DECEMBER 2024

Amazon Bioeconomy Marketplace Initiative

Market-Based Analysis of the Bioeconomy Ecosystem and Mapping of Bio-businesses with High Export Potential in the Colombian and Ecuadorian Amazon

The Rainforest Alliance is creating a more sustainable world by using social and market forces to protect nature and improve the lives of farmers and forest communities.

CONTENTS

Colombian and Ecuadorian Amazon bio-businesses create a wide variety of goods derived from forest products, including those on display here.

INTRODUCTION

The vastness of natural resources in the Amazon represents enormous potential for sustainable business development that regenerates tropical forestland while elevating the value of nature within global markets. The Amazon bioeconomy encompasses multiple and varied economic systems based on the sustainable use of biological resources to produce goods and services while reducing negative environmental impact and protecting forests and their biodiversity. The wide range of products and services offered throughout the Amazon basin within the forestry, agriculture, and biotechnology sectors cannot be overstated. Local bio-business owners possess a wealth of knowledge on production, use of raw materials, cultural and ancestral practices, and a deep understanding of the value of their natural capital. A crucial strategy to achieving international climate, biodiversity, and development goals —particularly in regions such as the Amazon— is to propel forest-positive economies in which forest communities, governments, multilateral institutions, and companies are leading the development of market-based solutions to the interrelated challenges of rural poverty and deforestation.

In partnership with the Inter-American Development Bank (IDB), the Rainforest Alliance is implementing the first phase of IDB's Amazon Bioeconomy Marketplace (ABM) initiative to improve socioeconomic conditions, fight climate change, and help restore ecosystems in the Amazon by supporting the identification and growth of export-oriented sustainable bio-businesses. Through business development activities such as product development and quality verification, continuous improvement planning, negotiation and commercial partnerships, among others, ABM aims to support bio-businesses to increase their access to export markets.

As part of its work under ABM, the Rainforest Alliance carried out a market-based analysis to gain a deeper understanding of the status and potential of the bioeconomy in the Colombian and Ecuadorian Amazon. The analysis includes a mapping and prioritization of bio-businesses with high export potential and identifies critical areas for sustainable growth, investment, and training, based on the expressed challenges, needs, and goals of bio-businesses. The analysis, including field visits, interviews, and desk-based research, was carried out from October 2023 to February 2024.

This results report makes several contributions to the global discourse and approaches to strengthening the Amazon bioeconomy:

- It provides a quantitative methodological framework for assessing diverse bio-businesses against a standard set of social, environmental, and operational performance criteria and prioritizing those bio-businesses with sustainable growth and export potential.
- It presents insights on challenges and opportunities from a range of actors within the bioeconomy ecosystems of Colombia and Ecuador, including government and financial institutions, service providers, consumers, and bio-businesses themselves.
- It offers a list of recommendations for public and private sector actors of the bioeconomy ecosystem to generate more and better opportunities for bio-businesses to create value chain efficiencies, improve business operations, and access markets for their sustainable origin products.

Açaí berries are the basis of many forest-derived products in the Amazon, including fruit pulp, snacks, and natural oils. Photo by Lets

PURPOSE AND METHODOLOGY

Through this market-based analysis, ABM sought to identify high performing bio-businesses, those with export and investment potential, assess the bioeconomy ecosystem in which they operate, and define the technical assistance and investment needs that would support bio-businesses to enhance their productive and business capacities and access new markets. The following overarching questions guided the analysis:

1. What is the status of the bioeconomy (principal value chains; product and service offerings; bottlenecks; demand, etc.)?
2. What are areas for potential growth, investment, and increased efficiencies in the bioeconomy ecosystem?
3. What bio-businesses have export potential?
4. What technical and financial assistance is needed to bring sustainably produced goods to international markets?

The analysis was designed and conducted using a mixed methods approach. Both qualitative and quantitative methods and secondary and primary data were assessed from a variety of sources. The Rainforest Alliance conducted a desk review of 16 documents, including sector specific and government reports, policy documents of relevant ministries in each country, and thematic reports and data on supply and demand, finance, and social themes. Qualitative information was collected through a total of 71 stakeholder interviews and meetings (11 institutional stakeholders, 57 bio-businesses, and three financial institutions). Interviews were semi-structured, using an established questionnaire. Information from interviews was collated and analyzed by category including sector/industry and product type; challenges and opportunities; operating and business environment; governance; among other variables.

In addition, the Rainforest Alliance carried out a quantitative assessment on a total of 893 bio-businesses (442 in Colombia and 451 in Ecuador). The list of bio-businesses was compiled with support from multiple stakeholders, including several ministries in each country, as well as local and regional stakeholders operating in the regions. Each bio-business was evaluated against a set of criteria that included financial capacity; social and environmental impact; geographic location (access to productive/market nodes, security); performance based on relevant Ministry of the Environment Standards in each country; and export potential of the product offering (whether the product has an official export record and established legislation for export in the country).

A weighted scoring methodology was developed to prioritize and qualify bio-businesses equally and facilitate comparative analysis. Bio-businesses were assessed, scored, and filtered to select the top 10 with the highest score in each department (60 total in each country). These top scoring bio-businesses were contacted for in-depth conversations, resulting in 57 final interviews with priority bio-businesses in which interviewers delved into their unique experience, including production and product offering, pain points, and growth objectives. Qualitative data from these interviews was

collated and analyzed using a matrixed analysis tool to identify the most significant themes.

Finally, using information collected and verified through in-depth interviews, the Rainforest Alliance ran additional diagnostics on the 57 bio-businesses to determine their potential for exportation in international markets, further filtering the list to identify a final 18 bio-businesses (nine in each country) with the highest potential to either enter international markets or to vastly grow their market presence in cases where they are already exporting some volumes. This final analysis to determine export potential and select high priority bio-businesses was based on four criteria:

- **Finished product or service:** Has the product successfully completed all phases of development and is it market-ready? Has the product undergone quality testing and/or verification based on applicable local and international standards?

- **Relevant environmental permissions:** Does the bio-business possess the relevant environmental licensing to operate according to the competent authorities in the country? Does the bio-business possess the relevant permissions for land-use, sustainable management, and harvesting of Amazon-based products?

- **Relevant health and sanitary permissions:** Does the bio-business possess the relevant public health and sanitary licenses to operate transformation facilities, engage in manufacturing processes, package, and put their product on shelves according to the relevant authorities in the country?

- **Adequate organizational and business governance structures:** Is the business and operating structure clearly defined and documented? Are corporate governance, transparency, and accountability systems defined and documented? Are there clear internal controls, administrative systems, roles and responsibilities, and mechanisms for decision making? Does bio-business have a sales strategy that has the potential to respond to the requirements and characteristics of international markets?

Limitations

Given the extensive and remote regions targeted within the Amazon, there were limitations in obtaining and verifying data from select bio-businesses. Due to security issues, the evaluation team was unable to conduct interviews with some bio-businesses in person, though these were conducted virtually. In other cases, the lack of connectivity of bio-businesses inhibited the evaluation team's ability to reach and speak directly to representatives, limiting the total sample of bio-businesses interviewed directly. Due to the highly diverse nature of the regions in which bio-businesses operate and of the bio-businesses themselves, it is difficult to generalize about the overall bioeconomy based on the interviews. Thus, the approach was to complement bio-business interviews with quantitative analysis, desk review, and additional stakeholder interviews and triangulate findings across all sources.

