



# How do we create the requisite institutional framework and public policies to develop the bioeconomy in LAC<sup>1</sup>

## Introduction

The bioeconomy is a new production paradigm that opens up numerous opportunities for economic development in Latin America and the Caribbean (LAC), due to the importance of natural resources in the region's economic structures (and in subsequent industrial linkages), its

scientific and technological capabilities, the existing production facilities and the prospects offered by international bioproduct and bioservice markets.

Through new sciences and technologies, the bioeconomy allows for more productive and sustainable use of biological resources, by generating plant and animal materials that are

### What is the bioeconomy?

The bioeconomy is the intensive and knowledge-based use of biological resources, processes, technologies, and principles, for the sustainable provision of goods and services in all sectors of the economy.

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For a region such as LAC, where biological resources provide one of its greatest comparative advantages, the use of the bioeconomy in production opens up a new window of opportunity for genuine and sustainable development.

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1. This technical note summarizes the principal findings of the "Guide for the formulation of public policies and strategies to foster and promote the bioeconomy", which was developed by IICA and will be available shortly at [www.iica.int](http://www.iica.int).

more productive, disease-resistant and environmentally friendly. It facilitates the use of biomass, including residue and waste, to produce new high value-added bioproducts, such as food, bioenergy and biomaterials for the cosmetic, pharmaceutical and chemical industries, as well as a range of new services that can be applied in the fields of human, plant and animal health or environmental bioremediation. Indeed, it enhances the value of biodiversity.

The bioeconomy ushers in a new industrial model geared toward the “comprehensive transformation of biological resources”, while respecting the environment, proposing a new territorial balance, developing the business ecosystem and establishing a more diversified production structure with a greater capacity to generate employment and opportunities for international trade access.

Nonetheless, the shift towards a new paradigm based on the intensive knowledge-based use of biological resources, processes, technologies and principles to achieve the sustainable production of goods and services, as proposed by the bioeconomy, will necessitate an adjustment in the way in which the production system interfaces with the rest of local society and the international environment. Therefore, it will call for a new institutional framework and the corresponding public policy framework.

## Policy-related challenges in transitioning towards the bioeconomy

Much like other experiences involving the introduction of a new production paradigm, the process is not automatic, instantaneous, linear, much less tension- or conflict-free<sup>2</sup>. The implementation of a bioeconomy paradigm is a complex process that requires institutional frameworks and public policies to cover all areas, which should operate in a coordinated fashion over time, within an organized and flexible framework, given the variability of the biological component and the fact that some support technologies are not yet mature.

Therefore, there will be a need to spur the integrated and complementary development of production activities of the new paradigm, based on the efficient and sustainable use of biological resources, for which the requisite procedures for storage, logistics and distribution may still not have been developed. Furthermore, in much of the region, the consumption of new bioproducts and services is still not entrenched or fully incorporated into daily life, beyond a vague and general acknowledgement of the convenience of adopting them. The dissemination and

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2. More so considering that the disruptive technologies that fuel it are predominantly applied to living things, which are subject to their own processes of improvement.

entrenchment of the new paradigm will depend of full acceptance by society.

It is apparent that applied bioeconomy is an area that defies the imagination and creativity of public policy, prompting several questions: How does one formulate public policies for the bioeconomy? Where do we begin? What analytical guide should be used? What are the recurring themes? What economic and human resources would be required? What are the general parameters of a possible work agenda?

These questions cannot be considered in abstract terms and the answers to them will vary, depending on each country's resources and capacities, which should serve as a starting point to design the pathways for use of the bioeconomy in production, both in agriculture and its subsequent production linkages, as well as in rural areas. Whereas the potential of some countries will lie in their technological capacities, prior production development or the maturity of their markets, in other cases, it will hinge on their biodiversity, or size, or possibly

on the development of their production, agricultural or industrial capacities.

It is evident that not all countries will capitalize on the production use of bioeconomy to the same extent. Some will do so by introducing production-commercial models that employ state-of-the-art technology to make intensive use of biological resources and principles (such as biorefineries that use biomass to produce bioenergy and biomaterials, the biohealth industry that modifies pre-existing health models or bioeconomic services). On the other hand, others will opt to apply traditional technology models that make greater use of the abundance of biological resources in the territory and in the chain (such as traditional production activities that incorporate biological inputs; agricultural products that utilize resources from the farm to offer ecotourism services; or agricultural and livestock industries that utilize residue or waste to generate bioenergy for personal consumption, biofertilizers, food products, to name just a few examples). See Annex 1 for more details.

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Even though all countries in the region share general principles regarding the new bioeconomy paradigm, the disparities between their starting points would necessitate differentiated strategies and specific policies.

