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# STUDY ON 6 PRIORITY SECTORS FOR EU TRADE AND INVESTMENT IN CENTRAL AMERICA

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## Acronyms

<b>AA</b>	EU-Central America Association Agreement
<b>AMEGUA</b>	Guatemalan Electric Mobility Association
<b>AMM</b>	Wholesale Market Authority (Guatemala)
<b>ARESEP</b>	Regulatory Authority of Public Services (Costa Rica)
<b>ARSA</b>	Sanitary Regulation Agency (Honduras)
<b>BCIE</b>	Banco Centroamericano de Integración Económica
<b>CAC</b>	Central American Agricultural Council
<b>CACU</b>	Central America Customs Union
<b>CAGR</b>	Compound Annual Growth Rate
<b>CAF</b>	Banco de Desarrollo de América Latina
<b>CCSS</b>	Costa Rican Institute of Social Security (Costa Rica)
<b>CECCA</b>	Clean Energy Corridor of Central America (Corredor de Energía Limpia de Centroamérica)
<b>CEI</b>	Cybersecurity Exposure Index
<b>CENTA</b>	National Center for Agricultural and Forestry Technology (El Salvador)
<b>CLV</b>	Certificate of Free Sale
<b>CNE</b>	National Energy Council (Consejo Nacional de Energía, El Salvador)
<b>CNFL</b>	National Energy and Light Company (Costa Rica)
<b>CNIBiot</b>	National Center for Biotech Innovations
<b>COMITRAN</b>	Sectoral Council of Transport Ministers of Central America
<b>COMISCA</b>	Council of Ministers of Health of Central America and the Dominican Republic
<b>CSIRT</b>	Computer Security Incident Response Center
<b>DDL</b>	Digital Development Level
<b>DGD</b>	Directorate of Digital Governance
<b>DNM</b>	National Medicine Directorate (EL Salvador)
<b>EASAC</b>	Climate-Adapted Sustainable Agriculture Strategy
<b>ECLAC</b>	Economic Commission for Latin America and the Caribbean
<b>EEN</b>	Electric Energy National Company (Empresa Nacional de Energía Eléctrica, Honduras)
<b>EiU</b>	The Economist Intelligence Unit
<b>EPR</b>	Extended Producer Responsibility
<b>ESC</b>	IADB's Emerging and Sustainable Cities Program
<b>ETESA</b>	Electric Transmission Company (Empresa de Transmisión Eléctrica, Panama)
<b>EU</b>	European Union
<b>FAO</b>	Food and Agriculture Organization
<b>FTZ</b>	Free Trade Zones
<b>GCF</b>	Green Climate Fund
<b>GDP</b>	Gross Domestic Product
<b>GHG</b>	Greenhouse Gases
<b>CICTE</b>	Inter-American Committee against Terrorism
<b>GLACY+</b>	Global Action on Cybercrime Extended
<b>GMC</b>	Good Manufacturer Certificate
<b>GMF</b>	Genetically Modified Foods
<b>GSP+</b>	General System of Preferences "plus"
<b>GTPP</b>	Gas to Power Panama
<b>HBT</b>	Health biotechnology
<b>HS</b>	Harmonized Commodity Description and Coding System
<b>IADB</b>	Interamerican Development Bank
<b>ICAPP</b>	Central American Biotechnology and Biosafety Initiative
<b>ICE</b>	Costa Rican Institute of Electricity
<b>ICTA</b>	Institute of Agricultural Science and Technology (Guatemala)
<b>IDIAP</b>	Institute of Agricultural Innovation (Panama)

<b>IEA</b>	International Energy Agency
<b>IFC</b>	International Finance Corporation
<b>IICA</b>	Inter American Institute for Cooperation on Agriculture
<b>INTA</b>	National Institute of Innovation and Transfer in Agricultural Technology (Costa Rica)
<b>INTA</b>	Nicaraguan Institute of Agricultural Technology (Nicaragua)
<b>IRENA</b>	International Renewable Energy Agency
<b>IT</b>	Information Technologies
<b>LAC</b>	Latin America and the Caribbean
<b>LATAM</b>	Latin America
<b>LNG</b>	Liquefied natural gas
<b>MAG</b>	Ministry of Agriculture and Livestock (Costa Rica)
<b>MER</b>	Central America Regional Power Market (Mercado Eléctrico Centroamericano)
<b>MICITT</b>	Science, Technology and Telecommunications Ministry (Costa Rica)
<b>MIDA</b>	Ministry of Agricultural Development (Panama)
<b>MNEs</b>	Multinational Enterprises
<b>MOPT</b>	Ministry of Public Works and Transport (Costa Rica)
<b>MOPS</b>	Ministry of Public Works (El Salvador)
<b>MoU</b>	Memorandum of Understanding
<b>MRLs</b>	Maximum Residue Limits
<b>NAMA</b>	Nationally Appropriate Mitigation Actions
<b>NCSI</b>	National Cyber Security Index
<b>OAS</b>	Organization of American States
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OTC</b>	Over the Counter (pharmaceuticals)
<b>PA</b>	Precision Agriculture
<b>PIMUS</b>	Integrated Sustainable Urban Mobility Plans (Plan Integral de Movilidad Urbana)
<b>PITTA P.O.</b>	Organic Production Technology Research and Transfer Program (Costa Rica)
<b>PNAO</b>	National Organic Agriculture Programme (Costa Rica)
<b>PNESER</b>	National Sustainable Electrification and Renewable Energy Program (Nicaragua)
<b>PNLOG</b>	Integrated Logistics and Mobility Policy and a Freight Logistics National Plan (El Salvador)
<b>PPPs</b>	Public-Private Partnerships
<b>PRONACOM</b>	National Competitiveness Program 8Guatemala)
<b>PRUGAM</b>	Plan Regional Urbano de la Gran Área Metropolitana de Costa Rica -PRUGAM
<b>RE</b>	Renewable Energy
<b>RTCA</b>	Central American Technical Regulation
<b>SCITA</b>	Technology Innovation Centers System (Honduras)
<b>SENASA</b>	National Agricultural Health Service (Guatemala)
<b>SEZs</b>	Special Economic Zones
<b>SICA</b>	Central American Integration System (Sistema de la Integración Centroamericana)
<b>SIECA</b>	Economic Integration Central American Secretary (Secretaria de Integración Económica Centroamericana SIECA)
<b>SIEPAC</b>	Central American Electrical Interconnection System
<b>SITGAM</b>	Great Metropolitan Area Integrated Transportation System (Sistema Integrado de Transporte del Gran Area Metropolitana, Costa Rica)
<b>SMEs</b>	Small and Medium Enterprises
<b>SWOT</b>	Strengths, Weaknesses, Opportunities, Threats analysis
<b>TELCA</b>	Limon Electric Freight Train
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>US</b>	United States
<b>USDA-FAS</b>	United States Department of Agriculture Foreign Agricultural Service
<b>WB</b>	World Bank

## Executive summary

There exist opportunities for EU exports and investments in many sectors across Central America. However, EU businesses face important challenges when doing business in the region, in particular when they are not familiar with the market structure, regulatory fragmentation and policy dynamics. Therefore, it is crucial to identify those sectors, and niches within them, that offer the best prospects and where EU businesses can achieve a competitive positioning.

This short study aims to provide a concise, comprehensive overview of 6 pre-mapped sectors across the 6 Central American countries. These sectors are aligned with the strategic priorities of the EU international strategy, in particular: the Green Deal, the Farm to Fork strategy- and the Digital Agenda. The six sectors are: Renewable energy, Sustainable Urban Mobility, Innovation for Sustainable Agriculture, "Green" Logistics, Cybersecurity and Health.

The objective is to provide sufficient, comparable information for each sector, to identify those 3 sectors that should be prioritized in a second phase and be analyzed in-depth. It is important to consider that the level of development of each sector across the 6 countries is uneven, and attention has been given to produce an as much as possible balanced overview of the six sectors.

The information has been presented to EU stakeholders in the Central American region, who have been requested to fill out a survey to select the 3 sectors to be prioritized, based on the following 5 indicators: Potential for EU trade/ investment, Market size, Opportunities for SMEs, Market access, Policies & regulations, and Environmental sustainability.

The results of the survey have been integrated with the conclusions of the consultants and are presented in a "Decision matrix" at the end of this study, that has been submitted for final approval to the EU.

The three priority sectors proposed are:

- Innovation for sustainable agriculture
- Renewable energy
- Green logistics and urban mobility

## A short note on sources

The following sources have been used to produce this study:

- Primary information:
  - Public domain data: Central Banks, Government, Statistical authorities, Procurement authorities, Customs, etc.
  - Interviews (with sector experts, sector associations, relevant organisations, core stakeholders). A total of 45 interviews have been conducted for this study.
- Secondary information: investment agencies, sector/ industry reports, international & regional institutions & think-tanks (World Bank, IFC, OECD, Central American Bank for Economic Integration, Central American Integration System, Interamerican Development Bank, United Nations Economic Commission for Latin America and the Caribbean, stakeholders, etc.)

The relevant sources are mentioned as footnotes throughout the text.



## 1. Policy and regulatory assessment

### 1.1. Renewable energy

Article 288.2.b of the AA supports “Trade Favoring Sustainable Development” and states that “The parties shall endeavor to: facilitate and promote trade and foreign direct investment in environmental technologies and services, renewable-energy and energy-efficient products and services, including through addressing related non-tariff barriers”.

The Treaty for the Central American Electric Market was created to contribute to the gradual integration of the Central American Electric Market by facilitating interconnecting amongst the countries’ grids as well as promoting a competitive market.

The International Energy Agency (IEA) and the Central American Integration System (SICA) have signed a Memorandum of Understanding (MoU) to promote clean energy transitions in Central America. Under the MoU, the two organisations will expand their cooperation on energy data and statistics, energy efficiency and climate resilience of electricity systems. These have all been identified as key areas for energy transitions and climate change mitigation in the region under SICA’s Central American 2030 Sustainable Energy Strategy.

The International Renewable Energy Agency (IRENA) is supporting the development of the Clean Energy Corridor of Central America (CECCA<sup>1</sup>), a regional initiative calling for accelerated development and cross-border trade of renewable power in Central America. The implementation of the CECCA initiative and its set of activities within the regional context aims to support the integration of larger sums of renewables into the Regional Transmission Network. With Mexico, Colombia and Belize expected to join the regional electricity market, the CECCA strategy could be expanded accordingly in future phases. This corridor initiative represents a strategic approach, structured around five pillars, and customized to address the regional and local context: (i) Enabling Frameworks to support systemic changes and developments required for a reliable and affordable power system transition (further subdivided into technical and governance themes); (ii) Country and Regional Planning to fully consider cost-effective RE options; (iii) Zoning & Resource Assessment to identify high resource and appropriate areas for RE deployment; (iv) Capacity Building to plan, operate, maintain and govern power systems with higher shares of RE generation; and (v) Public Information on how CECCA provides reliable, sustainable and affordable energy.

Costa Rica’s energy policy aims to move from a fossil fuels-based energy system towards renewable energy sources and to expand its power generation capacity, replacing old power generating stations and developing new projects. Costa Rica adopted the National Decarbonization Plan in February 2019 to achieve a net zero emissions economy by 2050.

The Costa Rican Institute of Electricity (ICE) holds a monopoly over electricity distribution and generation in Costa Rica. The Law that Authorizes the Autonomous Electric Generation N°. 7200 (Ley 7200 Generación Eléctrica Autónoma o Paralela) indicates that only the ICE can decide who produces energy in the country up to a limit of 50 MW. In addition, only ICE can purchase it to these operators and later resell it. Also, the law indicates that the total generated by the operators cannot exceed 15% of the power of the National Electric System. There are some exceptions where other public institutions and co-operatives are authorized by law to

<sup>1</sup> <https://www.irena.org/-/media/Files/IRENA/Clean-Energy-Corridors/CECCA-Strategy-Documents-Final--22-9-2015.pdf?la=en&hash=7E729C9B11024B38787490EDBAACDA720706CADD&hash=7E729C9B11024B38787490EDBAACDA720706CADD#:~:text=The%20Clean%20Energy%20Corridor%20of,renewable%20power%20in%20Central%20America.>

generate and sell electricity. The most relevant exception is the National Energy and Light Company (CNFL), which is a subsidiary of ICE. The following exceptions are entitled to generate, distribute and sell electricity within the circumscriptions that have been assigned to them by law. For example: Rural Electrification Cooperatives (including Coopesantos, Coope Alfaro Ruiz, Coopelesca and Coopeguanacaste) and Regional Public Service Entities; ESPH in Heredia province and JASEC in Cartago province. The law authorizes private companies and persons to generate for auto-consumption without any restriction. Generation of electricity to distribute and sell to third parties is authorized only when that energy is sold to ICE at a set price.

The monopoly granted by the law to ICE limits, among other things, the attraction of foreign investment in the field of electric generation. To change that situation, the government must make adjustments to the law 7200 since an investor has limited investment possibilities, in addition to the decision of ICE not to make more investments in energy in the next eight years, considering the demand satisfied and the growth in demand of 1.9% projected to 2040.

In El Salvador, the General Electricity Law of 1996, which liberalised the power sector, also allowed for more private sector participation in renewable energy development, alongside the government's more active promotion of renewable energy sources. The National Energy Policy 2010-2024 then became a key tool for the implementation of renewable energy, especially in the power sector.