DESCRIPTION OF TARGET REGIONS

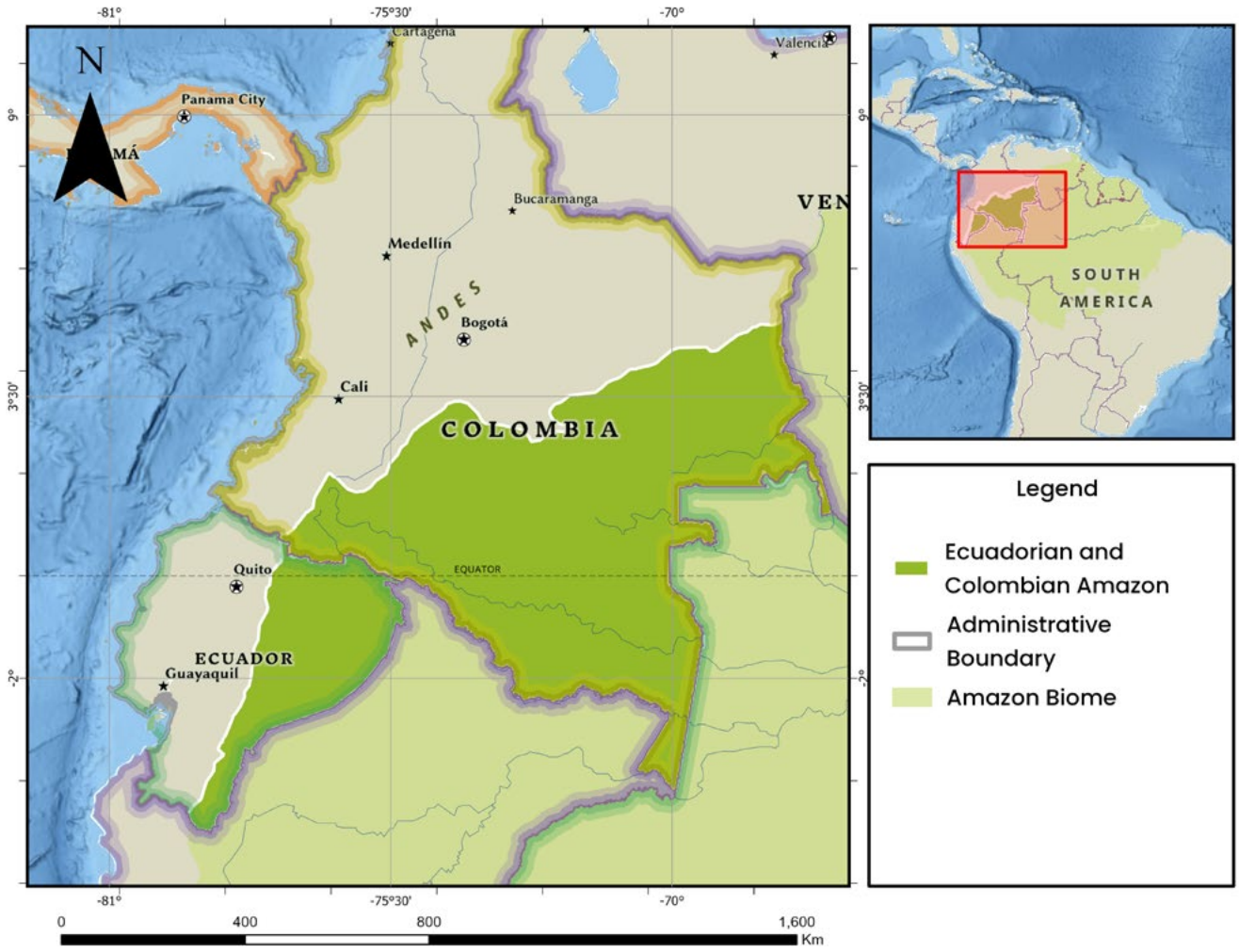
Spanning nine South American countries and 7 million sq km (2.7 million sq miles), the Amazon is the world's largest forest. Unparalleled in its biodiversity, it is home to one in 10 known species. The Amazon provides vital ecosystem services, working on a grand scale to regulate climate, balance ocean currents and wind patterns, purify water sources, and counter CO_2 emissions globally. Around 34 million people live within the Amazon biome,[1] including more than 2 million Indigenous People[2] representing over hundreds of Indigenous cultures whose ancestral practices and way of life are critical to its preservation.

The geographic scope of this analysis included the Amazon biome regions of Colombia and Ecuador, totaling about 603,000 sq km of highly biodiverse landscapes, ranging from tropical forestland to precipitous mountain ranges and extensive river basins. In Colombia, this includes the departments of Amazonas, Caquetá, Guainía, Guaviare, Putumayo, and Vaupes, while in Ecuador it comprises the provinces of Morona Santiago, Napo, Orellana, Pastaza, Sucumbíos, and Zamora Chinchipe. These regions represent unique socioeconomic, cultural, and ecological conditions that influence the types of natural resources and productive inputs available, the costs of production and distribution, competitiveness of bio-businesses, agricultural practices, processing, transportation, and manufacturing, etc. Both regions include complex mosaics of different land uses, comprising national protected areas and communal forest reserves, areas designated for sustainable forest management, and commercial agriculture and livestock. In both regions, there is high biodiversity that facilitates the availability of distinct raw materials, contributing to their potential and competitive advantage in the global bioeconomy. Additionally, both regions share a rich cultural presence of Indigenous Peoples and native

The Ecuadorian Amazon is one of the most biologically diverse places on the planet. Photo by Dominika Miłek

FIGURE 1

Colombian and Ecuadorian Amazon Biomes



communities that contribute valuable traditional knowledge which can be harnessed to accelerate sustainable value chain development, promote ethical business practices, and strengthen regional identity, adding value to unique origin products and services.

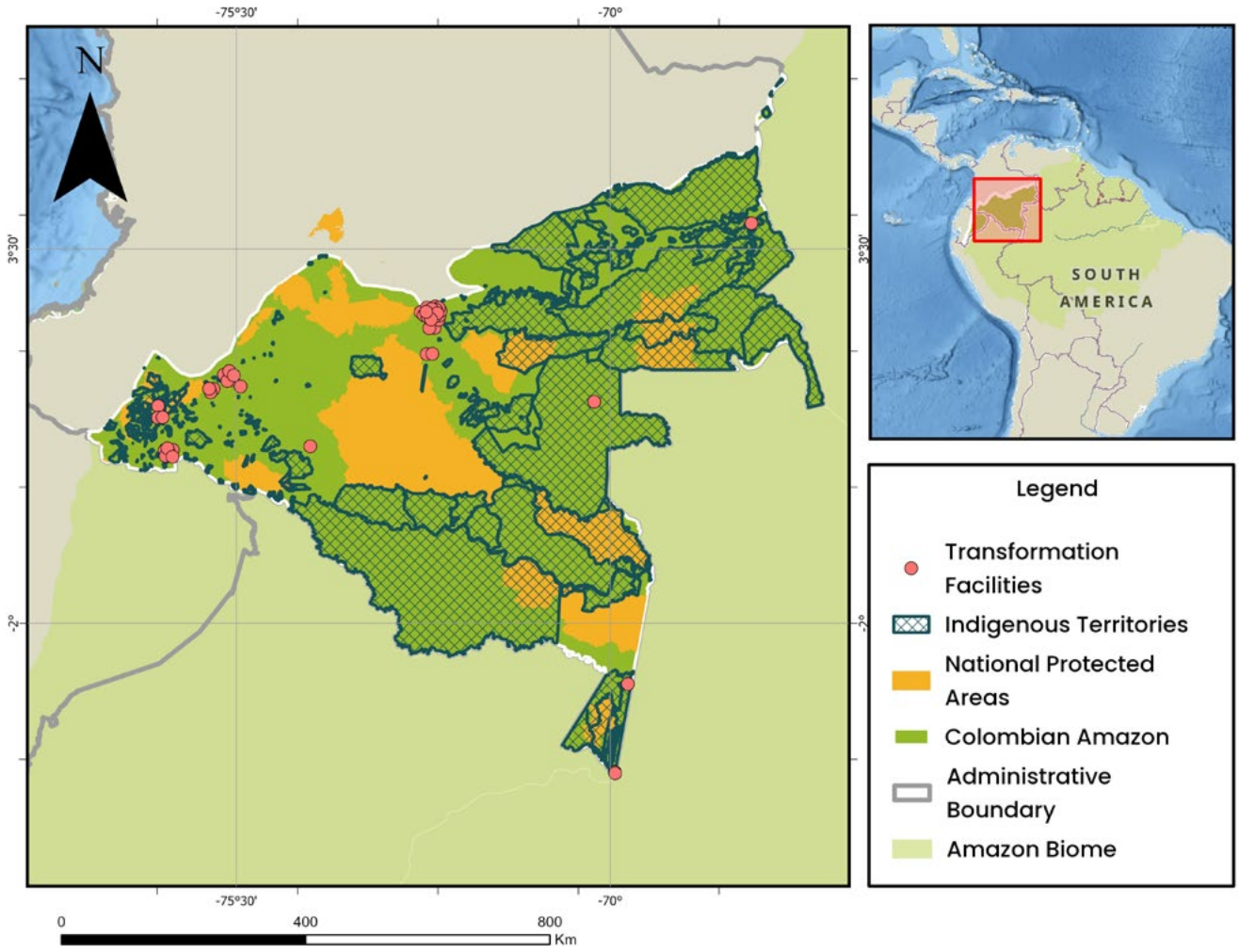
Colombian Amazon

The six departments spanning the 483,000 km sq of the Colombian Amazon are highly biodiverse, with Caquetá boasting five national protected areas alone[3] and Guaviare hosting the Chiribiquete National Park—the world's largest national park—representing 30 percent of ecosystems and flora in the Colombian Amazon. The Putumayo and Caquetá rivers feed the extensive Amazon basin, providing crucial water and ecosystem services, sustaining fishing, agriculture, and transportation activities. From 1985 to 2022, the Colombian Amazon lost 2.6 million hectares of forestland, with Caquetá, Guaviare, and Putumayo among the highest contributors to deforestation over the last several years.[4] This is largely driven by cattle ranching and unsustainable agricultural activities, as well as illegal land grabbing, timber extraction, and

The Caquetá River in Colombia. Photo by Mauricio Romero Mendoza

FIGURE 2

Colombian Amazon



A farmer harvests cocoa pods on a farm in Guaviare, Colombia. Photo by Angela Vives