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## Roadmap to devise policies to promote the bioeconomy

What steps should be taken to institutionalize the bioeconomy and to devise policies and strategies that foster and promote it? A careful analysis of international experiences enables the identification of best practices and lessons learned (see summary in Figure 1).

**Figure 1.** Guide for the establishment of an institutional framework and public policies to promote the bioeconomy in agriculture and rural areas in LAC

## **1. Building a bioeconomy system**

- Establishment of a Bioeconomy Promotion Group (BPG) as the sphere in which bioeconomy policymakers develop their activities
- Development of an appropriate bioeconomy concept that facilitates ongoing discussions between scientists, technology experts, businessmen, politicians and other civil society actors.
- Analysis of the potential of the bioeconomy: mapping of resources and capacities (biological, technological, human, production, market, etc.) that can serve as starting points for the bioeconomy
- Identification of initiatives that although not integrated or coordinated, can contribute to meeting the objectives of the bioeconomy (science and technology, agriculture and livestock breeding, natural resources and the environment, energy, public health, etc.)

## **2. Establishing institutional spaces**

- Defining of an institutional space (Ministry, Secretariat, Directorate, etc.) from which to develop partnerships and agreements with other public administration entities, the private sector, academia and civil society
- Elevation of the BPG to a supraministerial level as a policy sphere

## **3. Defining the modus operandi of the BPG**

- Defining of technical and academic profiles and the Group's relationship with the institutions involved
- Defining its relationship with international cooperation organizations
- Identification of spokespersons at all levels
- Defining of operational mechanisms (with a view to developing the bioeconomy)

## **4. Formulating a BPG work agenda**

- Entrenchment of the issue of the bioeconomy in various sectors of the society
- Development and consolidation of a shared vision of the Bioeconomy as the cornerstone of sustainable economic development
- Establishment of an institutional structure and a governance system for the promotion group
- Development of a Strategy for the development of the Bioeconomy and creation of an Action Plan

The **first step** is to create a formal forum to bring together and facilitate interaction between reference persons or groups that have introduced the issue of the bioeconomy in recent years and proposed actions in different public and private institutional spheres. Having undertaken a country-by-country assessment, it is clear that this forum, which we have called the Bioeconomy Promotion Group (BPG) should include middle managers in public administration, who have professional training and established positions in areas associated with medium-term bioeconomy-related programs or projects; and are located in government administration agencies related to this issue (generally in the areas of science and technology, agriculture and the environment) that operate as technical and policy points of contact with other public administration agencies and as focal points for the cooperation programs of international agencies.

The BPG will be tasked with formulating a concept of the bioeconomy that facilitates ongoing discussions between scientists, technical experts, businesspeople, politicians and other actors in civil society. The Group will also be expected to analyze all the resources and capacities that fuel the development of the bioeconomy at the country level, as well as at the territorial or value chain level. Among other things, this task will include analyzing the current scientific and technological status of each area related to the bioeconomy, keeping abreast of the latest scientific and technological developments, identifying bioeconomy-related developments in production in other regions, and

analyzing the limitations and bottlenecks imposed by existing legal frameworks, generally associated with the traditional way of doing things. Additionally, in this first stage, the BPG should identify initiatives that although not integrated or coordinated, can contribute to meeting the objectives of the bioeconomy (science and technology, agriculture and livestock, natural resources and environment, energy, public health, etc.).

The **second step** is to create a policy space to institutionalize the development of the bioeconomy at the highest policy level. This may mean placing the issue under the aegis of a public entity (for example, a ministry or secretariat) that will then forge agreements and partnerships with other relevant bodies, or it may go as far as elevating the BPG to a supraministerial level, with a formal policy mandate and its own operational structure. Having defined an institutional framework for bioeconomy policy, the task will then be to establish its *modus operandi* (**third step**).

Once the structure of the BPG has been consolidated and institutionalized, and once it has formulated an appropriate concept of the bioeconomy, identifying its potential and analyzing initiatives that may serve as points of departure, the Group can then proceed to step four: formulating a work agenda.

As outlined in Figure 2, this **fourth step** will pave the way for the entrenchment of the bioeconomy as a new development paradigm in all sectors of society, as well as the creation of the governance structure and public policy needed for its implementation and development.

**Figure 2.** Step four: formulation of a work agenda.



### **Entrenchment of the concept of bioeconomy and awareness building about its potential**

- Preparation of a document that combines messages based on a shared vision (public and private sectors, academia, international organizations, etc.)
- Dissemination, promotion and awareness-building strategies at all levels
- Inclusion of educational modules in the basic education system
- Sharing of success stories, for purposes of demonstration



### **Generation of a Shared Vision within the public sector**

- Surveying of technical bodies within the public sector for each of the 6 areas of the bioeconomy
- Working groups for each thematic area to analyze the capacities and limitations (biological, human, technological, production-related, legal, etc. ) and to create projections (aspirations)
- Consolidation of visions of the bioeconomy and of each of its specific areas
- Validation of visions with public and private actors, academia, international organizations, civil society, etc.