The National Energy Council (CNE - Consejo Nacional de Energía) is currently developing its long-term National Energy Policy 2020-2050. This aims to reduce the electricity tariff through added renewable power generation, facilitating the removal of electricity subsidies towards the end of the policy period. This new strategy goes beyond the power sector, too, stipulating targets for clean energy technologies in end-use sectors and energy efficiency, as well as promoting pilot projects for direct use of renewables in the industrial and agri-food sectors.

Decree 462, passed in 2007, grants tax breaks to companies who develop renewable energy projects and provides for 10 years of import tax exemptions for purchases of machines and equipment.

Guatemala's National Energy Plan of Guatemala defines the promotion of renewables as a priority. The plan aims to promote the use of clean and environmentally friendly energy for domestic consumption without losing sight of energy security and the need for supplying electricity at competitive prices. The 2013-2027 Energy Policy developed by the Ministry for Energy and Mining sets the target of 80% of Guatemala's energy generation coming from renewable sources by 2027.

The electric energy industry in Guatemala is governed by the General Electricity Act and related regulations. The General Electricity Act was adopted to liberalise the energy sector and to promote private investment in the industry. It has experienced no material changes in the past 20 years.

The Incentives for the Development of New and Renewable Sources of Energy Act 1986 provides for several incentives to encourage the use of renewable energy, including (i) Financing for new projects; (ii) Investment deductions for income tax purposes; and (iii) Charitable donations for renewable energy project deductions for income tax purposes.

Honduras has set ambitious goals for electricity generation from renewable sources, expecting to reach a 95% share by the end of the next decade. The Policy and Energy Plan lays out the policies to be implemented in the 2020-2030 period. Its goal is to provide lower-cost and reliable electricity, to expand the distribution and transmission networks, and to encourage the use of renewable energy.

The 2014 General Law of the Electricity Industry (Ley General de la Industria Eléctrica, LGIE) aimed to open the market to private operators, ending the State's monopoly by the State's



owned Electric Energy National Company (Empresa Nacional de Energía Eléctrica, EEN) on electricity markets in Honduras.

With significant recent capacity additions, the country has already made great progress helped by both price and tax incentives. The Law for the Promotion of Renewable Energy Production promotes public and private investment in renewable energy.

The National Energy Policy of Nicaragua establishes a policy framework for the development and exploitation of renewable sources. The law sets the objective of prioritizing the use of renewable energy in the national energy mix and of stabilizing energy prices using renewables. National Program of Sustainable and Renewable Energy Electrification.

The Generation Expansion Plan for 2019-2033 projects an almost 75% increase in demand over that period with local renewables contributing 70% of the generation by 2033.

The National Sustainable Electrification and Renewable Energy Program (PNESER) aims to support the efforts of the Nicaraguan government to reduce poverty by promoting access of a significant portion of the population to efficient, sustainable electricity service. It also supports the creation of the conditions to diversify and transform the energy matrix and contributes to better conditions for mitigation and adaptation to climate change.

The Nicaraguan government privatized electricity distribution in October 2000. Two years later in October 2002 the Nicaraguan government sold the state electricity generating company. In September 2020 the Nicaraguan National Assembly approved the proposed reform of Law 532, a law for the promotion of electricity generation with renewable sources.

Based on interviews carried out during this study, in Nicaragua there is a de facto monopoly by DINORTE- DISSUR.

Panama's National Energy Plan 2015-2050 suggests that 70% of the country's energy supply could be renewable after 35 years. The plan was adopted as a long-term roadmap to diversify the energy sector and advance energy access, energy efficiency, energy security and overall decarbonization of the energy system.

Law 6 of 1997 dictates that the transmission and integrated operation activities shall only be performed by ETESA, but this rule is included in a provision that seeks to impose restrictions on the simultaneous provision of services. This may be why the National Authority of Public Services (ASEP) issued a resolution governing the granting of transmission concessions to parties other than ETESA.

Electricity generation is rendered in competition. Distribution and commercialization, on the other hand, are currently limited to three concessionaires with exclusive rights in their areas of service, save for the fact that the distribution activity may be performed by other providers within isolated systems, and under rural electrification project rules, when the distribution companies close to the project areas decline the option to provide the service.

The law dictates that ETESA is responsible for the planning of the transmission network expansion, the construction of new assets and reinforcements for the network, as well as the operation and maintenance of the national interconnected system. ETESA is also obliged by law to mediate between generators and distributors by calling and conducting the public bidding processes necessary to award power purchase agreements to ensure satisfaction of the demand that distribution companies must serve under their corresponding concession contracts.

According to a Panama Renewable Readiness Assessment published by IRENA<sup>2</sup>, the current regulatory framework conditions, and specifically the PPAs, are designed for dispatchable

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<sup>2</sup> <https://www.irena.org/publications/2018/May/Renewables-Readiness-Assessment-Panama-EN>

technologies such as coal, gas, oil, and hydroelectricity, and do not incentivize new wind and solar PV projects.

## 1.2. Sustainable urban mobility

Article 288.2.b of the AA supports “Trade Favoring Sustainable Development” and states that “The parties shall endeavor to: facilitate and promote trade and foreign direct investment in environmental technologies and services, renewable-energy and energy-efficient products and services, including through addressing related non-tariff barriers”.

Public-Private Partnerships (PPPs) have been promoted worldwide as the solution for states to meet their need for infrastructure and public services with the participation of the private sector. Latin America has been no stranger to the implementation of this model, recognized in recent years as a leader in PPP with respect to the rest of the developing regions.<sup>3</sup>

PPPs regulatory frameworks have seen a significant development in Central America<sup>4</sup> in the last decade. Table on the left below shows all Central American countries are considered “developed” markets for PPPs. According to the EiU analysis, Guatemala and Costa Rica have made important gains following institutional improvements. As shown in Table on the right all Central American countries (except Panama, where PPPs regulations have stalled) are included in the top positions of the EiU ranking in terms of quality of PPP’s regulatory framework, which also includes the assessment of National Infrastructure Plans. The main challenge for PPP development in the transportation sector in the region is very limited financial facilities for funding infrastructure.

Table. Infrascoppe 2019 overall score (EiU)

Source: The EiU

Rank	Score /100
1	Chile 79
=2	Colombia 77
=2	Peru 77
4	Jamaica 76
5	Guatemala 74
6	El Salvador 73
=7	Brazil 72
=7	Costa Rica 72
=7	Uruguay 72
=10	Honduras 66
=10	Mexico 66
=12	Ecuador 63
=12	Nicaragua 63
14	Panama 60
15	Trinidad and Tobago 56
16	Dominican Republic 55
=17	Bahamas 53
=17	Paraguay 53
19	Argentina 52
20	Barbados 37
21	Venezuela 8
<b>Average</b>	<b>62</b>

■ MATURE (80-100) ■ DEVELOPED (60-79)  
■ EMERGING (30-59) ■ NASCENT (0-29)

Score 0-100 where 100=best. Rank out of 21 countries across LAC, 1=best, = before the rank indicates a tie.

Table. Regulations

Source: The EiU

Rank	Score /100
1	Colombia 95
2	Chile 94
3	El Salvador 88
=4	Costa Rica 84
=4	Honduras 84
6	Dominican Republic 82
7	Guatemala 81
8	Nicaragua 80
9	Mexico 79
10	Jamaica 78
11	Uruguay 76
12	Ecuador 74
13	Peru 70
14	Paraguay 68
15	Argentina 66
16	Brazil 63
17	Panama 60
18	Trinidad and Tobago 52
19	Bahamas 51
20	Barbados 21
21	Venezuela 16
<b>Average</b>	<b>70</b>

■ MATURE (80-100) ■ DEVELOPED (60-79)  
■ EMERGING (30-59) ■ NASCENT (0-29)

Score 0-100 where 100=best. Rank out of 21 countries across LAC, 1=best, = before the rank indicates a tie.

<sup>3</sup> Public-Private Partnership in Latin America. Facing the challenge of connecting and improving cities, CAF, 2018

<sup>4</sup> The 2019 INFRASCOPE. Evaluating the environment for public-private partnerships in Latin America and the Caribbean, The Economist Intelligence Unit, 2019

Sustainable urban mobility has been part of the EU agenda (e.g. the Plan Regional Urbano de la Gran Área Metropolitana de Costa Rica -PRUGAM Project) and prospects across the region are aligned with the broader concept of “smart city”. The PRUGAM project aimed at improving the living conditions of the population of the Central Valley of Costa Rica, through the greater competitiveness of its economic space, derived from greater efficiency and quality of its offer of services and spaces.” PRUGAM proposed a new urban model more in line with the functional and spatial integration of the environment, discouraging at the same time the use of private vehicles through the adoption of a first-rated public transportation system, as well as an integration of the natural environment into the built environment.

The PMUS or PIMUS (Integrated Sustainable Urban Mobility Plans) are strategic documents that seek to propose new and sustainable mobility models for urban and metropolitan areas. While there are numerous sustainable urban transportation projects planned or in implementation across the region, not all urban areas have developed PIMUS that serve as a policy and strategy guidance for the implementation of integral, long-term plans.

There is a growing support to the development of the sector across the region. The BCIE launched in November 2020 a tender<sup>5</sup> for the “Estudio para el desarrollo del Programa de Movilidad Urbana Sostenible (PMUS) en Centroamérica y República Dominicana” (Study for the development of the Sustainable Urban Mobility Programme in Central America and the Dominican Republic”. The objective of this study is to develop a strategic plan in each target country that would lead to the design of the BCIE Sustainable Urban Mobility Plan, its financing structure, and the implementation of PMUS.

In Honduras, Tegucigalpa y Comayagüela developed its PMUS in 2012, which established clear goals but lacked a consistent strategy and regulatory framework and has had as a result a limited development.

Costa Rica and Panama launched in 2017 a PIMUS respectively for the San Jose and Panama metro areas. In the case of Costa Rica, a pilot project was spun-off as a smaller-scale continuation of the PIMUS for the metropolitan area of San Jose, which is a detailed plan that takes into account the renovation of the central part of the city and seeks to ensure efficient and universal accessibility for people within the area of influence of the new development pole. For this purpose, it designed a modern, multimodal, low-emission transport system that considers the accessibility needs of the most vulnerable users.

In Costa Rica is also worth noting the Electric Transportation National Plan (Plan Nacional de Transporte Eléctrico) 2018-2030, a 12-year plan aimed to strengthen electric transportation in accordance to Law 9518, which establishes the incentivization and promotion of electric transportation. The plan drives the electrification of private, public, and institutional transportation through direct and indirect investment.

Panama’s PIMUS provides guidance for Panamá’s urban transportation transformation over a 20-year period, giving unprecedented attention to system-wide rationalization, public participation, and long-term sustainability. The plan delineates 149 project level actions in three categories: a) Integrated Transit System (SIT, Spanish Acronym for Sistema Integrado de Transporte): Restructuring bus routes and integrating independent operators into a regional public transit network anchored to the backbone of existing and future Metro (rapid rail) lines; b) Demand Management: Infrastructure and policy actions that push travel behavior toward transit and non-motorized transport, and discourage adoption and use of individual private vehicles; and c) Targeted roadway redesign and roadway construction projects that conform to the other two project categories to improve overall urban mobility efficiency and enhance

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[https://proveedores.bcie.org/opencms/export/sites/bcie/.content/proceso/PC\\_001291/documentos/documento\\_1605052437739.pdf](https://proveedores.bcie.org/opencms/export/sites/bcie/.content/proceso/PC_001291/documentos/documento_1605052437739.pdf)

transportation system resilience. Also, in Panama, CAF and KfW have supported the design of a PIMUS for David district and cities in the province of Chiriquí.

### 1.3. Innovation for sustainable agriculture

Article 288.2.b of the AA supports "Trade Favoring Sustainable Development" and states that "The parties shall endeavor to: facilitate and promote trade and foreign direct investment in environmental technologies and services, renewable-energy and energy-efficient products and services, including through addressing related non-tariff barriers".

Article 284. 2 declares that "the Parties reaffirm their commitment to achieving sustainable development, whose pillars - economic development, social development and environmental protection - are interdependent and mutually reinforcing. The Parties underline the benefit of considering trade related social and environmental issues as part of a global approach to trade and sustainable development".

For the Central American countries, the AA provides legally secure access to the EU market, as it consolidates the GSP+ (General System of Preferences "plus") regime of trade concessions and adds tariff rate quotas on products such as sugar and rum. Banana exports from the region also benefit from a gradually lowering preferential tariff, reaching a limit of 75 EUR per ton in 2020.

The Inter American Institute for Cooperation on Agriculture (IICA) defined in 2018 new areas of technical cooperation in the Mid-Term Plan 2019-2022, which is based on five hemispheric programs: Bio-economy and Production development; Territorial Development y Family Farming; International trade and Regional Integration; Climate Change, Natural Resources and Production Risk management; Agricultural health, Food Safety and Quality. These are integrated, transversally, with two programs that contribute to the five hemispheric programs: Innovation and Technology; Gender and youth.

The Central American Agricultural Council (CAC) launched the Climate-Adapted Sustainable Agriculture Strategy (EASAC according to its acronym in Spanish) for the Central American Integration System (SICA in Spanish) region (2018-2030), which is considered to be a key tool to boost more competitive, inclusive, sustainable agriculture adapted to the effects of climate change and climate variability. The objective is to increase productivity through conservation, sustainable and efficient water use, and biodiversity of soil and forests, to guarantee the population's food and nutritional security. Furthermore, this strategy foresees "building a dynamic portfolio of climate-smart agriculture projects and investments and identifying financing mechanisms."