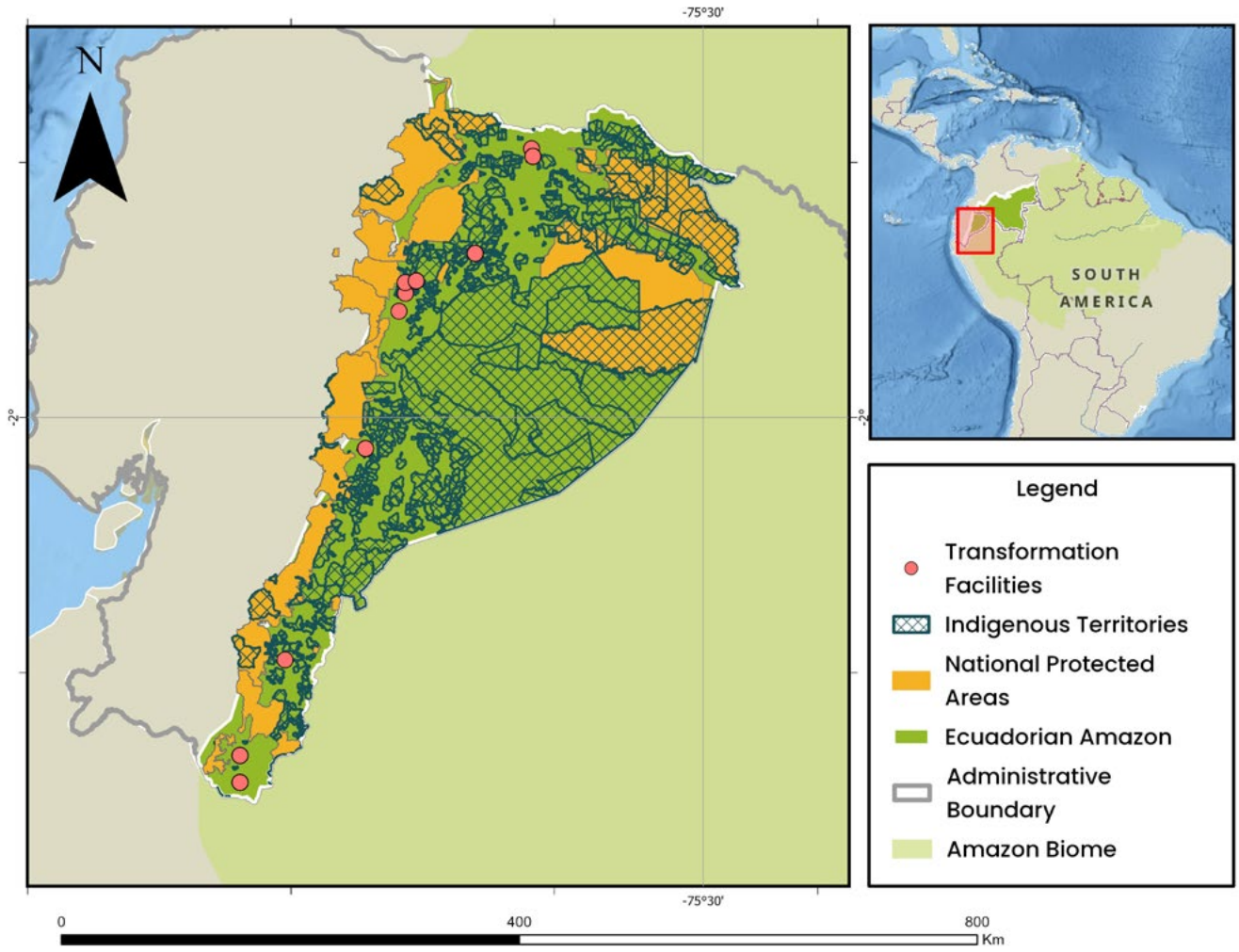
cultivation of illicit crops. Commodities produced throughout the Colombian Amazon biome range from commercial agriculture (plantain, yuca, pineapple) and livestock to forest-based production of coffee, cocoa, and a wide variety of non-timber forest products (NTFPs). Putumayo alone has over 1.4 million hectares of natural forest area eligible for sustainable forest management and agroforestry and produces a wide range of NTFPs such as acaí, copoazu, and cacay, among others.[5] The Colombian Amazon has two commercial ports: Puerto Asís in Putumayo and Leticia in Amazonas. These two ports represent the smallest share of total exports from Colombia's 20 entry points.[6]

Ecuadorian Amazon

The Ecuadorian Amazon represents 46 percent of the national territory. Extending over 120,000 km sq, its biodiverse natural ecosystems sit within mountain ranges, foothills, and Amazon lowlands or flat plains. Indigenous territories maintain dense forest cover, protected for generations by Indigenous cultures including the Waorani, Shiwiar, Zápara, Kichwa, Shuar, Siona, and Cofán, among others. Sucumbios and Orel-

FIGURE 3

Ecuadorian Amazon



lana in the northern region are home to a variety of species, including jaguar (*Panthera onca*) populations. These provinces include the buffer zones of the Limoncocha Biological Reserve, Sumaco Napo-Galeras National Park, and the Cuyabeno Fauna Production Reserve.[7] The Napo River basin extends over the Napo, Orellana, and Pastaza provinces. Two national protected areas — the Yasuni and Llanganates National Parks— fall within Pastaza, an incredibly biodiverse and threatened area, with 88 percent of its territory, about 2.6 million hectares, representing primary Amazon forestland. Morona Santiago and Zamora Chinchipe extend down through the southern Amazon and are equally biodiverse, with various national protected areas, forest buffer zones, and fauna, including jaguar, Andean Tapir, spectacled bear, and a wide variety of bird species. Total forest cover loss from 1985-2020 in the Ecuadorian Amazon equaled 379,000 hectares of forestland, consistent with an increase of 496,000 hectares of land used for agricultural activities, including cattle ranching, during the same period.[8] Commodities produced throughout the Ecuadorian Amazon range from commercial and subsistence agriculture (pitahaya, yuca), livestock and derivatives such as milk and cheese, coffee, cocoa, and NTFPs including guayusa, sangre de drago, and sacha inchi, among many others.

FINDINGS

Status of the Bioeconomy

The bioeconomy ecosystems of the Colombian and Ecuadorian Amazon are highly dynamic and comprise a range of industry and sector actors, programs, finance institutions, and policy initiatives designed to boost sustainable bio-business development, incentivize sustainable production and conservation, and reduce deforestation in the Amazon basin. There exist critical constraints for bio-businesses in terms of operating costs and infrastructure, developing demand driven business models, diversifying product offerings, ensuring product quality, and more. The following results highlight five major findings on the bioeconomy that, notwithstanding each country's unique context, were found to be similar across both the Colombian and Ecuadorian Amazon.

Finding 1: Despite progress over the last decade, policy, investment, and market initiatives face challenges in sustaining long term impact.

Both the Colombian and Ecuadorian governments are implementing robust and well documented programs to support sustainable development, land-use, and conservation in the Amazon. Colombia's initiative Visión Amazonia, established following the signing of the peace accord in 2016, now boasts more than 300,000 hectares of area under conservation agreements with communities, among other significant achievements.[9] Departmental and municipal governments of the Colombian Amazon have also outlined priority programs, offering distinct mechanisms of institutional support for bio-businesses on topics such as ecotourism, payments for ecosystem services, or business infrastructure (post-harvest processing, storage). The Corporation for the Sustainable Development of the North and West Amazon (CDA) and Corporation for the Sustainable Development of the South Amazon (Corpoamazonía) are Colombia's territorial regulatory bodies that work across regional jurisdictions with sub-national governments and communities to promote sustainable development and management of natural resources in the Amazon. These institutions support the implementation of myriad government of Colombia initiatives, including its regional Negocios Verdes program, its "green credit" products established with the Agrarian Bank of Colombia, and its payments for ecosystem services initiatives, including the pilot Amazon Forest Incentives program. These institutions also support bio-businesses to undergo proper environmental evaluations and licensing.

Similarly, within each Ecuadorian province, Decentralized Autonomous Governments (GADs) operating at the provincial and cantonal levels, carry out territorial land use planning, sustainable development, conservation, and reforestation efforts aligned with National Ministry objectives and land use planning requirements. National agencies such as the Institute for the Eco-development of the Ecuadorian Amazon Region (ECORAE) and the Ministry of Tourism's Regional Directorate of the Amazon have over the last decade held increasing influence in the Amazon through regional operations and relationships with GADs, municipal governments, and other governance bodies.

PROAmazonia is a joint initiative of Ecuador's Ministry of Environment, Water, and Ecological Transition (MAATE) and Ministry of Agriculture and Livestock (MAG) to improve sustainable production and conservation through territorial planning and the sustainable transition of productive systems in critical sectors such as coffee, cocoa, palm oil, and cattle ranching. Ecuador's Socio Bosque program has also had success in incentivizing forest conservation and bio-business development, mapping bio-business nationally and benefitting more than 46,000 people in the Amazon region alone.[10] Other prominent initiatives include the MAG's agenda for the conversion to sustainable production in the Amazon, which uses integrated farm and landscape management and a variety of incentives to strengthen sustainable forest and agriculture-based production.

Bio-businesses reported receiving business support and investments through numerous programs and initiatives. In Colombia, bio-businesses valued the services provided by CDA and Corpoamazonía, particularly their support to showcase products in business fairs and to obtain specialized product seals or branding, such as the *Colombia Destino de Paz* and *Amazonia Esencia de Vida* seals. In both countries, bio-businesses cited efforts to add value to bioeconomy products and provide increased authority and positioning of

Sunset on the Río Napo, site of several Ecuadorian ecotourism operations.

