 4.5: Project management

Time line

2014 – consolidate proposal and negotiate the project, as part of ALCUE NET

2015-2017 – in parallel to ALCUE NET – implementation phase requiring additional resources

8 Annex III

SUMMARY of CARIBBEAN H2020 Policy note “Securing greater impact through EU-Caribbean collaboration in Horizon 2020”

In order to increase the participation rate of Caribbean partners to the EU H2020 framework programme, the Eucarinet policy brief envisages to provide **Caribbean specific insights** to **improve H2020 EU-CAR collaborations** as well as **inputs into the multi-annual road map** for the CELAC region of Horizon2020.

The paper highlights clear cross-thematic (transversal) **Caribbean specific advantages/assets** for collaboration within H2020, i.e. the high **degree of diversity** in the Caribbean region which provides an ideal setting to determine how the inherent complexity of nature responds to human pressures and global change; **Caribbean islands as natural laboratories** particularly suitable for conducting research as a result of their discrete boundaries and their inherent diversity in terms of natural, cultural and socio-political systems; **the market opportunities offered by for European technologies**.

Five topics for targeted EU-CAR collaboration have been identified within the focal areas “*Blue Growth (BG): unlocking the potential of seas and oceans*” and “*Sustainable Food Security (SFS)*” **for input in the multi-annual EU-LAC roadmap:**

- Environmental profit and loss accounting
- Integrated coastal zone management
- Integrated aquaculture
- Secure supply chain systems for Caribbean producers and European SMEs
- Application of innovative technologies

The paper ends with six recommendations to secure greater collaboration

- **Continue and reinforce research and innovation dialogues with EU** to identify common EU-Car challenges. Ensure appropriate representation of the Caribbean region by well established institutions in the Joint Initiative on Research and Innovation (JIRI) and other decision making fora.
- **Expand networks such as the European Enterprise Network and EUREKA** to serve as an EU-Caribbean observatory to exchange business intelligence and information about opportunities for research and innovation
- To ensure that **Caribbean regional institutions** that serve a multiplicity of countries (both those eligible and not eligible for automatic funding) are able to participate and collaborate under the H2020 programme
- Consider 1) EU/CAR- specific themes in ERANET-LAC joint calls and 2) ongoing actions for twinning purposes
- Sustain and strengthen the Caribbean NCP and research officers
- The establishment of instruments to facilitate the institutional linkages between Research and Innovation actors in the two regions (INCO house, INCO lab instruments can serve as examples)

9 Acronyms

ALCUE	América Latina y Caribe – Unión Europea
ALCUE NET	Latin America, Caribbean and European Union Network on Research and Innovation
ALCUE– KBBE	Towards a Latin America and Caribbean Knowledge Based Bio-Economy in partnership with Europe
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement (France)
CYTED	Ibero- American Programme for Science, Technology and Development
EC	European Commission
ENLACE	Enhancing Scientific Cooperation between European Union and Latin America.
ERA	European Research Area
ERANet- LAC	Network of the European Union, Latin America and the Caribbean Countries on Joint Innovation and Research Activities
ERA-Nets	European Research Area Networks
ETPs	European Technology Platforms
EU	European Union
EUCARINET	Strengthening the Sustainable Scientific Cooperation between Europe and the Caribbean
EULAC	European Union, Latin America and the Caribbean
FP7	Seventh Framework Programme
INCO-NETs	Platforms bringing together policy makers and stakeholders of an individual targeted region
JIRI	Joint Initiative for Research and Innovation
KBBE	Knowledge Based Bio-Economy
LA	Latin America
LAC	Latin America and the Caribbean
LATPS	Latin America Technological Platforms
MINCYT	Ministerio de Ciencia, Tecnología e Innovación Productiva (Argentina)
NCPs	National Contact Points for the Seventh Framework Programme
RTD	Research & Technological Development
S&T	Science & Technology
S,T&I	Science, Technology and Innovation
SMEs	Small and Medium Enterprises
SOM	Senior Officials Meetings
STI	Science Technology and Innovation
TP	Technology Platform
WG	Working Groups
WP	Work Programme