The Resilient Central America program, a brainchild of multiple international organizations, likewise aims to address the region's agriculture production challenges through a three-step process. The first relates to strengthening and implementing good policies, with the focus centered on irrigation, climate change, and low emission livestock production. The project hopes to incentivize the private sector to shift towards a more resilient agricultural approach. Secondly, farmers will be assisted in their investment decisions regarding sustainable production. A lack of access to credit, markets, and technical capacity is currently hindering the ability of small producers to connect to the value chains of agricultural export products. Finally, the initiative seeks to bolster climate change adaptation in the region by building capacity, utilizing technology, and securing private sector commitments to protect local ecosystems.

In Costa Rica the National Institute of Innovation and Transfer in Agricultural Technology (INTA) focuses on promoting innovation and agricultural technology, by supporting research and development, innovation management, technology transfer activities to producers and management of experimental stations.

The National Organic Agriculture Programme (PNAO), attached to the Directorate of National Programmes of the Ministry of Agriculture and Livestock (MAG), has the aim of supporting and promoting the development of organic agriculture in Costa Rica through the promotion of the production, processing and marketing of organic products. The PNAO coordinates the Organic Production Technology Research and Transfer Program (PITTA P.O.), which is an instance involving the productive, academic and public sectors, and where actions are articulated to promote research and dissemination of results to producers.

The 2020-2030 Bioeconomy Strategy also deals with agriculture sustainability and aims to - among other results- to promote a sustainable agriculture by promoting (i) research, development and innovation on high-tech issues to increase the sustainability of agriculture; (ii) the development of circular economy processes in agricultural, agro-industrial, forestry and fisheries activities; and (iii) boost research and development of precision agriculture applications.

The National Center for Agricultural and Forestry Technology "Enrique Álvarez Córdova" (CENTA) of the Ministry of Agriculture and Livestock (MAG) of El Salvador seeks to provide innovative technological solutions to the agricultural sector, to help improve the country's environmental situation, and to ensuring the food and nutrition security in the country.

The El Salvador Parliament is currently discussing the Law for the Promotion, Protection and Development of Agroecology, that intends - among other aspects - for the country to have sustainable agricultural systems that guarantee and stabilize production, under the principles of justice, environmental protection and non-pollution.

The Guatemala Institute of Agricultural Science and Technology (ICTA) seeks to become an engine of development and integrates capabilities to promote inter-agency cooperation, generate knowledge and technologies and put them at the service of the sector through its extension, information and communication systems.

The Department of Organic Agriculture and Maga Native Resources aims to ensure the integrity of Organic Agriculture in Guatemala and promote it as a sustainable and sustainable production alternative, preserving and promoting the plant genetic and native resources of the country through rules governing the production, processing and marketing of products.

The Government of Honduras through the 2020 Plan has defined a new development strategy to promote the transformation and modernization of the agro-industrial and agribusiness sectors, showing a keen appreciation for needs on the ground as well as strong commitment to supporting agriculture sector development. A Technology Innovation Centers System (SCITA) was launched in 2019 to promote innovation in the agricultural sector, replacing the previous Center for Training of Agricultural Development (CEDA).

The Department of Organic Agriculture under the National Agricultural Health Service (SENASA) aims to "promote in the country an agricultural activity in harmony with nature, guarantee to consumers the offer of agricultural products that comply with the international valid standards in organic agriculture. promoting international trade in fresh and organically processed foods in Honduras, through the effective application of national technical and legal regulations in organic agriculture."

In Nicaragua, the Nicaraguan Institute of Agricultural Technology INTA, focuses on a dynamic oriented to research, innovation and technology transfer with a linking approach with the country's scientific technology sector, with the productive sector and with all the institutions of the National System of Consumption and Trade Production. INTA has made progress in the production of bio-inputs as an agroecological strategy, and a value aggregation to production in terms of quality and market access; in addition to reducing production costs in different areas, especially in vegetables, coffee, cocoa and basic grains.

Several legal and regulatory instruments (among others the Law No. 765, the Law for the Promotion of Agro-ecological or Organic Production, 2011) characterize agroecological production, and establish the competences, scope, operating structure, actions and mechanisms for the promotion and development of agroecology in the country. Even with these advances, a more systematic development has not yet been achieved, partly because of the need for some specific policy instruments that facilitate the scalability of agroecology in the country. FAO is collaborating with the Nicaraguan Government to design and implement a National Agro-ecological and Organic Agriculture Production Promotion Policy.

The Panama Institute of Agricultural Innovation (IDIAP) established in 2019 is the leading government institution in charge of research, adapt, validate, and disseminate agricultural knowledge and technologies, within the policies, strategic and guidelines of the agricultural sector.

The Ministry of Agricultural Development (MIDA) created in 2017 the Authority to Control Certification of Agricultural Organic Production, a government-controlled authority to certify organic productions in Panama.

#### 1.4. Green logistics

Article 288.2.b of the AA supports "Trade Favoring Sustainable Development" and states that "The parties shall endeavor to: facilitate and promote trade and foreign direct investment in environmental technologies and services, renewable-energy and energy-efficient products and services, including through addressing related non-tariff barriers".

Central America logistics performance index (as measured by the World Bank's Logistics Performance Index) is shown in the table below. Nicaragua is not included in the ranking, that covers 160 countries.

Table. World Bank's Logistics Performance Index (2018)

Source: World Bank

Country	Rank	Score	Customs	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing
Panama	38	3.28	45	2.87	3.13	3.31	3.33	3.4
Costa Rica	73	2.79	70	2.63	2.49	2.78	2.7	2.96
Honduras	93	2.6	125	2.24	2.47	2.66	2.72	2.68
El Salvador	101	2.58	120	2.3	2.25	2.71	2.56	2.47
Guatemala	125	2.41	132	2.16	2.2	2.33	2.25	2.42

In 2020 the Sectoral Council of Transport Ministers of Central America (COMITRAN) and the Secretariat for Central American Economic Integration (SIECA) approved the 2035 Mobility and Logistics Master Plan roadmap. The plan is part of an agreement reached three years ago to turn the region into a world-class logistics and transport hub by solving problems related to high transport costs and outdated and poor infrastructure mobility delays. It should be ready by 2022 and will consider specific actions and recommendations for Honduras, Panama, El Salvador, Guatemala, Costa Rica, and Nicaragua over the next 15 years.

The green/ sustainable angle in logistics has been so far very limitedly adopted by governments or private operators across the region, and Latin American & Caribbean are considered low-performance regions in terms of logistics. environmental performance.<sup>6</sup>

In February 2021 a "High-level launching of the Latin America and the Caribbean Circular Economy Coalition" took place, as part of the XXII Session of the Forum of Ministers of

<sup>6</sup> Green Transportation and Logistics Performance: An Improved Composite Index, MDPI, 2019



Environment of Latin America and the Caribbean, aiming at promoting the principles of circular economy across all sectors of the economy in the region.

While there is not a consistent regulatory framework in the region, large multinationals in Central America, including logistics firms but also manufacturers and wholesalers, are implementing sustainability and circular economy requirements along their supply chain, driven by compliance with regulatory requirements and consumers demands in international markets.

Costa Rica has medium and long-term plans which establish the elements and projects necessary for the integral logistics development of the country. These include the National Development Plan, the National Logistics Plan, a National Logistics Policy, and the National Transportation Plan. All these documents place a particular emphasis on the development of seaports and airports, as well as the infrastructure of national border crossings (infrastructure and processing management).

According to the National Logistics Plan, the cost of implementing all identified measures is estimated to be approximately US \$5.6 billion. The investments are to be carried out mainly by the Costa Rican Ministry of Public Works and Transport (MOPT) and the institutions that make up the transportation and infrastructure sector. The Ministry of Trade, however, will carry out investments to facilitate and improve the flow of commerce at Costa Rica's border crossings.

In its efforts to improve the nation's logistics sector, the government of El Salvador has developed an Integrated Logistics and Mobility Policy and a Freight Logistics National Plan (PNLOG) 2018-2032, aligned with the country's short and long-term goals. It is consistent with national and regional development plans.

The Ministry of Public Works, Transport, Housing and Urban Development, asserts that the components of the initiative have general and sectoral scopes that will have a positive impact on all modes of transportation and road infrastructure for trade facilitation, as well as will result in increased dynamism and reduced processing times at the country's border crossings. Additionally, an investment of US \$125.3 million will be made to improve shipping infrastructure located in El Salvador's Marine Coastal Strip.

Special Economic Zones (SEZs) will be developed around the nation's seaports. The ports of Acajutla and La Union will be expanded and improved, as will be the Puerto Corsain in the Gulf of Fonseca.

Within the air transport sector, the Monsignor Arnulfo Romero y Galdámez Airport is being expanded and modernized. This effort is being conducted with the technical support of the Economic Commission for Latin America and the Caribbean (ECLAC). Ilopango Airport is also undergoing improvement. Additionally, the Salvadoran Ministry of Public Works (MOPS) will invest US \$410 million in the development of road infrastructure by 2030.

Guatemala's National Competitiveness Program (Pronacom) lays out a strategic National Competitiveness Agenda that seeks to strengthen Guatemala's productive base and to improve the nation's seaport infrastructure, airport infrastructure, and national system of roads.

In 2015, Pronacom commenced the process of authoring the National Logistics Plan with input from both the public and private sectors, as well as from the Inter-American Development Bank. It was launched in 2016 and has been integrated as a priority of the National Competitiveness Policy 2018-2032, which refers to the improvement in conditions of infrastructure, logistics and connectivity, as well as access to local and international markets. Specific projects have been identified to address air cargo capacity and handling problems, as well as the inspection of cargo at seaports, airports, and land borders.

A major project to be implemented for the purpose of improving Central American logistics is the expansion of the air cargo area of La Aurora International Airport.

Efforts will be aimed at making improvements in infrastructure and capacity in cargo management of both imports and exports. These improvements will be made due to private investments in the operations.

A specific protocol has been developed for Puerto Quetzal. The port was selected to implement a pilot program for intrusive revisions. The goal of the initiative is to reduce the cost of joint inspections from US \$400 to approximately US \$100, as well as to reduce the time needed for inspections to five days from fifteen.

Two projects from the National Logistics Plan were undertaken between 2018-2019. These were the creation and implementation of a Logistics Observatory, whose objective is to measure the economic impact of improvements made in the areas of logistics and cross-border trade, as well as the creation of a Collection Center. This facility is for the improved management of goods transported by air for the purpose of reducing costs and transport times.

Honduras is prioritizing the international mobility issue through the creation of better linkages between the Gulf of Fonseca and the Atlantic ports of Castilla and Cortés. To accomplish this Honduras will invest in improved road infrastructure and airports.

The head of the Commission for the Promotion of Public and Private Alliances (Coalianza), Miguel Gámez, has communicated that plans for Honduras are comprised of several projects which include the establishment of a container terminal and a bulk terminal at Puerto Cortés.

Other projects that are being undertaken in Honduras include the development of the Logistics Corridor and the CA-5 Road, which is popularly known as the "Dry Canal." This highway connects Palmerola Airport with the border of El Salvador at the Amatillo customs facility. This project is expected to be completed sometime during 2020.

In Panama the development of a National Logistics Strategy was undertaken by the Panamanian government in 2015. Additionally, the Central American logistics strategy put forth by the Panamanian government has been structured to consist of three main areas. These include making the country the central hub of interoceanic trade, integrating all modes of national and foreign trade logistics, and achieving institutional consensus in both the public and the private sectors. As of the date of drafting this document, progress has been made in the production of the Master Plan for the Interoceanic Zone, the adoption of a new Law on Cargo Transport, and the establishment of the Panama Maritime Single Window (VUMPA). The latter has been designed to reduce the number of forms required to transport cargo through the Panama Canal, as well as to reduce the waiting times for ships.

The Panamanian Ministry of Agricultural Development (MIDA) is developing a masterplan to establish a Food Logistics Hub (free zone for food), which will consist of a bulk terminal, cold deposits, and processing facilities. In this area, the region's agricultural crops would be consolidated and processed for export to most likely Asia, but also to the United States, the Caribbean and Europe.

Panama is also aiming to become an LNG logistics hub for Central America. A 441MW Gas to Power Panama (GTPP) planned for 2022 would be Panama's second such undertaking, after AES Colón brought online an LNG reception terminal and associated 381MW gas-fired plant in 2018.

Nicaragua is developing with the support of the IADB a National Logistics Plan aligned with regional roadmap approved by SIECA.

Regarding circular economy (that is relevant to embed environmental management strategies across the supply chain), regulatory development is very limited across the region. Countries

like El Salvador and Honduras are designing circular economy roadmaps. Panama approved a Zero Waste Policy through the 2018 Law on Integrated Waste Management and Zero Waste Policy, while Costa Rica has introduced Extended Producer Responsibility (EPR) provisions within the 2010 Integral Waste management Act. Circular economy is also being hailed by industry representatives across the region as a post-COVID growth strategy.

### 1.5. Cybersecurity

The Budapest Convention on Cybercrime<sup>7</sup> serves as a checklist for the development of domestic substantive and procedural law on cybercrime and electronic evidence. In Central America, only Costa Rica and Panama have ratified the Budapest Convention.