TABLE 1

National Product Seals, Certification, or Verification Programs[16]

Name	Description
Colombia	
Sello Destinos de Paz	Established in 2023 by the Ministry of Commerce, Industry, and Tourism, this seal aims to promote inclusive regional economies and responsible local consumerism by recognizing tourism operators or other tourism-associated businesses that meet specified criteria, including belonging to or employing populations that have signed onto the peace accord and are substituting illicit crops or demobilizing arms. Businesses touting the seal receive benefits, such as participation in the government of Colombia's tourism campaigns and business roundtables, priority status to receive training or access subsidies or incentives, and membership in its network of touristic territories of peace.[17]
Amazonia Esencia de Vida	Amazonia Esencia de Vida is a brand and online platform promoting regional products of producers registered and participating in the Colombian Government's Negocios Verdes program.[18] It aims to differentiate products originating from the Amazon, creating a regional identity and seal that better positions Amazonian products within local, regional, and national markets. Products are published and can be purchased on an online market platform.
Ecuador	
Sistema Participativo de Garantía de la Chakra Amazónica (SPG Sello Chakra)	Developed by an Ecuadorian NGO operating in Napo, the Sello Chakra promotes commercialization and consumption of high quality and sustainable bioproducts produced in chakras through ancestral agroecology practices. Corporación Chakra verifies agroecology, governance, and biodiversity conservation practices[19] and provides ongoing verification and technical assistance to certified producers, as well as support to access niche national and international markets that recognize sustainable origin products.
Sello de la Agricultura Familiar Campesina (AFC)	Created in 2017 by the MAG, the AFC Seal aims to position products produced by local farming families, highlighting their contributions to food security in Ecuador and promoting responsible consumerism.[20] Bio-businesses bearing the seal have access to training, financial incentives, and publication of the product on a digital catalogue providing more visibility with consumers. AFC has four different variations of the seal to recognize specific social (gender and youth) and environmental (agroecological) practices.

bio-businesses through no or low-cost localized certification or verification programs (see Table 1). Bio-businesses are engaging with these local certification programs, with eight of the 57 bio-businesses possessing one or more. In addition, bio-businesses reported receiving infrastructure and transportation support (cargo motorcycles) from PROAmazonia and Visión Amazonia respectively. In Ecuador, for example, one bio-business in the fresh fruits sector reported being able to transition from manual pulp transformation processes after obtaining machinery from PROAmazonia, which they currently use.

Despite this progress, stakeholders and bio-businesses reported several challenges. Institutions have limited reach

"A major problem we face is that most of the employees are contractors and there are constant changes in personnel, which does not allow [proper follow up] on processes"

– Institutional stakeholder interview, Colombia

over extensive Amazon territories, with staff noting that more field support is needed to establish contact with bio-businesses initially, as well as to provide ongoing monitoring and technical assistance to ensure their business goals are met. CDA and Corpoamazonía also noted high staff turnover, with some staff lacking capacity and experience in working with local communities, affecting their ability to provide consistent services over time.

There has been interinstitutional collaboration and efforts to connect bio-businesses with ecosystem actors, such as Procolombia, a key agency promoting exports, tourism, and foreign investment in Colombia, and Artesanías de Colombia, an organization created through a 2013 legislation under the Ministry of Business, Industry, and Tourism. Artesanías de Colombia has well-established programs to improve quality, innovation, and sustainable practices across the handicrafts sector in the country. Corpoamazonía representatives highlighted a successful collaboration agreement with Artesanías de Colombia which has resulted in numerous artisans receiving the technical assistance needed to improve manufacturing, product quality, and presentation. However, this type of collaboration is not yet systematic, and critical challenges remain in ensuring integral support along the entire value chain. For example, artisans now have a high-quality final product, but too often lack the legal permissions needed to sustainably extract raw materials and scale their production.

Other successful examples of interinstitutional collaboration include leading universities with strong academic and research programs related to Amazon bioeconomy issues, such as the Amazon Regional University Ikiam in Ecuador, which has an undergraduate degree in biocommerce and a laboratory for conducting R&D on forest-based products. In Napo province, one bio-business highlighted an innovation project in partnership with Ikiam and the GAD to design a "science and transformation park," for the bio-business, through which its associate members and other actors in the region can access fundamental services such as processing and value-added transformation of NTFPs, lab testing and quality control, product development, and commercial spaces where products can be placed on exhibit.[11] Still other bio-businesses mention support from international institutions such as WWF and the Comité Europeo para la Formación y la Agricultura (CEFA).

Finding 2: There is insufficient supply to meet growing demand across Amazonian value chains.

Market demand for products such as fresh fruits, spices, and raw materials for cosmetics is on the rise, with large global and regional consumer goods companies expressing interest in increasing sourcing of products such as copoazú, acaí, and sacha inchi. National exportation data on natural oils for cosmetics and other beauty and health products from both Ecuador and Colombia showed an increase in exports from 2022 to 2023 of 52 percent and 14 percent, respectively. In addition, exportation data on handcrafted goods in both countries showed an increase from 2022 to 2023 of 47 percent and 13 percent respectively.[12] However, most bio-businesses cannot meet the volumes required by buyers nor the economies

"There is a lack of financial and technical capital to accompany producers, to improve production, quality, and so [that] producers understand the value chain"

– Bio-business interview, Ecuador

of scale that would bring costs of exportation down. In several cases, bio-businesses detailed examples of buyers seeking large product volumes that they cannot meet because production of many products remains untapped.

Bio-businesses within NTFP value chains rely on local community members to produce, harvest, and supply products, but community capacity to safely, sustainably, and legally produce or extract products is limited. Local and Indigenous communities often have access to land, but lack the investments, working capital, and productive inputs needed to develop and maintain highly productive agroforestry systems for commercial use of their products through community and family Chakras. Bio-businesses working in NTFPs in Ecuador appear to have higher production capacity overall, with several bio-businesses citing working with women and families to increase production on Chakras. Another bottleneck to increasing supply is obtaining the relevant legal permissions for sustainable management and use of NTFPs in the Amazon, though this alone is not a silver bullet. In Colombia, some bio-businesses that have successfully obtained the legal permissions to harvest NTFPs directly from the forest, mention they are still harvesting less than 50 percent of what they are allowed under those permissions.

"There is a need for concrete support [to obtain] sustainable harvesting permissions, almost all of the businesses face this barrier in terms of the paperwork"

– Institutional stakeholder interview, Colombia

Food products made by Ütaí, a Colombian bio-business.

Most bio-businesses operate in isolation and at small scales. This was particularly the case in Colombia, where many bio-businesses interviewed had less than 10 member producers. Bio-businesses working with women in NTFPs in Ecuador had more reach (some up to 500); however, aside from a handful of businesses with the capacity to do so, many lack the reach that would allow them to increase and diversify their product offering. In addition, the seasonality of production cycles and bio-business' overreliance on only one product often leaves storage, processing, and transformation facilities underutilized during the low seasons. Stakeholders emphasized the need and desire by some bio-businesses to establish relevant models that promote association and would allow them to pool higher product volumes. Aside from the logistical and geographical challenges to this level of association, there are other barriers including a deep-seated lack of trust and "culture of individualism," which was noted particularly in Colombia.

Finding 3: The high cost of conducting business in the Amazon stifles bio-business growth and development.

One of the most significant challenges cited by interviewed bio-businesses is the high cost of transformation or value-added processes and product distribution from highly isolated regions. Bio-businesses in the departments of Amazonas, Vaupés, and Guainía in Colombia reported the highest overall costs related to production and transportation, with gasoline ranging from US $4.50 to $5.00/gallon; energy at $0.20-$0.40 per kilowatt/hour; and average $10.00 per kg of product transported, due to the remote locations and lack of infrastructure. Costs were reported to be generally lower in Caquetá, Putumayo, and Guaviare, all departments that boast relative improved connectivity via major roads and infrastructure compared to the other departments in the Colombian Amazon.

The cost of doing business in Ecuadorian Amazon departments was comparable to Caquetá, Putumayo, and Guaviare, about half of what it costs in Amazonas, Vaupés, and Guainía. However, bio-businesses in all regions cited costs of production, transformation, storage of products, infrastructure development, and distribution as significant barriers to achieving business growth and development. These high costs negatively impact the profitability and competitiveness of Amazonian bio-businesses within national and international markets.

Bio-businesses also cite the high costs of running their business as a barrier to setting aside resources for other types of investments, such as quality verification or traceability systems, marketing, external communications, or digital payment systems, establishing training programs for member associates, or engaging with internationally recognized certification programs and standards. One tourism bio-business cited 30-40 percent of its total operating costs going toward transportation of tourists, while another cited high costs of construction as a barrier to expanding lodging options for its customers.

"Clients in the US have mentioned to us that when we have certain certifications, they will buy from us, but those certifications can be between 70 to 140 million pesos [about US $17,000 to $33,000]"

– Bio-business interview, Colombia

Finding 4: Bio-businesses lack strategies focused on generating demand for Amazonian products.

Interviews revealed limited progress among bio-businesses on developing strategies to increase demand for their products, exacerbating barriers to effective entry into markets. Most bio-businesses are heavily focused on increasing supply and production, but lack a general understanding of market dynamics, buyer profiles, and their potential customer base. Depending on the product and sector, some bio-businesses had negotiated agreements, but with only one or two buyers, while others had no clearly defined client base. Some high performing bio-businesses did categorize their potential customer base and create product offerings which appeal to the needs and desires of those specific customers, but this was not the norm among bio-businesses interviewed.