### **Construction of a policy governance structure with a wider scope than BPG**

- Assessment of public policy areas and their respective legislation in this area
- Identification of decisionmakers in the thematic areas
- Identification of principal activities/ ongoing projects
- Development of a Policy Coordination Steering Group –at the middle and higher echelons of the public sector (to validate the process)
- Development of an agenda of proposals for the institutional framework, policy agreements and legal implementation.



### **Formulation of a Bioeconomy Development Strategy and Action Plan**

- Development of a proposed strategy that addresses the specific problems and potential of the bioeconomy (using change theory)
- Development of an Action Plan (policies, regulations and investments) by the BPG, addressing, at least, the following areas: a) timeframe and institutional entrenchment; b) rules governing implementation; c) an approach to enable the participation and involvement of various actors; d) generation of information; e) sensitization on the issue; f) strengthening of the innovation network; and h) funding.



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A paradigm shift will require a new institutional and public policy framework that not only fosters and enables new production applications of the bioeconomy, but is also sufficiently flexible and adaptable to ensure sustainability over time and to guarantee environmental and health security.

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After the four steps of the guide have been completed, national and international actors involved in the production development of agriculture and rural areas will be aware of the potential of the bioeconomy and will have a shared vision of it as the cornerstone for sustainable development. Governance structures for the bioeconomy with a much wider scope than the BPG will have also been established (a major public-private ecosystem will have been created) and a strategy for the development of the bioeconomy will have been implemented with short-, medium- and long-term plans.

## IICA's support for policy management processes to promote the bioeconomy in LAC

Cognizant of the potential of the bioeconomy to develop agriculture and rural areas in LAC, the Inter-American Institute for Cooperation on Agriculture (IICA) established a technical cooperation

hemispheric program in its 2018-2022 Medium Term Plan that will assist its member countries to: i) establish a bioeconomy-based vision for the production development of agriculture and rural areas, and ii) promote the formulation and implementation of strategies, policies, norms and investments that enable these countries to capitalize fully on the production potential of the bioeconomy, in an inclusive and sustainable manner.

With this in mind, the Bioeconomy and Production Development Program of IICA will focus on four strategic areas:

1. Evidence, awareness- and capacity-building: research, studies, workshops, seminars and courses to promote awareness and greater capacity among decision-makers and actors in the agriculture and rural sector in the new applications of the bioeconomy.
2. Roadmaps: formulation and implementation of tools to create country-specific roadmaps to capitalize on the bioeconomy.
3. Policy, regulatory and legal frameworks: support for management of policies, regulations and market incentives that facilitate and enable new applications of the bioeconomy in production in the agriculture sector and rural environment.
4. Investments and chain strategies: support for the design and implementation of strategies, projects and investments to foster new bioeconomy business models in rural areas and in agricultural value chains.

## Annex 1. Thematic areas of the bioeconomy

- **Natural resources and biodiversity (recognizing the value of biodiversity):** The valuing of biodiversity will stem from the recognition by society that the possession, sustainable reproduction and use of animal and plant species and the ecosystemic services that they offer are valuable assets. This recognition may be demonstrated through attaching a cost (for example, the water in a hydroelectric dam or the landscape as a basis for tourism) or through extra-market considerations (for example, the preservation of biodiversity and air quality).
- **Bioenergy:** Energy generated from biomass (plants, waste or recycling, using bio-based technology), ranging from basic heating with firewood, through increasingly common biodiesel and bioethanol fossil fuel blends, all the way to second generation biofuels (for example, hydrogen cells powered by ethanol produced from plants).
- **Biohealth:** This field is applicable to humans, plants and animals, as well as to the environment itself and involves bioeconomy products and services that substantially alter traditional health models, as reflected in activities such as gene therapy in human healthcare, bioremediation of degraded soils and the use of biocontrollers in agriculture.
- **Agriculture and food:** Above all, this area focuses on the various ways of supplying food, but with an emphasis on ensuring efficient use and processing, the reuse of waste, minimizing of losses and incorporation of the concept of functional foods (nutraceuticals and probiotics).
- **Biomaterials:** Regrouping of naturally occurring monomers and polymers which are used to replace the chemical inputs that are currently derived from fossil fuels. The idea is to utilize biomass and waste as inputs in a modernized material industry to substitute inert inputs or byproducts from the cracking of petroleum or fossil gas.
- **Bioeconomic services:** Associated with the specific characteristics of the new paradigm, these include genomic analysis services and bioinformatics, which are key to the development of some of the most important technologies of the bioeconomy.



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