The Global Cybersecurity Index (GCI) is published by the International Telecommunication Union (ITU). It assesses cybersecurity preparedness of member states based on the analysis of five pillars: a) Legal, b) Technical, c) Organizational, d) Capacity Development and e) Cooperation. The Table below shows the position of each Central American country out of 175 member states evaluated.

Table. GCI ranking of Central American countries (2018)

Source: ITU

Country	Score	Regional Rank	Global Rank
Panama	0.369	13	97
Guatemala	0.251	16	112
Costa Rica	0.221	18	115
Nicaragua	0.129	26	140
El Salvador	0.124	27	142
Honduras	0.044	32	165

Costa Rica has updated its national legislation creating a legal development of protection for the Costa Rican cyber society, allowing the possibility that people report violations suffered in the virtual world that previously had no legal response. Among them, stands out the Law of Protection of the Person in front of the treatment of his Personal Data and its Regulation, creating in this way the Agency of Protection of Data of the Inhabitants (PRODHAB). It also has the Computer Crime Law No. 9048. However, despite having the regulations that allow and promote the use of the signature and digital certificates, it does not have a national cryptographic approach policy; that is, of technical and legal standards that cover the whole of the State in a single instrument for document management and authentication.

Costa Rica lacks a cybersecurity policy. By the end of 2017, the MICITT (Science, Technology and Telecommunications Ministry) presented what is called the National Cybersecurity Strategy (ENC), a normative foundation comprehensive but which, however, does not represent an effective legal instrument in terms of securing the cyber security of the ICT user population. Decree 40.862-MP-PLAN-MICITT lays the foundations for the creation of a Directorate of Digital Governance (DGD). This would aim to closely coordinate the Digital Signature and Information Security addresses and expand their functions with a project management perspective to centralize decision-making in ICT matters for the Central Government.

The Computer Security Incident Response Center (CSIRT) oversees ensuring cybersecurity in Costa Rica. It was open in 2015. This center is in the facilities of the MICITT in Zapote, San José.

Although El Salvador does not currently have a national cybersecurity strategy, one of the objectives of the 2018-2022 E-government Strategy is to have a National Cybersecurity Policy,

<sup>7</sup> <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/185>

as a “result of a consultation process involving international experts, academia, government institutions, private sector and civil society organizations.” One of the first efforts against cybercrimes is the creation of the Special Law against Cybercrimes and Related Rights. The country has a nationally recognized CSIRT, SaLCERT, which must respond to cybersecurity incidents and coordinate with other response teams. In recent years, the country has exchanged knowledge on topics such as the protection of critical infrastructure and the improvement of cybersecurity, with Israel, Korea, Spain, and Ecuador, among others. The 2020-2030 National Digital Agenda of El Salvador has not been approved yet.

It is also worth mentioning that there exists a “Manual to Obtaining Communication Service Provider Evidence from US”, whose purpose is to guide Salvadoran law enforcement agencies on the different mechanisms that exist to request and obtain user's data and digital evidence of Internet service providers strengthening of the capacities of El Salvador National Police to effectively identify and investigate cybercrime cases.

The Guatemala 2018 National Cybersecurity Strategy (Estrategia Nacional de Seguridad Cibernética) is the first step towards establishing the guidelines and objectives that were proposed in the National Security Policy and calls to: a) Regulate the protection of digital information systems in the public and private sectors in order to guarantee the continuity of their services; b) Establish coordination organizations (CSIRT-GT) to implement the national cyber security; and c) Design a national protection plan for critical infrastructures for strengthen contingency and recovery plans. Guatemala's CSIRT-GT is an incident response team under the supervision of the Ministry of the Interior 196 and is a member of the CSIRT Americas network. Although Guatemala does not yet have a formal definition of critical infrastructure, one of the steps established in the legislative axis of the security strategy is to create, approve, and implement a Critical Infrastructure Law to identify and analyze the main characteristics of the sectors that provide essential services and establish prevention, protection, and recovery measures against threats.

Guatemala's National Plan for an Open Government (Title 4) presents the Electronic Government and online public services. Furthermore, the Digital Government Law develops the legal framework for Digital Identity.

Honduras has developed the National Cybersecurity Law and Measures for Protection against Hate and Discrimination Acts on the Internet and Social Networks bill, which identifies the need to create a national cybersecurity strategy as well as an Interinstitutional Cybersecurity Committee that is in charge of strategy development and implementation. In addition, Honduras reached an agreement with Israel in 2016 for cooperation focused on “strengthening the capabilities of prevention, defense, and reaction to possible cyberattacks to government institutions, infrastructure managers and critical services.

The Interinstitutional Cybersecurity Committee is tasked with formulating, designing, implementing, and monitoring compliance of the National Cybersecurity Strategy. It seeks to establish an Executive Cybersecurity Directorate as the entity in charge of overseeing the execution of the policies approved by the Committee.

Honduras' new Penal Code codifies cybercrimes, including hacking, phishing, identity theft, pornography (child and adult) and sexual provocation.

Nicaragua is in the process of formulating a national cybersecurity strategy, which will contain within its axes, among others, the creation of a cybersecurity incident response center and updating of the legal, administrative, criminal and procedural frameworks to allow for the prevention, investigation, judgment, and punishment of cybercrime. Currently, the Cybercrime Unit of the National Police attends cybersecurity incidents together with the Specialized Unit against Organized Crime of the Public Ministry and other institutions specialized in the field.

Nicaragua's Cybercrime law was passed in 2008. Article 30 foresees to jail anyone who spreads "false or distorted" information that produces "alarm or fear" with two to four years in prison, and up to three years in prison for false information that damages a person's "honor" or reputation and up to five years for false information that "incites hate or violates, jeopardizes economic stability, public order, public health or sovereign security. Moreover, the law would punish "illegally intercepting any type of written communication" with up to three years in jail.

The National Cybersecurity Strategy "guarantees the sovereign, secure, and trustworthy use of the cyber-space" and serves to protect "information and services to the general population".

Panama has a sound governance framework for developing digital government, although its cybersecurity institutions are still in development stages. The Panamanian government is committed to the digital transformation of the public sector and has invested heavily in e-government. More accessibility also brings more significant security challenges that create opportunities for companies that offer cybersecurity solutions that prevent and deter cybercrimes. With an increased focus on the disruptive and expensive consequences of cyber threats, both private and public need to increase their IT security investment.

Additionally, the government aims to move beyond awareness and actively combating cyber threats and online services disruption. In March 2019, Panama's national assembly passed the Personal Data Protection Law, effective as of 2021. This law regulates the principles, rights, obligations, and procedures regarding personal data protection and compensate individuals for the improper use of their data. The Computer Security and Incident Response Team of Panama (CSIRT) operates under the Government Innovation Authority (AIG).

## 1.6. Health

The Central American and Dominican Republic Ministers of Health Council (COMISCA), part of the Central American Integration System (SICA), focuses on establishing the healthcare regional policies, through instruments like the Policy Healthcare Plan for the 2015-2022 period.

In 2013 the Central American Biotechnology and Biosafety Initiative (ICABB) was officially established at the headquarters of Inter-American Institute for Cooperation on Agriculture (IICA). ICABB's objectives include concurring and strengthening the actions of countries related to biotechnology and biosecurity, supporting the modernization and harmonization of their legal frameworks, promoting scientific research, and improving the perception of these issues among the population.

Central America Customs Union (CACU) member countries have harmonized Sanitary Registration and Sanitary Inscription procedures for processed food products (Central American Technical Regulation-RTCA in Spanish). Through this procedure, products registered in one CACU country do not need to be registered again in another. Products manufactured in the EU are not eligible for this registration exemption. However, the product's Country of Origin is considered CACU if processed in a CACU member country, even if the raw material originates from a non-CACU country.

RTCAs have been recently issued for pharmaceuticals and cosmetics, among other products, and will enter into force in July 2021. The CATRs establish unified standards and requirements for commercial pharmaceuticals, cosmetics, healthcare products and others within the Central America region. Compliance with these technical regulations assures that products may be imported without major complications. The CATRs require a Certificate of Free Sale (Certificado de Libre Venta, CLV) for imports of regulated products. Registrants shall present the original, signed, and notarized certificate of free sale issued by the competent authority in the country of origin.

It is worth noting that the Pan American Health Organization (PAHO) has a system for evaluating National Regulatory Authorities for Drug Products, which is based on the recommendations of the World Health Organization (WHO) for strengthening regulatory bodies.<sup>8</sup> Four levels of regulatory development (from 1 to 4) are defined, and authorities considered as Regional Reference Authorities by PAHO are those classified as Level 4. Currently, none of the National Regulatory Authorities in Central America are considered competent and efficient to carry out the health regulatory functions recommended by PAHO / WHO to ensure the efficacy, safety, and quality of drug products, that is, Level 4.

In Costa Rica, pharmaceuticals, drugs, cosmetics, medical devices and some chemical products, such as solvents, agricultural inputs and precursor chemicals used to produce narcotic drugs, must have import permits (valid for five years) and be registered with the Ministry of Health. In addition, the Costa Rican Institute of Social Security (CCSS) Procurement Department requires bar code identification on all purchases of medicines and medical supplies upon entry into the Costa Rican market.

Surgical and dental instruments and machines can be sold only to licensed importers and health professionals. Also, regulations require that imported biomedical equipment and materials be registered with the Ministry of Health. Under local sanitary registry regulations all dietary supplements and natural medicinal products should be registered with the Ministry of Health before being sold in Costa Rica.

To register a medical device to sell in Costa Rica, approval from the Ministry of Health-from Costa Rica must be first obtained. It is also necessary to appoint a representative within the country and properly classify the device in accordance with the classification system of four levels of the Ministry of Health to enter the market of Costa Rica.

In El Salvador, medical devices, pharmaceuticals, and dental products are regulated under the 2012 Medicine Law. These products need to be registered at the National Medicine Directorate (DNM). In the case of medical devices, some products are excluded from the registration process.<sup>9</sup> In addition, ionizing radiation devices or equipment require an import permit from the Radiation Protection Directorate at the Ministry of Health.

New and used medical equipment can be imported into El Salvador and needs to be registered at the DNM; however, used or refurbished equipment cannot be older than 10 years from the date of manufacture. In addition, exporters should be advised that a Good Manufacturer Certificate (GMC) is required when exporting new, used or refurbished equipment to El Salvador.

The Guatemala Division of Registration and Control of Medicines and Foods of the Ministry of Health issues import permits for medical devices, pharmaceutical products, and cosmetics. In addition, some products require an inscription (registration) at the registration office of the Ministry of Health. These registrations need to be renewed every five years.

Surgical devices that require a registration are those classified as cutting the skin or a membrane, or which touch blood, such as syringes or finger pricks. Devices such as anesthetics and asthmatic inhalers, high-pressure measuring apparatus, laser-guided apparatus and others do not require a registration. These would be classified under medical equipment and supplies and undergo normal customs clearance procedures.

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<sup>8</sup> [https://www.paho.org/hq/index.php?option=com\\_content&view=article&id=1615:2009-sistema-evaluacion-autoridades-reguladoras-nacionales-medicamentos&Itemid=1179&lang=en](https://www.paho.org/hq/index.php?option=com_content&view=article&id=1615:2009-sistema-evaluacion-autoridades-reguladoras-nacionales-medicamentos&Itemid=1179&lang=en)

<sup>9</sup> For a current list of excluded products please visit: <http://www.medicamentos.gob.sv/index.php/es/normativa-m/normativa-por-unidad/unidad-de-registro-de-insumos-medicos>.



In Honduras the Ministry of Health (MOH) governs the sector, coordinates all health-related activities, sets health priorities, and charts the course of development efforts in the public and private subsectors. Product registration is required for all pharmaceuticals and is handled through the Sanitary Regulation Agency (ARSA), who issues the sanitary registration number (SRN) and is also in charge of inspection of medicines, natural products, cosmetics, medical devices and hygiene products approved to be sold at the retail and wholesale level. Requirements for obtaining sanitary licenses for medical devices vary in accordance with product classification and risk categories.

The Nicaragua Ministry of Health, Pharmaceutical Office, issues import permits for medicines, cosmetics and hygiene products. Importers must present documentation demonstrating safety and effectiveness and pay fees to obtain a sanitary registration, as well as fees for laboratory analysis. The Ministry of Health also requires that pharmaceutical products be packaged and labeled in Spanish for retail distribution and that their dosages be clearly indicated. For companies interested in participating in government tenders, sample products must be submitted with the required labels in Spanish.

In Panama, it is mandatory to obtain previous authorization to import, develop, test and market a drug product by the manufacturer, distributor and importer (License). To market a product, a sanitary registration and a pharmaceutical or non-pharmaceutical License must first be obtained. For testing, all trials must be approved by the Bioethical National Committee.

Importation, exportation, marketing and use of a medical device on a public or private level can be authorized once the applicant demonstrates with documental evidence that the medical device complies with all the security, efficiency and quality defined by international regulations. Also, the manufacturer and distributor need the authorization (License) to import and market medical devices.

## 2. Market assessment

### 2.1. Renewable energy

#### 2.1.1. Market overview

Historically, Central America has been powered mostly by hydropower, but in the mid-1990s hydro's share dropped as it began to be replaced by fossil fuels. Second only to hydro power, Central America continues to use today imported fossil fuel to generate electricity with the attendant high costs, high carbon emissions, and lack of investment in local infrastructure and job creation. Every country in the region is a net importer of fossil fuels, which makes both personal and government spending highly dependent on international fuel prices. Additionally, firewood remains a major source of fuel for households with the resulting environmental and health impacts.