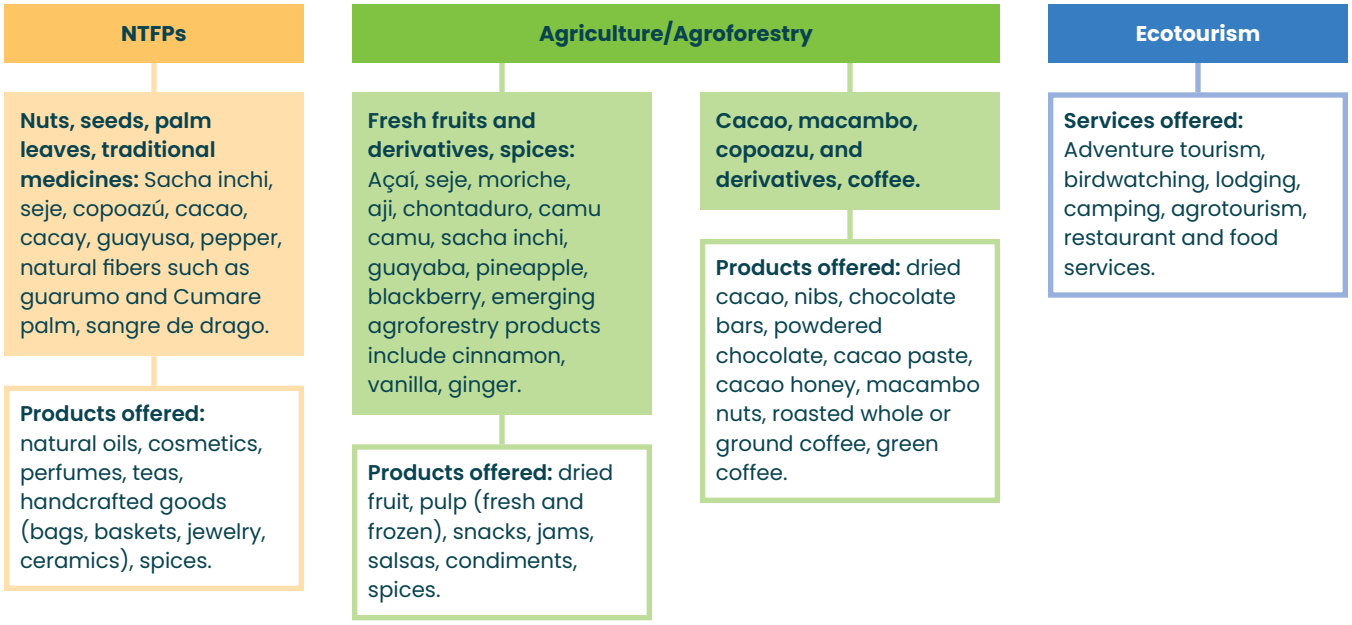
Status of Bio-Businesses Interviewed

Colombian and Ecuadorian bio-businesses produce and supply diverse Amazon-based products within numerous value chains. The 57 bio-businesses interviewed offer a wide variety of products, including NTFPs, such as Amazonian nuts, seeds, and palm leaves; fresh fruits and fruit derivatives with-

Josué Avila leads jungle wildlife tours for guests of Sani Lodge in Napo, Ecuador.

FIGURE 4

Bioeconomy Value Chains: Colombia and Ecuador



in the agriculture and agroforestry sectors; cacao, chocolate, coffee, and sub-products; and ecotourism services (Figure 4).

All 57 bio-businesses interviewed have a well-developed "star" product or service (see Table 2), with the large majority seeking to both increase their offering in terms of volume, as well as diversify production and transformation to offer additional products. Bio-businesses working in agroforestry and NTFPs cited the high social and biodiversity value that their products have in the region. One bio-business selling packages of toasted or dehydrated macambo seeds works with 500 producers throughout Napo in Ecuador. Almost 90 percent of these producers are women who harvest macambo and other products, such as yuca and chontaduro, in their family chakra.

With more than 25 years of experience in the sector, this bio-business has established training programs for women producers to ensure quality processes in harvesting, storage, and drying of the product, all of which is done from women's homes, prior to being transported to a storage center in Quito. Macambo is an ancestral plant harvested for generations by Indigenous families, but bio-business representatives reported that cultivation practices are being lost within younger generations.

Similarly, bio-businesses offering woven baskets, bags, or handmade jewelry pride themselves on the ancestral techniques used to make these items from natural fibers and see their business as contributing to the preservation of Indigenous culture. These bio-businesses have found value in commercializing their product made by Indigenous women through local or international business fairs or in specialized stores, boutiques, and cultural or tourist spaces.

"These are products [that were] cultivated by matriarchs, but not within the new generations"

– Bio-business interview, Ecuador

Higher performing bio-businesses are engaging in numerous transformation processes to develop cosmetics, natural oils and beauty products, and food products. Some bio-business have their own transformation facilities or rent space in centralized facilities. Cocoa and coffee associations in Ecuador often have transformation facilities available and seek to increase producer capacities to supply higher product volumes for transformation. Like other leading bio-businesses interviewed —particularly those within the cacao and chocolate value chain— the macambo-based bio-business has tested and employed localized finance mechanisms such as rotating funds to support member producers with the working capital needed to maintain and increase the supply of quality products.

Others provide support to producers to transport products, as the cost of distribution from remote regions was one of the most significant challenges cited. Most products are transported through third party, private transportation or courier services. Particularly for bio-businesses within the fresh fruit value chains, product transportation and distribution present a real challenge as fruit is harvested during specific seasons and must be stored in refrigeration to keep from spoiling. In addition, fresh fruit is heavy, raising prices for transport as companies charge for both weight and volume. In these cases, transformation must occur locally in the region prior to being transported to urban centers.

"Transportation to Leticia is the biggest problem. [The women] must take the bus and it is very restricted, the products can be damaged. They walk a considerable distance from their home and if they request a private service, it is very expensive, approximately 200,000 pesos [$48]"

– Bio-business interview, Colombia

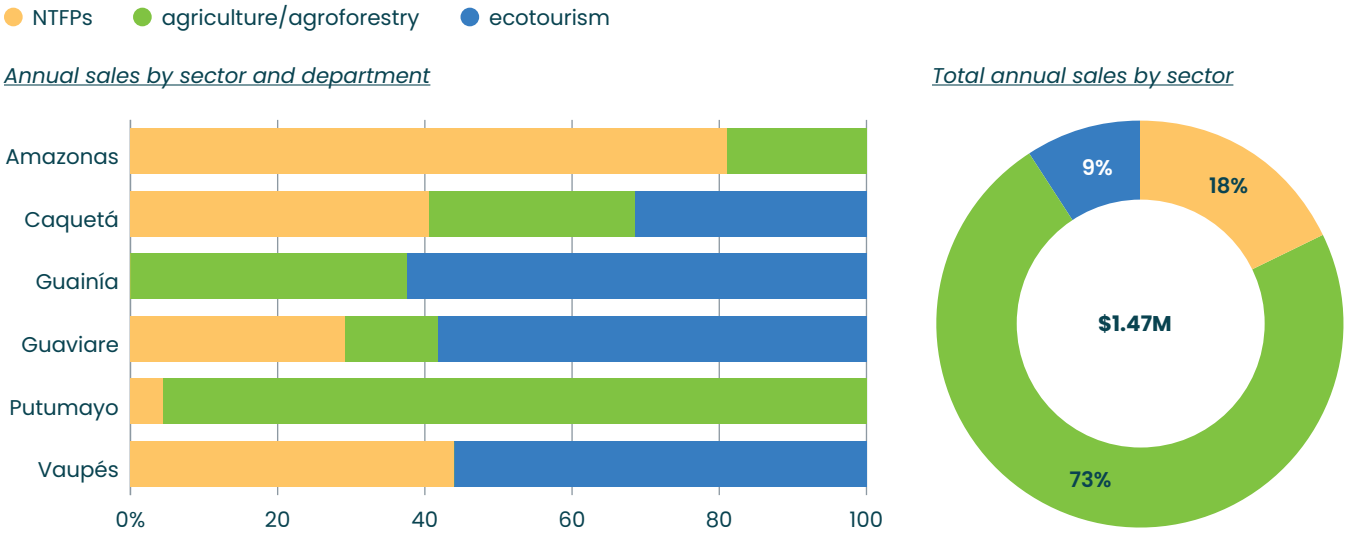
Bio-businesses rely on various channels to reach their target audience and customers, both for point of sale and for marketing of their main products. Local, national, and regional fairs and product expos are highly valued, with bio-businesses citing these as an important platform to showcase their products and establish direct connections with consumers. Other bio-businesses sell their products within centrally located stores and boutiques closer to urban regions. These bio-businesses experience wider reach than those that sell products locally within Indigenous communal spaces and directly from their family homes. Social media and digital marketing, though used extensively by only a few bio-businesses, is recognized by most as a tool of interest that can increase reach, brand visibility, and interactions with clients.