In the mid-2000s, increasing shares of renewables, such as wind in Costa Rica, Honduras, and Nicaragua, decreased the region's dependence on oil. Despite the range of fossil fuel options now available, the region is continuing to expand its use of renewable energy, Central America is rich in renewable energy resources and there exists tremendous opportunity to harness this potential.

An important development in recent years is the integration of the Central American Regional Electricity Market (MER, in Spanish) regulatory framework, which provides the impetus for regional exchanges of electricity, as in the case of the Central American Electrical Interconnection System (SIEPAC, in Spanish)—a transmission line running from Guatemala to

Panama. Transactions in the regional market doubled in just one year, from January 2013, when the definite market regulation started to apply, and have more than quadrupled since.

Furthermore, SIEPAC connects now the electrical distributions systems of Panama, Costa Rica, Nicaragua, Honduras, El Salvador, and Guatemala, and provides power to more than 35 million consumers. It has been a reliable distributions system, integrating local grids into a larger regional market, enabling more efficient dispatch from the members' generation systems, and providing more reliability across the region. It has also drawn significant foreign investment into the region.

The Clean Energy Corridor of Central America (CECCA) initiative was developed in 2015 to promote the accelerated deployment and cross-border trade of renewable power in Central America, in the context of the MER and the SIEPAC.

In February 2021 the International Energy Agency (IEA) and Central American Integration System (SICA) signed an MoU to promote clean energy transitions in Central America by expanding cooperation on energy data and statistics, energy efficiency and climate resilience of electricity systems, areas identified as key for energy transitions and climate change mitigation in the region under SICA's 2030 Central America Sustainable Energy Strategy.

### 2.1.2. Trends and opportunities

Renewable energy is both a mature market as well as emerging sector in Central America depending on the country. The only common ground on all markets is the use of solar energy to generate needed grid power, lower the usage peaks or lower the energy bill for companies. Investment opportunities exist for developing small hydropower dams, solar photovoltaic and wind systems as well. In a recent article<sup>10</sup> shared by the General Secretariat of the Central American Integration System (SICA), the largely untapped geothermal utilization potential for the region is estimated at 3 to 5 gigawatts (GW), of which about 650 megawatts (MW) are currently used to generate electricity and only 7 MW for energy. Geothermal energy has the advantage of not being reliant on climate change-dependent sources. It is also worth noting the creation of the Regional Geosciences Technical Group for the development of harmonized strategies and regulatory frameworks across the region, which could facilitate the development of geothermal projects.

Another untapped and abundant source is tidal energy, of particular interest for the EU due to the large patent share of EU companies. It is also interesting to develop biomass as a resource for clean energy, which is an abundant source but usually used for heat and cooking at homes.

There are also opportunities for the development of micro-grids for "energy communities", covering industrial areas (such as industry parks or free trade zones) or with a multi-stakeholder approach, including industries, municipalities, and other actors. Key advantages of this approach are the reduced need for physical infrastructure to connect to the national grid and the maximum price of electricity consumed next to the production site versus the wholesale price when delivered to the national grid.

Regarding energy efficiency, there are ongoing discussions for the development of regional regulations for import of solar panels and lighting (Regional Technical Group on Energy efficiency), which may support EU competitiveness by requiring compliance of relevant products with certain quality standards.

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<sup>10</sup> [https://www.sica.int/noticias/sica-centroamerica-cuenta-con-mas-de-1-300-fuentes-de-agua-termal-con-potencial-de-aprovechamiento-en-la-geotermia\\_1\\_126554.html#:~:text=Centroam%C3%A9rica%2C%20095%20marzo%20de%202021%20.&text=El%20potencial%20geot%C3%A9mico%20econ%C3%B3mico%20en,7%20MW%20para%20energ%C3%ADa%20t%C3%A9rmica](https://www.sica.int/noticias/sica-centroamerica-cuenta-con-mas-de-1-300-fuentes-de-agua-termal-con-potencial-de-aprovechamiento-en-la-geotermia_1_126554.html#:~:text=Centroam%C3%A9rica%2C%20095%20marzo%20de%202021%20.&text=El%20potencial%20geot%C3%A9mico%20econ%C3%B3mico%20en,7%20MW%20para%20energ%C3%ADa%20t%C3%A9rmica).

## Analysis of 6 priority sectors - Activity A

Finally, in Guatemala, there is a specific demand to carry out an updated mapping of renewable energy resources (geothermal, solar, wind).

Using latest data published by the International Renewable Energy Agency (IRENA), the tables below provide an overview of the current capacities and the fastest-growing sectors per country. Solar energy leads growth in capacity change across the region between 2014-2019.

COSTA RICA	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>474</b>	<b>16</b>	<b>-24</b>	<b>-3.4</b>
<b>Renewable</b>	<b>3.146</b>	<b>87</b>	<b>+40</b>	<b>+2.2</b>
Hydro/marine	2.343	65	+32	-1.2
Solar	47	1	+185	+69.7
Wind	411	11	+113	+0.8
Bioenergy	82	2	+127	+31.5
Geothermal	262	7	+20	+26.6
<b>Total</b>	<b>3.620</b>	<b>100</b>	<b>+26</b>	<b>+1.4</b>

EL SALVADOR	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>757</b>	<b>34</b>	<b>0</b>	<b>0.0</b>
<b>Renewable</b>	<b>1.474</b>	<b>66</b>	<b>+46</b>	<b>+14.4</b>
Hydro/marine	573	26	+18	-0.0
Solar	391	18	+2.586	+89
Wind	0	0	0	0.0
Bioenergy	305	14	+0	0.0
Geothermal	204	9	0	0.0
<b>Total</b>	<b>2.231</b>	<b>100</b>	<b>+26</b>	<b>+9.0</b>

GUATEMALA	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>1.245</b>	<b>30</b>	<b>-5</b>	<b>-0.0</b>
<b>Renewable</b>	<b>2.870</b>	<b>70</b>	<b>+62</b>	<b>-3.7</b>
Hydro/marine	1.574	38	+57	-2.9
Solar	101	2	+866	0.0
Wind	107	3	0	0.0
Bioenergy	1.036	25	+45	-6.1
Geothermal	52	1	+6	+5.7
<b>Total</b>	<b>4.115</b>	<b>100</b>	<b>+33</b>	<b>-2.6</b>

HONDURAS	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>1.081</b>	<b>38</b>	<b>+23</b>	<b>+12.0</b>
<b>Renewable</b>	<b>1.742</b>	<b>62</b>	<b>+91</b>	<b>+3.7</b>
Hydro/marine	731	26	+17	+5.0
Solar	514	18	+9.862	-0.0
Wind	241	9	+59	+7.2
Bioenergy	221	8	+64	+5.5
Geothermal	35	1	0	0.0
<b>Total</b>	<b>2.824</b>	<b>100</b>	<b>+57</b>	<b>+6.7</b>

NICARAGUA	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>888</b>	<b>55</b>	<b>+21</b>	<b>+7.8</b>
<b>Renewable</b>	<b>731</b>	<b>45</b>	<b>+23</b>	<b>+8.6</b>
Hydro/marine	157	10	+31	+10.5
Solar	16	1	+1.086	+17.2
Wind	186	11	0	0.0
Bioenergy	218	13	+63	+23.6
Geothermal	156	9	-1	-0.8
<b>Total</b>	<b>1.620</b>	<b>100</b>	<b>+22</b>	<b>+8.2</b>

PANAMA	Capacity 2019		Capacity change (%)	
	Sources	MW	%	2014-2019
<b>Non-renewable</b>	<b>1.819</b>	<b>44</b>	<b>+58</b>	<b>-4.7</b>
<b>Renewable</b>	<b>2.296</b>	<b>56</b>	<b>+34</b>	<b>+1.1</b>
Hydro/marine	1.796	44	+11	+1.1
Solar	198	5	+3.139	+2.8
Wind	270	7	+391	0.0
Bioenergy	33	1	+8	0.0
Geothermal	0	0	0	0.0
<b>Total</b>	<b>4.115</b>	<b>100</b>	<b>+44</b>	<b>-1.6</b>

## 2.2. Sustainable urban mobility

### 2.2.1. Market overview

The Central American region is the second in the world with the fastest rate of urbanization<sup>11</sup>. Considering this trajectory, an increase of twenty-five million new urban dwellers is estimated for the next thirty years. Specifically, Costa Rica is the country with the highest proportion of urban population in the region - about 75 %- while Panama has intermediate levels of urbanization - around 60 %. Both have urban population percentages above the global average, which is 55%

There is an urgent demand across Central America to resolve the major urban transportation bottlenecks. Such a pressing scenario has paved the way for the advancement of different proposals. In fact, in some cases, the current situation demonstrates a crisis of image of the public transport systems, where residents demand qualitative changes (less saturation, personal safety, better travel experience, better segmented services, new vehicular technologies) apart from the basic fact of availability.

However, there is a lack of integrated urban transportation strategies across the region, with few exceptions, and a few relevant, although fragmentary, initiatives in individual countries. Private management of most mobility networks (via public concessions), informal transportation, limited government funding and the development of extensive, low-density, poorly planned urban clusters, hinder the potential development of this sector.

The IADB's Emerging and Sustainable Cities Program (ESC) is a non-reimbursable technical assistance program providing direct support to national and subnational governments in the development and execution of city action plans. ESC employs a multidisciplinary approach to identify, organize and prioritize urban interventions to tackle the main roadblocks that prevent

<sup>11</sup> Study on the urbanization of Central America. Opportunities for an urban Central America, World Bank, 2019

the sustainable growth of emerging cities in Latin America and the Caribbean. This transversal approach is based on three pillars: (i) environmental and climate change sustainability; (ii) urban sustainability; and (iii) fiscal sustainability and governance.

In Central America four capital cities have been part of the Initiative: San José (Costa Rica), Panama City (Panama), Tegucigalpa (Honduras) and Managua (Nicaragua). Other intermediate cities in the region such as Quezaltenango (Guatemala) and Santa Ana (El Salvador) have also participated in the IADB's initiative.

### 2.2.2. Trends and opportunities

While Costa Rica and Panama have developed more ambitious, integral, long-term strategies, there are relevant projects in all the region. From a business perspective, there is a great opportunity for the European Union to participate in bidding procedures for design, construction, equipment, operation, and maintenance of sustainable mobility infrastructure projects. In the case of PPP (Public Private Partnership) development, participation as bidder in the concession, capital contributor, operations operator via subcontract, participation as construction company via subcontract or debt financier.

In Costa Rica, the Government is implementing the results of the PRUGAM programme (see "Policy and regulatory assessment") through the Greater Metropolitan Area Integrated System (Sistema Integrado de la Gran Area Metropolitana, SITGAM), that includes the development of interconnection nodes and dedicated bus lanes. Furthermore, the RPT project is directed at providing public transport users in the Greater Metropolitan Area of Costa Rica an electric train that connects a main axis from east to west between the cities of Cartago, San José, Heredia, and Alajuela. RPT allows intra-city mobility between the different points in a safe, clean, fast, and efficient way. Depending on the estimated volume of traffic, it will be necessary to buy 78 trains (including maintenance and reservation) all of which will be light articulated trains with electric traction of 5 modules in double composition. The capacity of this type of train ranges from 430 passengers and 600 passengers. The maximum speeds expected are 25 km/h in urban areas, 50 km/h in semi-urban areas, and 70 km/h in interurban areas.

In order to improve the quality of the public transport service in Guatemala City and substantially reduce travel times for its citizens, the Government is implementing a new urban passenger rail system "Metro Rail": a light rail electric subway stretching 21 km and with 20 stations, the service crosses the capital along its north-south axis and transport 250,000 passengers per day. It will provide greater connectivity with the construction of two large multimodal bridges, 20 stations and a 20.5-kilometer route, from Centranorte (zone 18) to Calzada Atansio Tzul (Zone 12), with a maximum speed of 70 kmph. The railway track width of 30.48 meters (around 100 feet) will be used to rehabilitate and complete the Atanasio Tzul roadway and turn it into an urban highway.

In 2016 Panama launched the Urban Mobility NAMA<sup>12</sup>, that seeks to implement a series of transport-oriented-development policies and initiatives in Panama City's metropolitan area within the next 30 years, including an integrated system for the public transport of passengers and investment in urban mobility infrastructure. This is the Panama flagship NAMA as it will benefit half of the population. It is the first Panamanian project requesting support from the Green Climate Fund.

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<sup>12</sup> For developing countries, an important means to achieve their NDC targets under the Paris Agreement is through their Nationally Appropriate Mitigation Actions (NAMAs), which are plans they have already developed under the UNFCCC.

Other relevant projects across the region are the following:

- Guatemala City Aerometro: Project for a public aerial cable car type transport system, carried out through a municipal concession in Guatemala City and Mixco.
- Honduras "TRANS-450 Public Transportation for Central District": aims to address the problem of urban mobility through the rehabilitation and improvement of urban and transport infrastructure and the development of a new mass transport system BTR (Rapid Transit Bus)
- Line 2A of the Panama Subway (extension of existing Line 2): this line would be the extension of the existing Line 2, in order to connect the Tocumen International Airport area with downtown Panama City, in turn facilitating trips to the University of Panama. An estimated 9.8 km along Ricardo J. Alfaro Avenue, with 12 stations from San Miguelito to Paitilla.
- Panama Metro Line 5: this line would be the next to be executed after 2A. It would connect with the already existing Line 1 at Sto. Tomás station, it would communicate Bella Vista and the entire banking area, with the districts of San Francisco and Parque Lefevre, continuing to Costa del Este and Santa María and connecting with Line 2, also already existing, at El Cresol. It is estimated to have 12.8 km and 14 stations.
- Panama San Miguelito Metro cable System: as a complement to the Panama Metro Master Network, due to San Miguelito topographic conditions and urban structure.

From a broader perspective, the megatrends of electrification, digitalization, autonomous vehicles and the shared economy, have been included in the discussion of public policies as regards mobility. Moreover, the Internet of Things (IoT) is starting to gain momentum as a platform to increase the efficiency of transport operations. Even more recently, pedestrian mobility, road safety, access for all and gender trends have all enhanced the debate.

Electrification is probably the key trend across the region and has gained momentum in virtually all countries in recent years. Electric vehicles and the advances made in terms of range and cost will gradually improve the feasibility of these technologies on the market. It is also worth noting that the 6 Central American countries -out of a total 14 Latin American participants- participate in the "Advancing a regional approach to e-mobility in Latin America" Green Climate Fund. Using data from this GCF initiative, the following graph shows key developments across the LAC region.

Graphic. Summary of the incentives for electric mobility in countries of the region  
Source: Green Climate Fund

Category	Instrument	Argentina	Chile	Colombia	Costa Rica	Cuba	Dominican Rep.	Ecuador	El Salvador	Guatemala	Honduras	Mexico	Nicaragua	Panamá	Paraguay	Perú	Uruguay	
Purchase incentives	Purchase tax rebate/exemption																	
	Import tax rebate/exemption																	
Operation incentives	Property tax rebate/exemption																	
	Waiver on tolls or parking																	
Other incentives	Waiver on driving restriction																	
	Differentiated EV charging tariff																	
	EV charging point regulation																	
	National Electric Mobility Strategy																	

● Complete incentive / Policy instrument approved and implemented  
● Partial incentive / Policy instrument in design stage

In December 2017, Costa Rica's congress passed the Electric Transportation Bill which established several tax exemptions for electric vehicles. Defined as the Law on Incentives and



Promotion for Electric Transportation, the initiative eliminates sales, customs, and circulation taxes for electric vehicles (EV) and allows them to use municipal parking facilities free of charge. Moreover, approximately 61 EV charging stations have been deployed in the country. In addition, public banks will offer attractive lines of credit for the purchase of electric vehicles (private, taxi and buses), while the regulator of public service tariffs, the Regulatory Authority of Public Services (Autoridad Reguladora de los Servicios Públicos, ARESEP), will establish a special electric tariff for charging electricity nationwide.

In addition, the National Electric Transport Plan 2018-2030 focuses on three uses for electric vehicles: public transport, institutional transport, and private vehicles. Among the main aspects of the plan is the creation of multisectoral working groups for the creation of enabling conditions related to cargo infrastructure, exemptions for components related to electric vehicles, electricity tariffs for the recharging of electric vehicles, among others. Furthermore, to accelerate substitution in institutional fleets, public institutions are required to replace internal combustion vehicles with zero-emission vehicles. The country is working to generate the enabling conditions for the electrification of the public transport system in all its modalities (buses, trains, and taxis).

In the same line, the government of El Salvador and the company Distribuidora de Electricidad del Sur (DELSUR) announced in May 2018 the introduction of electric mobility in that country. In November of the same year, the organization Mover El Salvador presented the preliminary draft of the "Electric Transport Promotion Act", which provides for differentiated tax incentives for plug-in electric and hybrid vehicles and their parts. This draft law continues to be reviewed and discussed. Several events in relation to electric mobility have been organized in the country, including in 2018 the "Forum for the Boost of Electric Mobility in the Region" was held in order to exchange experiences and speed up the process in the country.

The Guatemala's National Energy Plan expects to reach almost 4,500 electric vehicles in circulation by 2032. The Empresa Eléctrica de Guatemala S.A. (EEGSA) has implemented an hourly rate for commercial and medium voltage customers with power demand. In 2018, a test project was initiated with an electric bus in Guatemala City on the initiative of Luka Electric, importer of electric vehicles, and the Municipality of Mixco. In addition, the city is doing technical and economic feasibility studies so that a route works exclusively with electric buses. In 2019, the Guatemalan Electric Mobility Association (Asociación de Movilidad Eléctrica de Guatemala, AMEGUA) was formed, made up of private and private companies in the country. AMEGUA is promoting a bill on electric mobility in Guatemala. In March 2019, the first Electric Mobility Congress was held in the country, with support and participation from 24 companies and institutions related to electric mobility, as well as national and international exhibitors.

At the beginning of 2019, the Honduras Institute for Land Transport, in conjunction with the Bureau of Climate Change and the Secretariats of Energy and Economic Development, announced an interest in developing a national electricity mobility strategy to introduce electrical units as part of public transport fleets. Also in the same year, a cross-sectoral working table on sustainable mobility and electric mobility was set up, coordinated by the Secretariat of State of the Presidency, with the participation of representatives of the Presidential Bureau of Climate Change, the Honduran Institute of Land Transport, the Secretariat of Natural Resources and Environment, the Ministry of Energy, the Revenue Management Service, the Honduran Bank for Production and Housing (BANHPROVI) and the Central American Bank for Economic Integration (BCIE), among others.

More recently, in January 2021, Nicaragua established the National Table on Electric Mobility, led by the Ministerio de Hacienda y Crédito Público (MHSP), the Ministerio de Ambiente y Recursos Naturales (MARENA), the Ministerio de Minas y Energía (MEM), the Ministerio de

Transportes e Infraestructura (MIT) and the Managua Collective Transportation Regulatory Institute.

Finally, and also within the scope of electric mobility, Panama launched in 2019 its National Strategy for Electric Mobility which defines the following targets for 2030: (i) between 10% and 20% of the total fleet of private vehicles will be electric; (ii) between 25% and 40% of private vehicle sales will be electric; (iii) between 15% and 35% of buses in authorized concession fleets shall be electric; and (iv) between 25% and 50% of public fleets will be made up of electric vehicles. The public transport company has already approved the purchase of 35 buses of 9 meters for the Panama city. In September 2019, an announcement was made by various representatives of the private sector, including carriers, technology suppliers, power companies and insurers, to present progress in negotiations in the framework of the modernization of public transport of taxis and buses at the national level, as well as the commitment to help the country's targets for the national electricity mobility strategy in relation to electric public transport.

## 2.3. Innovation for sustainable agriculture

### 2.3.1. Market overview

The agricultural sector plays a critical role in the economy of Central American countries through job creation, rural income, export promotion, and food security. Furthermore, it has significant spillover effects on other sectors of the economy. However, agricultural productivity in LAC countries is facing the rising challenge imposed by low use of technologies, climate change, natural resource depletion and environmental degradation.

Data from USDA-FAS (2019) show that the relative composition of the total value of raw food products has changed over the last 20 years in favor of those crops for which the region has a comparative advantage, such as tropical fruits and vegetables, tilapia, shrimp, palm oil, and coconut oil.

While the region is slowly diversifying toward other tropical agricultural products, the productivity of its agricultural output needs to continue increasing. This is fundamental for long-term poverty alleviation and for overall economic growth.

The adverse impacts of climatic variability on agricultural production are gaining more attention in the research arena, with an increasing number of studies focusing on the interrelation among climatic variability, agriculture, the food system, and the associated adaptation costs. Some projections<sup>13</sup> show that climatic effects will decrease productivity growth in the region by 2.4%-10.7%, on average, between 2013 and 2040. Moreover, the analysis suggests that technological progress (TP) has been the key driver of agricultural productivity growth in LAC whereas technical efficiency (TE) has fluctuated up and down over time in the region. These results highlight the importance of local government investments in research and development generally, and in promoting adaptation strategies in particular to reduce the impact of climatic variability.

However, while large and some medium-size producers have developed stable linkages to international markets and have access to state-of-the-art technologies, most producers are small growers and cooperatives with, in general, a very low purchasing power.

According to the IADB Agrimonitor database, the average government support to agriculture in the Central American region is around 15.2% of farmers' total receipts, comparable to the support provided by Organization for OECD countries (18%) and higher than average for Latin

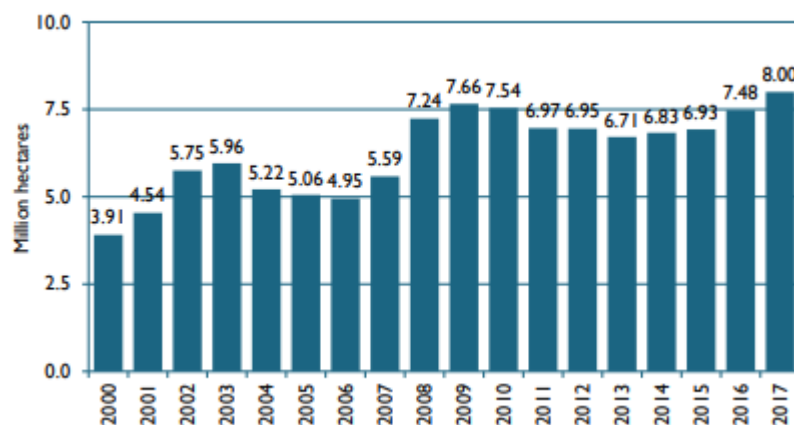
<sup>13</sup> Agricultural productivity growth in Latin America and the Caribbean and other world regions An analysis of climatic effects, convergence and catch-up, IADB, 2016

America and the Caribbean (3.29%). On average, Central American countries dedicated 2.2% of their GDP to supporting agriculture. One of the issues is that most of the government funding in Central America goes to the purchase of inputs that have low impact on productivity.

Nonetheless, the value of agricultural product exports has experienced a four-fold increase since 1991, with over 41% growth in the past decade. Historically, the agricultural sector in the region has had a positive trade balance, with an average annual trade surplus of \$2.67 billion between 1991 and 2016. In terms of product categories, the region is a net exporter of tropical products such as vegetables, fruits, and nuts; coffee, cocoa, tea, sugar and related products; fish and crustaceans; tobacco and tobacco products; and live trees, plants, and vegetable-planting materials.

While there are no disaggregated data for Central America, the organic agriculture production in Latin America has continuously increased since 2017, as shown in the figure below.

Figure. Latin America and Caribbean: Development of organic agricultural land 2000 to 2017  
Source: Research Institute of Organic Agriculture (FiBL)



In Central America, Nicaragua and Honduras are the leading organic producers. It is also worth noting that the organic share in the Central American countries -except in El Salvador- is above most Latin American countries (with the exceptions of Argentina, Dominican Republic, Peru, and Uruguay, among the largest agriculture producers).

Table. Organic agricultural land, organic share of total agricultural land, and number of producers 2017  
Source: Research Institute of Organic Agriculture (FiBL)

Country	Area [ha]	Organic share [%]	Producers [no.]
Costa Rica	8'736	0.5%	50
El Salvador	1'677	0.1%	383
Guatemala	13'380	0.4%	3'008
Honduras	29'274	0.9%	6'023
Nicaragua	33'621	0.7%	10'060
Panama	15'183	0.7%	1'300

Central America is a net importer of agricultural inputs, including fertilizers and machinery. A quick look at some of the largest groups of imported products show the following<sup>14</sup>:

- Imports of "Fertilizers" (HS code 31) grew 19% between 2016 and 2019, up to \$768.5 million. Guatemala was the largest importer in 2019, accounting for almost 33% of total

<sup>14</sup> For Panama only mirror data are available for the entire period.

- imports, followed by Costa Rica (22%), Honduras (17%), El Salvador (12%), Nicaragua (10%) and Panama (5.5%).
- Imports of “Agricultural, horticultural or forestry machinery for soil preparation or cultivation” (HS code 8432) decreased by 33% between 2016-2019 to \$9.7 million, with substantial drops in all countries in the region. Honduras (23%) and Costa, Rica, Panama, and Guatemala (around 22% each) accounted for around 89% of total imports in 2019.
  - Imports of “Harvesting or threshing machinery” (HS code 8433) fell 25% in 2016-2019, to almost \$36 million. Guatemala was the largest importer, with over 35% of total imports in 2019, followed by Honduras (21%), Panama (19%), Costa Rica (14%), El Salvador (6%) and Nicaragua (4%).
  - Imports of “Agricultural, horticultural, forestry, poultry-keeping or bee-keeping machinery” (HS code 8436) decreased by 18% in the period 2016-2019, to \$41.3 million, of which Guatemala represented 36%, Honduras 18%, Costa Rica 16%, Panama 15%, El Salvador 8% and Nicaragua 6%.
  - Imports of “Machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables” (HS code 8437) fell by 35% between 2016-2019, to almost \$17 million. Guatemala was the largest importer in 2019, accounting for 32% of total imports, followed by Honduras (21%), Nicaragua (17%), Panama (14%), Costa Rica (11%) and El Salvador (5%).
  - Imports of irrigation equipment (including HS codes 842441, 842449, 842481 and 842482) decreased in the same period 24%, to almost \$26 million in 2019. Guatemala represented 37% of total imports, Honduras 20%, Costa Rica and Panama around 14% each, Nicaragua 8% and El Salvador 6%.