Snapshot of overall performance of bio-businesses

In Colombia, the average annual sales of bio-businesses who reported the indicator was US $42,000, with more than 60 percent of bio-businesses selling under $25,000 worth of product annually. In contrast, the average annual reported sales of bio-businesses in Ecuador was $1.12M.[13] Among

FIGURE 5

Bio-business performance: Colombia



Facts and figures

29 bio-businesses are certified Negocios Verdes (82.9%)

11 bio-businesses with INVIMA sanitary registration of products or DIAN commercial export (31%)

1 bio-business is certified through an International Standard (3%)

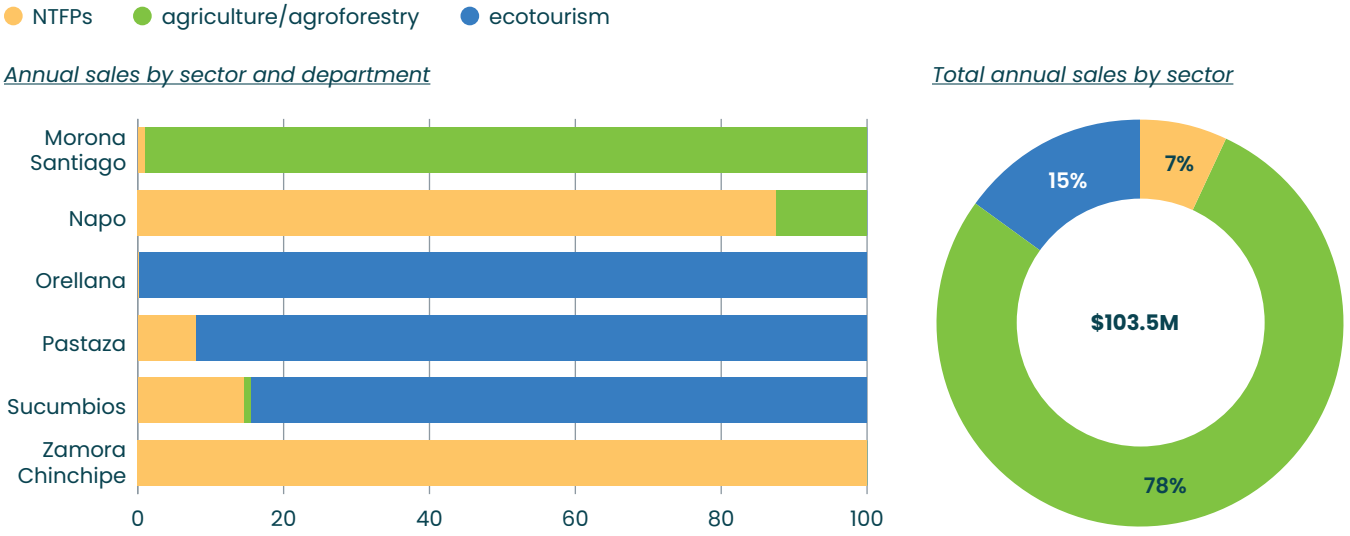
3 bio-businesses have the Colombia Destination of Peace Seal or Amazon Essence of Life Branding (8.6%)

13 bio-businesses are engaging with finance mechanisms (37%)

$42,000 average annual sales by Colombian bio-businesses

FIGURE 6

Bio-business performance: Ecuador



Facts and figures

13 bio-businesses are engaging with finance mechanisms (37%)

3 bio-businesses have the Sello Chakra (14%)

2 bio-businesses have the Ministry of Agriculture AFC Seal (9%)

11 bio-businesses are certified through an International Standard (50%)

$1,120,000 average annual sales by Ecuadorian bio-businesses

the bio-businesses participating in the study, Ecuadorian bio-businesses generally demonstrate higher performance in terms of overall sales as well as access to international certification or verification standards (11 bio-businesses in Ecuador vs. one bio-businesses in Colombia). Ecuadorian bio-businesses report holding certifications ranging from Fair Trade and Organic to USDA's Good Agricultural Practices and Good Handling Practices.

In both countries, though few bio-businesses possess the seals, they generally value local efforts to create differentiated products through seals such as the Colombia Destino de Paz or Chakra Seal in Ecuador. Three bio-businesses in Colombia report having either the Colombia Destino de Paz or Amazonia Esencia de Vida seals and another three bio-businesses in Ecuador report having the Chakra Seal, with an additional bio-businesses in the process of obtaining it.

The percent of bio-businesses engaging with formal finance mechanisms was relatively higher in Ecuador (50 percent) than Colombia (37 percent), with many bio-businesses expressing fear around indebtedness. Figures 5 and 6 present a summary dashboard of performance indicators for the 57 bio-businesses interviewed in Colombia and Ecuador.

Export potential of bio-businesses

Results of final diagnostics of the 57 pre-selected bio-businesses to determine those with the highest potential to engage in international markets showed that all bio-businesses have a finalized product or service, with most also possessing the necessary environmental, sanitary, and export licenses to be able to demonstrate a level of operational success and formality. However, an overwhelming majority of the highest performing bio-businesses still lacked adequate organizational and business governance structures, with weak accountability, transparency, or decision-making processes. Some bio-businesses also had limited internal controls and weak financial and administrative systems. Finally, bio-businesses lacked a clear sales strategy that would support them

TABLE 2

Summary of export potential of 57 pre-selected bio-businesses by country and sector

Country	Sector	% (#) of bio-businesses with finished product or service	% (#) of bio-businesses with relevant environmental permissions	% (#) of bio-businesses with relevant sanitary permissions	% (#) of bio-businesses with adequate organizational and business governance structures
Colombia	NTFPs	100% (17)	100% (17)	100% (8)[21]	24% (4)
	Agriculture / Agroforestry	100% (9)	89% (8)	100% (9)	33% (3)
	Ecotourism	100% (9)	100% (8)	100% (3)	11% (1)
Ecuador	NTFPs	100% (14)	100% (14)	93% (13)	43% (6)
	Agriculture / Agroforestry	100% (5)	100% (5)	100% (5)	40% (2)
	Ecotourism	100% (3)	100% (3)	100% (3)	67% (2)

to establish strong external relationships and grow sales (see Table 2).

Following these diagnostics, a final 18 bio-businesses (nine in each country) were determined to have the highest potential to either enter international markets or to vastly grow their market presence in cases where they are already exporting some volumes. Most of these outstanding bio-businesses are participating in and accessing government incentives and training programs and have obtained or are in the process of obtaining key export certificates and other required product registrations from government entities. Many have obtained one or more international certifications. These bio-businesses sell products such as copoazú butter, frozen acaí, chonta, pitahaya fruit pulp, fresh fruit jams, chocolate and cocoa products, coffee, and honey, among other Amazonian products.

Potential for Growth and Investment

The bio-businesses interviewed have a desire to grow and invest in their operations, including increasing the number of employees, associates, and community members who participate across the value chain, from production to transformation, packaging, marketing, sales, and distribution. They largely understand the biodiversity value of their businesses and clearly expressed areas of need in terms of investments, technical training, potential opportunities for improved social inclusion and employment, access to markets, and increased environmental benefits (Table 3). Though often lacking formal business plans, bio-businesses have identified new potential products and laid out basic plans for growth in infrastructure, technification of processes, and formalization of lab testing and manufacturing facilities.

"Bio-businesses want to develop the agroforestry economy"

– Institutional stakeholder interview, Colombia

Diversification of production and product offerings

Investments are needed to increase high quality production and harvesting of various NTFPs through technical training to improve sustainable production practices, safe and legal harvesting practices, and to diversify production systems. A critical opportunity to increase production is through the Chakra, family run plots of land which integrate diverse NTFPs. Productive inputs and training are needed wherever local communities have interest to establish, expand, and strengthen these systems to move beyond family sustenance to integrate high value timber species (chuncho, tornillo), with NTFPs (copoazú or cocoa, chondauro, vanilla), and crops providing nutritional and cultural value (yuca, plantain, traditional medicines, etc.).[14]

Bio-businesses in Ecuador mentioned production of native species of vanilla as becoming increasingly popular within Chakras. Sold at about US $500/kilo,[15] with minimal harvesting and processing costs, bio-businesses understand the potential economic value of vanilla and are interested in developing the value chain. Training on its particular care

Technical Training Needs: Production and Supply

- Climate smart production practices
- Understanding and interpreting changes in productive cycles of different species in relation to uncertain climate and weather patterns
- Strategies for ensuring water supply throughout the year
- Conducting analysis of soil health, integrated pest management, benefits of organic production
- Diversifying agroforestry systems to incorporate numerous high value products, such as honey, vanilla, fruits, spices
- Use of nurseries to supply seeds, plantlets, and organic material for increased production and productivity
- Safe and legal harvesting practices, seasonality of harvesting different NTFPs
- Farm management and land use planning

Nurseries, like this one in Ecuador, are a key tool for farmers and communities to increase their productivity.

and harvesting procedures, as well as productive inputs are needed, but with a high potential for return on investment, vanilla is a significant opportunity to strengthen the Chakra-based bioeconomy.

Relevant for both the Colombian and Ecuadorian Amazon regions, productive restoration models based on integrated Chakra agroforestry systems have potential to increase production and supply of key products while enriching biodiversity and soil health and contributing to carbon sequestration across vast swaths of Indigenous-managed territories.

Bio-businesses also described need among supplier producers for working capital, with some establishing pre-payment systems for product volumes or vouching for producers so they can access credit from savings cooperatives; however, the support anchor bio-businesses can provide is limited and the need for cash flow throughout the year is high.

Bio-businesses operating in NTFP value chains stated that producers must be supported to diversify income sources, both through more diverse production systems and by including increasing access to payments for ecosystem services or carbon, such that the incentive to harvest more and varied NTFPs in the Amazon is increased.