### 2.3.2. Trends and opportunities

Digital technologies—including the Internet, mobile technologies and devices, data analytics, artificial intelligence, digitally-delivered services, and apps—are changing agriculture and the food system. Examples abound at different stages of the agri-food value chain: farm machinery automation allows fine-tuning of inputs and reduces demand for manual labor; remote satellite data and in-situ sensors improve the accuracy and reduce the cost of monitoring crop growth and quality of land or water; and traceability technologies and digital logistics services offer the potential to streamline agri-food supply chains, while also providing trusted information for consumers

A study<sup>15</sup> published by the European Parliament established that precision agriculture (PA) will be a driving force for agriculture sustainably. In 2020 PAD (Precision Agriculture for Development) and the Interamerican Institute for Agriculture Cooperation (IICA) signed an agreement to promote digitalization of agriculture across the region.

Central America has also begun to test PA through different arrays of applications, which include automated drip irrigation, drones in the field, computerized greenhouses, vertical farms, livestock tracking, mobile price monitoring apps, and some Fintech apps with new digital payment methods, among others.

Digital technologies can also support trade in agriculture and food products, by connecting private sector suppliers to new markets, and enabling new ways for governments to monitor and ensure compliance with standards and to provide faster and more efficient border procedures that are essential for perishable products.

As part of its Digital Strategy, the General Secretariat of SICA strengthened its web portal, gathering real-time satellite information tools, thanks to the SICA-NASA agreement, and

<sup>15</sup> Precision agriculture and the future of farming in Europe, European Parliament Research Service, 2016

granted access to digital applications titled Climate Fishing, Coffee Cloud, HydroClima and Climate Center.

There are also initiatives aimed at small producers by the Inter-American Institute for Cooperation on Agriculture (IICA) that announced an alliance with Microsoft and Global Hits, a subsidiary of América Móvil, to promote the digital transformation of the sector in the region. This includes a pilot plan to collect real-time data from farms and some specific crops. Next year, a laboratory (a smart greenhouse) will be available to develop IoT prototypes and tools to familiarize growers with the technology. The project uses Microsoft Azure platform both for data storage and analysis and for the creation of chatbots and technical videos that seek to answer online inquiries, from producers, about crops and diseases.

Since May 2020, the government of Costa Rica has been promoting AGRINNOVACION 4.0, a national high-tech programme for improving the productivity and sustainability of the agricultural sector, through precision tools and value aggregation to agriculture that will be applied in a step-by-step manner throughout the country. The platform will allow the systematization of data for decision-making and the strengthening of rural agribusinesses. In the same line, in 2019, agricultural analytics company CropX partnered with Costa Rican agroforestry equipment vendor FarmAgro to provide satellite-powered precision agriculture tools to farmers in Central America.

Another programme, DESCUBRE, launched by a group of Costa Rican ministers and institutions together with the Development Bank, supported investment in technology and innovation. However, due to the impact of the COVID-19 pandemic, the budget has been redirected to other more pressing issues.

In Guatemala, the World Bank DIGITAGRO pilot, launched before the pandemic with support from InfoDev Trust Fund, is developing digital tools to support the country's farmers. Building on the lessons learned from the DIGITAGRO work, the World Bank together with the Guatemalan Ministry of Economy is preparing a project "Responding to COVID-19 - Modern and Resilient Agri-Food Value-Chains" that will streamline digital technologies throughout the project as a way to better respond to COVID-19 and modernize the agri-food system.

The National Investment Council (Consejo Nacional de Inversiones, CNI) of Honduras promotes the transformation of traditional processes to digital platforms that add value and generate positive change in the economy and investment in Honduras. The CNI considers that digital technologies can be a part of the solution to certain obstacles that agribusinesses face since it allows a more efficient, productive and sustainable agriculture through the optimization of its processes. The use of information technology, sensors, and digital processes to the unit of small producers, associations, and cooperatives, among others, could represent a new route in the medium and long term to stabilize supply, combining traditional means and new formats to make business.

Recently the new AgritecGEO technology platform<sup>16</sup> was introduced, which integrates all the necessary actions so that farmers can perform their tasks accurately, optimize their resources and improve their productivity and profitability. AgritecGEO offers a new model that includes agronomic advice, high-tech agriculture services and inputs tailored to each crop, through software installed on the user's phone via free-app, which will help farmers better manage their crop and make it more sustainable.

With regards to agrochemicals, it is worth noting that restrictions on maximum residue limits (MRLs) for pesticides in the EU may open opportunities for alternative, innovative products as they become available in the market. However, in the short term, access of several Central American products to the EU may be hampered.

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<sup>16</sup> <https://www.precisagro.com/agritecgeo-storytelling>

Opportunities in the agrochemicals sector in Costa Rica may also be facilitated following the reform of the active ingredients registration regulation<sup>17</sup>, based on harmonization requests from the OECD, and that should shorten registration process from 10 years to around 41 days. This regulation was approved two months before drafting of this study, and attention should be given to the effective implementation of its provisions.

Finally, there is also a growing market for seeds (in particular in Guatemala) as well as a gradual development of regulatory frameworks for genetically modified foods (GMF) in Honduras and Guatemala (in experimental phase in the latter country), all of which may act as drivers for innovation in the agribusiness sector.

## 2.4. Green logistics

### 2.4.1. Market overview

The Central American economies are small and open by nature, a particular circumstance that has led them to base their own development in the exchange of goods through intensive trade, and the attraction of foreign direct investment to their territories, all of which requires wide support from a logistics and supply chain dimension.

Growth in trade and investment supported by logistical assets is driving regional economic progress by creating short run business opportunities. In addition, the regional business facilitation agenda has also stimulated intraregional trade in goods.

However, Central America faces serious logistics challenges, including -among others- poor infrastructures, delays in customs clearance processes and overdependency on road transportation. Furthermore, as urbanization accelerates and continues to grow in Central America, urban freight becomes increasingly a challenge to "green" logistics.

As concerns on climate change grow, companies are venturing into green logistics, where they are beginning to internalize externalities produced by air pollution, noise, and production processes. To this respect, it is important to note that because road transportation is the larger contributor to GHG in Central America, dependency on road freight and low quality of diesel used in the region represent overall limitations on the potential impact of implementing "green" logistics strategies.

While there are important initiatives to improve logistics infrastructure and trade facilitation in virtually all countries, the development of regulatory frameworks that are conducive to "green" logistics has been very limited and uneven across the region (see chapter "Policy and Regulatory Assessment"). As a result, private sector, individual, isolated initiatives have become the only drivers for the sustainable logistics market in Central America.

### 2.4.2. Trends and opportunities

The private sector is leading the transformation towards a more environmentally friendly logistics system in the region. The Business Alliance for Sustainability in Central America was formed in February 2015 by 17 leading companies in the region during the Second Sustainability Forum. It seeks to become the regional benchmark in the theme of Sustainability and Competitiveness applied to retail trade.

Large multinationals and international logistics operators across the region have launched in the last few years very relevant initiatives across the region, that include ambitious "green"

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<sup>17</sup> [http://www.digeca.go.cr/sites/default/files/decreto\\_ejecutivo\\_42769.pdf](http://www.digeca.go.cr/sites/default/files/decreto_ejecutivo_42769.pdf)



strategies along their entire supply chains. The private sector leadership is supported by regulatory requirements and consumers demands -primarily in trade partners.

Agricultural -but also increasingly pharmaceuticals and biochemicals- export success requires increased facilities to secure cold storage networks, and foreign investors seeking efficiency by transferring processes to the region require free trade zones (FTZ) parks under which they can operate. There are also new "green" logistics parks in the region that apply global environmental and sustainable management standards.

Most perishable products require temperature control, and often cannot be consolidated easily with other types of cargo, including other refrigerated cargo. For large-scale exportation to North America and Europe, the equipment required to maintain the cold chain, including refrigerated/reefer containers, access to electricity in parking areas, and refrigerated storage space, is provided by international shipping agencies. In addition to their role and maritime freight service providers, these international actors have come to dominate the supply chain for international cargo, serving as shippers, freight forwarders, and third-party logistics operators throughout Central America.

Key European road freight operators have also entered the Central American market in recent years and are implementing sustainability practices that should contribute to gradually upgrade the regional performance.

From a broader perspective, there are opportunities in the following areas:

- Automated warehouses as part of a green logistics strategy. In fact, it is one of the most common solutions for those companies that plan to reduce energy consumption and achieve a high performance of their supply chain.
- Propulsion systems for alternative vehicles: such as liquefied natural gas (LNG), hybrid or electric vehicles for urban deliveries.
- Specific apps: that offer data that helps optimize and establish more efficient freight transport routes, in addition to calculating the carbon footprint.
- Use of renewable energy systems for the logistics centers.
- Certification on environmental management and performance provides international standards and recognition.
- Load consolidation: strategies to improve the consolidation of loads, pooling small shippers' cargo to gain efficiency in transportation.
- Sustainable packaging: there are many companies that are choosing ecological alternatives to pack their products. Not only does it save money, it also helps to retain the most eco-sensitive customers.
- Reverse channels: specialized segments of the distribution industry are emerging for promoting the recycling of wastes, packages and returned products from the supply chain. Specially, important for the return levels of the e-commerce purchases.

As discussed above, governments across the region are implementing ambitious initiatives to improve physical infrastructure for transportation and logistics. Upgrading of these infrastructures should have an overall positive impact in terms of reduction of GHG emissions.

Some relevant projects are:

- Costa Rica: Caldera Port expansión and El Limon Electric Freight Train (TELCA)
- El Salvador: Cargo Terminal of the International Airport of El Salvador, Central American Union Port, Port of Acajutla expansion
- Guatemala: La Aurora Airport, Tecún Umán Intermodal Dry Port II, El Arenal Port Pier
- Honduras: Puerto Cortes expansion
- Nicaragua: Puerto Corinto expansion.
- Panama: Port Armuelles Food Hub

In a recent, very relevant development, the Panama Canal revealed in April 2021 plans to decarbonize its operations, with the aim of becoming carbon neutral by 2030. Part of its strategic decarbonization plan also includes tugboats and launches that use alternative fuels, the substitution of electricity production processes in favor of photovoltaic plants, the use of hydraulic energy, and ensuring that all facilities and infrastructure projects are environmentally responsible and sustainable.

## 2.5. Cybersecurity

### 2.5.1. Market overview

Latin American cybersecurity market is estimated at \$4,480 million in 2020, and is expected to raise to \$9,570 million in 2026, with a Compound annual growth rate (CAGR) of 10.8% between 2021-2026<sup>18</sup>. While there are no specific data for Central America, growing connectivity increases cyberattacks risks at all levels.

The Central American region is a key strategic target for logistics, transportation, telecommunications and commerce. As each country begins to adapt to a new, unprecedented, post-COVID 19 world, cybersecurity becomes increasingly imperative to secure digital infrastructures.

The region is accelerating the development over cybersecurity matters, and while some countries have achieved an intermediate level of preparedness for cybersecurity, yet their capabilities are still limited due to the lack of regional advancements. Most of the countries count with no coordinated capabilities to fully respond to cyber-threats, meaning that their vulnerability to cyberattacks in any sector is high.

Security company Kaspersky noted in 2017 that cyberattacks increased from 2016 to 2017 by 59% in Latin America, which, put in context, means that internet users in the region suffer an average of 33 cyberattacks per second. Brazil, Mexico, Colombia, Honduras, Panama, Guatemala, and Chile -three of them Central American countries- registered the highest number of attacks in 2017. Kaspersky's prognosis for Latin America is an increase of cyber-threats, cyberattacks to the financial sector, cyber-military operations, attacks on small and middle enterprises, cryptocurrency mining abuse, and even more attacks on the IoT, among others.

The Global Cybersecurity Exposure Index 2020 From 0 to 1, the Cybersecurity Exposure Index (CEI) calculates the level of exposure to cybercrime for 108 countries. The higher the score, the higher the exposure. In Latin America, El Salvador is the most exposed country, followed by Honduras, Nicaragua, and Panama.

Table. Central American countries in the Global Cybersecurity Exposure Index 2020<sup>19</sup>

Source: *PasswordManagers.co*

Country	Global ranking	Score
Costa Rica	37	0.438
Panama	50	0.569
Nicaragua	56	0.600
Honduras	57	0.603
El Salvador	59	0.617

Regarding national cybersecurity strategies and cybercrime laws, it is of the essence that countries share similarities and a certain harmony between them to guarantee a successful

<sup>18</sup> Latin America Cyber Security Market - Growth, Trends, Covid-19 Impact, and Forecasts (2021 - 2026), Mordor Intelligence

<sup>19</sup> Guatemala is not assessed in this index.

functionality. In the region, only Costa Rica, Guatemala and Panama are parties to the Budapest Convention on Cybercrime.

Central American countries have achieved important milestones into developing a strong foundation for national cybersecurity. Although political and strategic instruments already exist and have been recently implemented in countries like Costa Rica, Guatemala, and Panama, while others like El Salvador are taking initial steps. However, there is still a significant gap between them and the operational field.

### 2.5.2. Trends and opportunities

Cybersecurity trends, as the sector itself, are global and not market specific. Rather, cybersecurity opportunities rely on the connectivity of the economy, society, and governments, as well as the maturity of their corresponding cybersecurity regulatory frameworks and cybersecurity infrastructure and systems.