Bio-businesses offering ecotourism services have strong potential to benefit from payments for ecosystems services as well, but often lack tools and data needed to monitor and report on ecosystems and biodiversity.

Stakeholder interviews revealed that bio-businesses need support to access the permits needed to legally harvest, produce, and sell their products. This includes the relevant harvesting permits in each country, as well as formalizing or legalizing their business through the relevant national customs and taxing agencies, and obtaining the necessary sanitary permissions required for products for human consumption,

"You cannot just talk to people about caring for and conserving [the forest]; you have to offer them productive alternatives. Sometimes the inequality gap is accentuated because of this, because people are not allowed to cut down trees, et cetera, but there are no alternatives"

– Bio-business stakeholder interview, Colombia

in the case of food products. Securing these licenses would require a variety of investments, including in operating processes and structure, personnel, and technical and legal processes:

- **Sustainable harvesting permits:** Bio-businesses need to develop the required documents in sustainable forest management planning, identifying product volumes, harvesting periods, and areas for different land uses (forest management versus agroforestry), etc. These require detailed analyses and technical reports, which communities have limited capacity to produce.

- **Formalization of bio-businesses:** To export products internationally, bio-businesses must be legally registered and have the proper tax ID and billing systems as a first step. Additional requirements include certificates of origin for their products and other customs requirements.

- **Quality testing and sanitary permissions:** Bio-businesses need to conduct studies on the composition of products, nutritional value, lab testing, and the development

of detailed technical profiles, as well as obtaining the necessary food handling and sanitary permissions required to sell their product nationally and internationally.

Most bio-businesses also expressed interest in international certification programs, with many potentially already qualifying for organic certification due to the nature of their harvesting practices within natural forestland. Bio-businesses need investments in increasing access to both national and internationally recognized certification programs and product seals, which in turn could increase production and supply, as well as to boost market competitiveness for bio-businesses across the Amazon.

Additionally, bio-businesses understand that export regulations are changing and often expressed interest in establishing rigorous traceability systems to demonstrate their products are zero-deforestation. Particularly relevant for cocoa and coffee, some associations are already developing their own traceability systems or internal controls, with each production area and purchase point traced. Bio-businesses expressed that more investment is needed in this area, such that they can confidently demonstrate they have met the requirements of legislations, such as the European Union Regulation on Deforestation-free Products (EUDR).

Processing, transformation, and packaging

Bio-businesses cited investment needs in infrastructure and equipment, storage, sustainable and low-cost energy for refrigeration or freezing, and improved packaging, among other needs. Cacao-producing bio-businesses lack the cocoa drying and fermentation infrastructure, such as fermentation boxes or solar-powered dryers, that would allow them to process more production and ensure higher quality. Most producers are engaging in artisanal drying practices and de-pulping the cocoa by hand. Bio-business operating in fresh fruits and pulps described a need for increased cold storage capacity, better de-pulping machinery, and systems to ensure water quality and availability during transformation processes.

Bio-businesses producing handcrafted goods expressed interest in improved manufacturing and storage spaces, as well as presentation of their products. Many bio-businesses need investments in brand development, as well as quality packaging, both in the material used and the design of the presentation.

More advanced bio-businesses have a strong desire to innovate but need investments to achieve this. Some expressed interest in research and development (R&D) to develop additional sub-products and understand market demand, production costs, and sales potential. For example, one bio-business mentioned a new project to develop freeze-dried acaí which would vastly increase its shelf life and decrease the costs of storage and transportation. Bio-businesses producing macambo in Ecuador have the potential to develop new products involving white chocolate, with opportunities to access niche chocolate markets.

Bio-businesses also described efforts to diversify the products transformed at plants to address barriers in seasonal harvesting of certain products and extend the operating period of processing plants during more months out of the year, with potential to generate new permanent jobs. Still others discussed creating a zero-waste business by increasing processing and transformation capacities to include pressing the oil from cacao or acaí seeds. These seeds can be used to make extracts, cremes, or oils that are in high demand within the beauty and cosmetics industries. In the case of acaí, transformation capacities among bio-businesses are largely limited to converting the fruit to a pulp, with the oil-rich seed often thrown out.

"Pure innovation is difficult to monetize"

– Bio-business stakeholder interview, Ecuador

Marketing and commercialization

Few bio-businesses are using social media to promote their brand and products, with most bio-businesses lacking capacity and knowledge to engage in digital marketing to expand their visibility and reach, reducing their possibilities to identify clients and access new markets. Bio-businesses need investments in computers, internet connectivity, and access to software. This should be coupled with skills development to help them digitalize their marketing and sales processes, bringing them closer to their potential client base and generating brand visibility.

For instance, bio-businesses operating in ecotourism cited investment needs in website design and maintenance, to market their service offerings to a wider online audience which would include international tourists and students. Bio-businesses also need investments in systems for online reservations and payment and to adopt and engage with e-commerce platforms, such as *Amazonia Esencia de Vida* and others, which have the potential to increase the volume of sales. On commercialization, bio-businesses need training in understanding market dynamics, business competitiveness, how to establish pricing, and how to approach negotiation with potential buyers.

Organizational capacity, governance, and business skills development

Bio-businesses largely require investments in organizational capacity strengthening, including financial and administrative management, financial planning and analysis, risk management, human resources management, and business governance. Many bio-businesses lack transparent decision-making processes and have limited inclusive governance and accountability mechanisms, which not only limits operating capacity, but stifles potential for innovation and growth.

In Colombia particularly, bio-businesses described a culture of competitiveness, which also limits potential collaboration among bio-businesses along the value chain. Other investments are needed in training and technical assistance in different business development topics, including:

TABLE 3

Matrixed Value Chain Assessment

Value chain and products	Potential for social inclusion, employment, income diversification	Export/market potential	Potential to increase biodiversity value and environmental benefits
NTFPs Nuts, seeds, palm leaves, traditional medicine, fruits, spices	• Job opportunities in harvesting, processing, manufacturing, packaging, and sales • Income diversification through multispecies agroforestry and emerging NTFPs, such as honey and vanilla • Business leadership opportunities for women, youth, and Indigenous Peoples • Alternatives to illicit crops • Preservation of Indigenous cultural production techniques, artistry, and product uses	• Growing demand nationally and internationally for natural oils from acaí, copoazú, moriche, canangucha palm • Significant international markets for Cacay oil and butter, touted for beauty and anti-aging benefits • Apt for virtual marketplaces, digital transactions and payment • Untapped market potential for products with high cultural value such as Guayusa and sangre de drago in Ecuador • Opportunities to sell in bulk, diversify buyer profiles (individuals, restaurants, boutiques)	• Support natural regeneration, recovery, and reforestation efforts; create buffer and prevent growth of agricultural frontier • Potential for zero-waste models where unused organic matter is repurposed for replanting or enriching soil • Enrichment of secondary vegetation with a variety of native commercial species
Agroforestry Cacao, macambo, copoazú, coffee	• In Ecuador, cacao is often produced in family Chakras by women • Vast opportunities for employment in processing and transformation facilities, but more volumes are needed (facilities operating at 50-60% of their capacity) • Potential to develop youth-led business services in technical assistance, traceability, monitoring • Opportunities to diversify incomes with honey and fruits, such as guayaba or plantain	• "Wild cocoa" – origin cacao is high quality and grows organically in the Amazon • Strong demand from buyers in U.S., Canada, Belgium, Spain, but larger volumes are needed	• Potential to scale diverse agroforestry systems, including native timber, cacao, nogal, and other native species • Potential for zero waste models where unused organic matter is repurposed for replanting or enriching soil (biofertilizers, etc.) • Transformation of illicit crops • High potential to expand sustainable production on Chakras
Ecotourism	• Job opportunities for youth in marketing and promotion of tours, tour guides, and others • Income generation opportunities through products and services, such as gastronomy, cultural experiences, traditional healing, handcrafted goods • Alliances between nearby or similar tourism services to offer "tourist packages"	• Opportunities to diversify client base, increase demand locally & internationally (university students, conscious travelers, adventure tourists) • Coordination with national agencies such as Procolombia for marketing and communications • Access to and use of data and information for marketing purposes (biodiversity, recovery/ restoration of degraded land) • Increased demand by tourists for local goods and services	• Integrate reforestation activities, like forest nurseries, environmental education, and "rafting festivals" • Potential to leverage circular economy, use of organic waste and water • Opportunities to expand tourism routes and design new conservation products and services

- Technical capacity strengthening for employees and supply chain, product development, quality controls, value added transformation processes, and other topics that ensure development and presentation of high-quality products.

- Soft skills development such as communication, leadership, negotiation, and interpersonal relations. This includes improved customer relations and client services and satisfaction.

- Language skills development is needed to be able to expand access to and understanding of national and international markets and facilitate communication and connections with a wider client base.

RECOMMENDATIONS

The following conclusions and recommendations are for public and private sector actors and stakeholders of the bioeconomy ecosystem, including institutional donors, companies, governments, and civil society organizations. Based on the findings of this analysis, they provide ideas on the way forward to generate more and better opportunities for bio-businesses to create value chain efficiencies, improve business operations, and access national and international markets for their sustainable origin products.

Develop clustering and cooperation models to increase efficiencies and reduce costs.

Bio-businesses have high potential for interconnectedness and to create synergies along and between the value chains in which they operate. Networks of bio-businesses, which are connected to each other and to centralized services or market opportunities can create more opportunities for efficiencies and innovation, promoting more robust bio-economies and resolving some of the critical bottlenecks caused by operating in isolation.

There is potential to develop shared distribution channels and transformation services, engage in joint training, pool resources and product volumes, and reduce operating inefficiencies and costs. For instance, products can be grouped according to similar characteristics and distributed in larger batches, such that bio-businesses receive a better price per weight transported. Bio-businesses offering personal and beauty products such as handcrafted goods, bags, essential oils and creams, or other products such as dried fruits, snacks, and spices, have the potential to develop strategies for consolidated volumes and negotiated improved pricing with transporters. Within fresh fruits and pulps, there are opportunities for win-win partnerships between production and processing bio-businesses, with some bio-businesses establishing local "rotating funds" or pre- or premium-payment systems to support producers with working capital to increase supply.

Bio-businesses should be supported to build on and replicate successful experiences. Sharing centralized transformation and storage facilities among bio-businesses with similar transformation needs could vastly extend operating periods of the facilities that exist, expand capacity to transform diverse products, and increase job opportunities. In addition, forming associations or partnerships between bio-businesses to jointly apply for relevant licenses, harvesting permissions, and/or certification programs could simplify bureaucratic processes and reduce the costs and time associated with obtaining these.

Create opportunities for experience exchange and learning among bio-businesses and value chain actors.

Shared learning and experience exchanges between bio-businesses would promote more collaboration along the value chain and between sectors, as well as support scale up or replication of successful experiences. Good business and production practices could be identified, systematized, and communicated among bio-businesses with similar challenges and interests. Communities of practice or learning forums can facilitate communication between bio-businesses, better cooperation, and facilitate joint problem solving. "Model" bio-businesses can also be identified and supported to showcase their business journey and the benefits derived from different production, transformation practices, access to finance, or incentives programs.

Establish innovative finance, grants, and unconditional cash mechanisms.

Stakeholders must work with bio-businesses to design appropriate strategies to increase cash flow and access to working capital, including models such as providing cash or pre-negotiated premiums that would enable bio-businesses to invest in their self-determined business priorities, such as production and operations, transformation infrastructure, digital connectivity, brand development, marketing, and other investments that help them meet their business goals. Due to widespread fear of indebtedness, flexible funding that includes grants mechanisms coupled with business development planning could help bio-businesses establish and grow their operations, such that they are able to make a profit and reach self-sufficiency.

Private sector companies, particularly those who source from Amazonian landscapes, must work with governments, civil society, and bio-businesses themselves to engage more deeply in targeted business roundtables and co-design novel supply chain partnerships or programs that incentivize sustainable production and supply of commodities of interest. Leading associations in the Amazon have a desire to co-develop relevant incentives and training programs to promote sustained restoration and good production practices.

Prioritize bio-business access to diverse financing, including carbon markets, payments for ecosystem services, and public incentives programs for forest conservation and restoration.

It is imperative that, in addition to traditional and grant financing, bio-businesses begin to access more and diverse sources of finance as a reward for their stewardship and protection of Amazonian natural and forest resources. Despite the recent

A family farm in Guaviare, Colombia. Photo by Angela Vives

surge of initiatives and incentives programs nationally and internationally, bio-businesses still largely lack access to these resources. Stakeholders can provide direct, on-the-ground accompaniment and support so bio-business understand the range of potential mechanisms available to them and the benefits, processes, and associated risks.

Leverage national business and market development efforts, including product seals and regional branding, to boost access to international markets.

Though most national product seals are offered at no cost to bio-businesses and come with a variety of benefits, such as training, incentives, and support with commercialization and increased visibility, few bio-businesses are accessing these programs. Stakeholders can provide bio-businesses with support to understand the requirements and benefits of product seals and regional branding initiatives, and to produce and submit the paperwork required. This could be part of a wider program to improve product presentation, branding, and packaging.

Other immediate support needed to create the enabling conditions for bio-businesses to access international markets includes:

- Develop specialized training programs on meeting the legal, quality, customs, taxing, and other market requirements of exportation. This could include support with preparing and submitting documentation and developing pathways to exportation based on improvement planning in key areas, such as product presentation and quality, licensing, and regulatory requirements.
- Identify and develop various channels to international export of products, such as online commercial platforms or marketplaces, participation in international business fairs, business roundtables, and association with product distributors.
- Conduct analysis on product demand, including interviews with sourcing companies to understand barriers and needs.
- Implement initiatives to identify and establish partnerships with sourcing companies that provide favorable conditions for bio-businesses and support pathways to growth.
- Invest in digital infrastructure, improved connectivity, and e-commerce training for bio-businesses.

Expand R&D to inform commercially and culturally viable product solutions.

Bio-businesses lack the technical capacity and resources to engage in science-based development for testing products. Partnerships with local and regional universities, such as Ikiam in Ecuador can be pursued to increase bio-business access to information on market trends and demand, use of byproducts and innovative technologies, R&D on new products, nutritional value of products, and productivity studies, etc.

Bio-businesses designed around Chakra agroforestry systems could incorporate economic modeling with the support of universities and other stakeholders, to define high-potential production scenarios across relevant sectors, considering factors like market access and demand, community and family needs, ecological conditions, potential for carbon financing or payment for ecosystem services, and production volumes and seasonality, etc. Additionally, bio-businesses can be supported to measure their business' impacts on biodiversity conservation and ecosystem health, as well as deforestation and land conversion.

ENDNOTES

1 "Gestión territorial indígena como estrategia de conservación de la Amazonía." IUCN, August 2022. https://iucn.org/es/blog/202208/gestion-territorial-indigena-como-estrategia-de-conservacion-de-la-amazonia

2 "Ocho países de la Amazonia con el poder de salvar el planeta," World Bank, July 2023, https://www.bancomundial.org/es/news/feature/2023/07/05/ocho-paises-de-la-amazonia-con-el-poder-de-salvar-el-planeta-america-latina.

3 Caquetá Departmental Development Plan 2020-2023, pp. 16.

4 Map Biomas Colombia: 38 Años de Cambios 1985-2022, https://colombia.mapbiomas.org/wp-content/uploads/sites/3/2023/11/2.-FactSheet_Mapbiomas-BIOMAS-DE-COLOMBIA.pdf

5 Putumayo Departmental Development Plan, 2024-2027, pp 47.

6 Colombia Directorate of Taxes and National Customs, Dirección de Impuestos y Aduanas Nacionales - DIAN.

7 http://areasprotegidas.ambiente.gob.ec/en/areas-protegidas/cuyabeno-fauna-production-reserve

8 Cuenca Amazónica Ecuatoriana: 36 años de cambios 1985 – 2020. Mapbiomas Amazonía, http://ecociencia.org/wp-content/uploads/2022/06/FactSheetEC.pdf

9 Vision Amazonia, Hacía un Modelo Forestal Sostenible, VISION-AMAZONIA-REM-I-1.pdf (minambiente.gov.co).

10 Programa Socio Bosque, https://sociobosque.ambiente.gob.ec/?q=node%2F44.

11 For more information, see: https://www.ikiam.edu.ec/index.php/coordinacioninvestigacioninnovacion/proyectos-de-innovacion-y-transformacion-de-tecnologia/.

12 Data from Colombia's Ministry of Commerce, Industry, and Tourism, Perfiles económicos y comerciales por departamentos | MINCIT - Ministerio de Comercio, Industria y Turismo.

13 Note that the average annual sales calculated for the 22 bio-businesses in Ecuador excludes one bio-business which reported $80M in sales, vastly higher than their counterparts, to avoid skewing the average value.

14 Chakras have potential to generate economic and biodiversity gains throughout the Amazon. Within the Chakra, producers can establish hundreds of plants of short-, medium-, and long-term growth, with incremental levels of return throughout the year, as well as outlying surges of income during wood harvesting periods (e.g., balza at year 3, cedar at year 7, chuncho at year 17), to increase net income over time and enhance profits and cash flow for current and future years.

15 La extraordinaria y valiosa vainilla que se produce en Ecuador (primicias.ec)

16 Note, this list does not include internationally recognized standards, such as Fair Trade, Organic, Global G.A.P, among others. It is meant to highlight national efforts to boost competitiveness by creating accessible and recognized rewards for specialized products and services. In addition to these national seals, nearly all bio-businesses mention the significance of international standards, with many already possessing a certification and/or in process of obtaining one or multiple certifications. More information on international certification standards can be found under the section Status of Bio-businesses.

17 Colombia Ministry of Commerce, Industry, and Tourism, 2023. See summary requirements and the government of Colombia's strategy Tourism for a Culture of Peace.

18 As a specific initiative of Corpoamazonia, the platform currently promotes products and bio-businesses from Amazonas, Caquetá, and Putumayo departments only. For more information, see: https://amazoniaesenciadevida.com.co/.

19 Of note, the nine principles that define the Chakra Seal certification system are aligned with the Napo GAD's 2017 ordinance which legally recognizes the kichwa Amazonian chakra as a local production system with specific technical management, governance, sustainability, and ancestral aspects that define production and use of bioproducts grown on a chakra. For more information, see: https://www.corporacionchakra.org/que-es-el-sello-chakra/

20 https://serviciosafc.mag.gob.ec/sello-afc/.

21 Note that this excludes businesses producing and selling handicrafts, which do not require sanitary permissions.

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