Nonetheless, some industries face a higher risk of cyberattacks than others. This includes industries that typically have high-value organizations or hold a large amount of personal data, such as financial and healthcare. As a result, those countries with a larger share of Multinational Enterprises (MNEs) -i.e. Costa Rica and Panama in the region- offer more opportunities for the development of a dynamic cybersecurity market. From this same perspective, attention must be given to the development of a consistent framework that facilitates the operationalization of the cybersecurity strategies that have been developed (see chapter on "Policy and Regulatory Assessment").

The National Cyber Security Index<sup>20</sup>, developed by e-Governance Academy, measures 151 countries' level of cyber security and identifies the main fields of priority that need to be tackled in order to improve status of cyber security. The index also provides an overview of countries' preparedness to prevent and fight cyberattacks and crimes.

The "Difference" shows the relationship between the NCSI score and Digital Development Level (DDL) in each country. A positive result shows that the country's cyber security development is in accordance with, or ahead of, its digital development. A negative result shows, that the country's digital society is more advanced than the national cybersecurity area, which increases the risk for and vulnerability to cyberattacks.

The following table shows the Central American countries assessed through the National Cybersecurity Index.<sup>21</sup>

Table. Central American countries in the National Cyber Security Index

Source: e-Governance Academy

Country	Ranking	NCSI	DDL	Difference
Costa Rica	53	53.25	64.34	-11.09
Panama	61	48.05	55.26	-7.21
Guatemala	96	28.57	41.75	-13.18
Nicaragua	106	22.08	36.35	-14.27
El Salvador	111	19.48	45.53	-26.05
Honduras	141	10.39	42.83	-32.44

<sup>20</sup> <https://ncsi.ega.ee/>

<sup>21</sup> The Index ranks 151 countries based on its National Cyber Security Index (NCSI) score. The "Difference" shows the relationship between the NCSI score and Digital Development Level (DDL) in each country. A positive result shows that the country's cyber security development is in accordance with, or ahead of, its digital development. A negative result shows, that the country's digital society is more advanced than the national cybersecurity area.

International and regional organizations are supporting the development of cybersecurity across the region. The Organization of American States (OAS) has been vital to provide a set of norms, methodologies, and guidance to several countries in developing their national cybersecurity strategies. The OAS, through the Inter-American Committee against Terrorism (CICTE) and its Cyber Security Program, has cooperated with countries in the region in designing and implementing a national cybersecurity strategy that not only provides the necessary framework within each state but also facilitates international cooperation in building confidence measures while providing tools to combat cybercrime.

The series of Cybersecurity Reports for Latin America and the Caribbean published by the Cybersecurity Observatory and the OAS, shows the LAC region is accelerating their development over cybersecurity matters, and although some countries have achieved an intermediate level of preparedness for cybersecurity, their capabilities are still limited due to the lack of regional advancements, and no coordinated capabilities to fully respond to cyber-threats.

In 2018, 10 countries in the region published a National Cybersecurity Strategy—three of them being Central American countries (i.e., Guatemala, Costa Rica, and Panama)—in which the OAS provided crucial cooperation. In the same manner, countries like Guatemala and El Salvador have come forward with the Council of Europe to request cooperation through their Global Action on Cybercrime Extended (GLACY+) Program to implement a cybercrime act that can enable those countries to adhere to the Budapest Convention. This will enable them to exchange information and build capacities with other members more efficiently and be part of the solution to crack cybercrime globally.

From a complementary perspective, Central American countries - in particular Costa Rica, but also, to a more limited extent, other countries- are gradually developing ecosystems favorable to the entry of international cybersecurity suppliers. Indeed, the internationalization process of SMEs in the sector relies to a large extent on cooperation and business alliances, which require an environment that provides qualified human resources and a critical mass of dynamic start-ups.

## 2.6. Health

### 2.6.1. Market overview

Between 2012 and 2017, private investment in Latin America's pharmaceutical industry almost doubled from US\$ 68 billion to US\$ 110 billion<sup>22</sup>. This influx of private capital is also driving the development of new medical devices, treatments, and medications that revolutionize healthcare in Latin America.

In recent years, the healthcare industry in Central America has also shown significant progress, gaining recognition among Pharma and OTC (over the counter drugs) companies as a promising region. The region's development supports the medium-term growth of the middle class and the enhanced accessibility of healthcare services. This situation is promoting the expansion of the healthcare, pharma, and OTC industries in Central America. In fact, the healthcare sector was valued at US \$17.8 billion in 2015 and the Pharma and OTC industry reached US \$4 billion and grew at 5.6%.<sup>23</sup> Within the region, two countries stand out for their

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<sup>22</sup> Biotech is Booming in Latin America: Here's Why", Nearshore Americas, 2019

<sup>23</sup> "Discovering Untapped Business Opportunities for OTC and Pharma in Central America", Chameleon Pharma Consulting, 2019

potential to generate business opportunities for EU companies: Panama and Costa Rica. Guatemala has also developed a relatively strong pharma manufacturing base.

The most significant challenge for biotech development is the upfront risk of investing in a product that has not been tested on the market. Many devices and medications must be subjected to clinical trials and tests before they can debut on the market so a biotech startup cannot grow without capital like a bootstrapped fintech company or marketplace. These startups see a competitive advantage in Latin America: access to top scientists and hospitals with modern technology, for a fraction of the cost of a lab in the more developed countries.

Using latest data available from the International Trade Center,<sup>24</sup> the region's imports of pharmaceuticals, imports in the region raised to \$4 billion, a -9% decrease since 2016. Panama accounted for 30% of total imports, followed by Costa Rica (20%), Guatemala (17%), Honduras (13%), El Salvador (11%) and Nicaragua (9%). Exports were \$1.25 billion decreased a 9% between 2016-2019, due to a 70% drop in exports from Panama in the same period. The main exporter in 2019 was Panama (38%), followed by Costa Rica (26%), Guatemala (16%), El Salvador (14%), Nicaragua (2%) and Honduras (1%).

With regards to medical devices, imports reached \$676 million in 2019, a 23% increase since 2016. Costa Rica accounted for 56% of total imports, followed by Panama (15%), Guatemala (13%), El Salvador (6%), Nicaragua (6%) and Honduras (4%). Exports raised to \$2.80 billion, of which Costa Rica represented over 99%. The country is second only to Mexico as a medical device exporter in Latin America.

### 2.6.2. Trends and opportunities

In recent decades, a large part of Costa Rica's economic development strategy has been dedicated to working to develop the country's high value-added productive sectors with the aim of producing goods and services that revolutionize markets. Companies involved in the Life Sciences sector in Costa Rica have combined to make the country the largest exporter of medical goods to the United States after Mexico. In 2018, Costa Rica exported over US \$2.7 billion dollars of life science products which represented 29% of its exports. This figure is up from 2017 when 27% of exports were in this product category.

Today there are 72 multinational companies involved in manufacturing in the Life Sciences sector in Costa Rica. These companies have generated approximately 22,000 direct jobs and have created an industry value chain that is complex and diverse. Six out of ten of the largest medical device firms in the world have established operations in Costa Rica. Several of these companies produce cardiovascular care products. In addition to this, the Life Sciences industry in Costa Rica is the source of items such as medical-aesthetics devices, dental products, orthopedic and optical devices, and products used in endoscopy, among others. The presence of this wide variety of production is another reason Costa Rica is globally recognized as a top-tier player in the medical device industry.

In addition to large companies such as Baxter, Abbott Labs, Boston Scientific, and others, the Life Sciences sector in Costa Rica has a volume of production that creates a lucrative space for companies that are suppliers of items such as raw materials and subcomponents, as well as of engineering services. Small and mid-sized companies can establish themselves in Costa Rica to become partners with the larger corporations in the country's Life Sciences sector in innovation and the creation of sophisticated, high value-added products.

It is also worth mentioning the National Center for Biotech Innovations (CENIBiot), a laboratory of the National Center of High Technology (CeNAT-CONARE) that works in the biotechnological scaling, with the purpose of promoting the development of biotechnology in

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<sup>24</sup> For Panama only mirror data are available for the entire period.

the region. The CENIBiot Laboratory promotes accessibility to installed capacity in three sectors fundamental: academia, government, and industry, supporting initiatives that strengthen the entrepreneurship, technology transfer and university-business relationship. It also works in the approach and linking of the different biotechnology managers at the regional level.

El Salvador is making steady, if slow progress in establishing itself as a viable market for pharmaceuticals, as evidenced by the construction of a mega-structure production plant at Santa Tecla. Supporting this are the Ministry of Health's efforts to solicit outside assistance to bolster health care provision in all quarters of the country. Despite improvements in the regulatory environment since the Medicine Law of El Salvador was approved in 2012, only a few international companies -mostly Latin Americans- have established in the country as result of underdeveloped infrastructure and manufacturing.

Guatemala is one of the largest pharma markets in the region of Central America. Guatemala is also one of the leading manufacturers in the region, and the largest supplier of pharmaceuticals to the Central American market. Investments in new medical equipment within the private healthcare sector are expected to continue, as new clinics and existing hospitals buy periodically to meet their equipment needs and continue to invest strongly in new technology, such as diagnostic and treatment equipment. Despite the economic difficulties faced by each country in the region, demand in this sector has not diminished, as 60% of service users have private medical insurance.

The healthcare industry's medical devices and equipment sector in Honduras is highly dependent on imports. However, despite the existing opportunities there is significant margin for improvement in its healthcare system and regulatory frameworks are still being consolidated. Public investment in the health sector is highly dependent on bilateral and multilateral donors.

In recent years Nicaragua has begun significant investments to improve and modernize the country's health care sector with the support of multilateral donors, such as the World Bank and the IDB. As result of several new and renovated hospitals, specialized centers, a growing focus on oncology care, and additional investments by the public sector and multilateral donors, there are multiple large-contract opportunities for international suppliers. Specialized and diagnostic equipment, pharmaceutical products, and hospital equipment all have growth potential in the country.

Panama's economy's strength in the last decade has been witnessed by the public funding for healthcare services and medicines, which is currently worth over US \$3 billion. Panama remains the largest importer of pharmaceutical drugs and medicines in Central America. Local demand is high, and the government is increasing access to healthcare for most of the population under a universal healthcare policy. Eighty percent of the population lives in urban areas contributing to ease of access, GDP has been growing steadily over the past years and the economy is one of the strongest and most stable in the region.

As the sector develops further, Panama aims to become a pharmaceutical hub for the region. Considering Panama's ideal geographic location between North and South America, maritime connectivity along the Panama Canal and Tocumen International Airport, which is the largest airport in the region, these factors make it a business-friendly place along with tax and fiscal incentives. Companies may choose Panama to not only consolidate operations in Central America but also to invest in their own expansion into Latin America.



### 3. Entry barriers

There are multiple types of market entry barriers and various ways to categorize them. A practical, non-theoretical, ad-hoc approach is adopted in this document. Because the objective is to identify key barriers that in some cases may be sector-specific, while at the same time facilitating a consistent cross-sectoral comparison, a quick assessment of each sector is provided below, followed by a table that appraises the impact of the following categories:

- Export & Import controls
- Customs tariffs & Taxes
- Government subsidies
- Regulatory disincentives & monopolies
- Economies of scale & logistics

From a general perspective, it is evident that physical distance, limited exposure and awareness, cultural differences and language may act as barriers for many new EU entrants to the Central American markets. Also, economies of scale may be difficult to achieve in several sectors due to limited market size, as well as logistics costs, and as a result these may also act as trade disincentives.

High-tech services face often lower entry barriers, as many of the impediments previously mentioned do not impact exports-or do so to a limited extent. In other cases, some entry barriers may be overcome by using one country as a platform, while considering the entire region as the target market. Although it must be acknowledged that integration at the political and regulatory levels is somehow limited, there is a growing de facto market integration driven by the private sector and the development of commercial networks at the regional level.

No significant barriers have been identified for any of the sectors analysed in this document. The most relevant, specific one is related to a monopolistic situation of the electrical market in Costa Rica, that may create uncertainty to investors and producers as is described below.

In other cases, barriers are related to registration and authorization processes (fertilizers, pesticides, chemicals, pharmaceuticals, or medical devices), that are not totally transparent or create excessive delays. In some instances, while there are no proper obstacles, market entry may be disincentivized by lack of a supportive regulatory framework (such as in the case of green logistics) or a cohesive policy strategy (sustainable urban transportation). As a result, in these cases there may appear individual opportunities, however fragmented or isolated.

Entry barriers may also be broken down differently. However, the level of the analysis proposed in this chapter is consistent with the scope of this short study and the goal of facilitating reasonable decisions on the selection of those sectors that are more attractive for EU exporters.

#### 3.1. Renewable energy

While several countries maintain a monopoly of electricity transmission, the Costa Rican Public Electric Utility (ICE) is guaranteed the decisions about who can produce and sell electric power, in a way that allows that entity to keep monopolistic practices and creates unpredictability to producers.

ICE can decide who produces energy in the country up to a limit of 50 MW. In addition, only ICE can purchase it to these operators and later resell it. Also, the law indicates that the total generated by the operators cannot exceed 15% of the power of the National Electric System. Private firms, individuals and co-operatives can generate and sell to ICE, up to 30% of the country's demand of electricity. ICE can only buy energy from private companies owned at least 35% by Costa Rican nationals. Therefore, there is a restriction for participation by non-residents in electricity generation. In addition, public municipal companies and co-operatives

are authorized to generate, distribute and commercialize electricity to cover the demand of their circumscriptions. Finally, participation of foreign persons or foreign firms in public or private companies entering joint ventures with Heredia Public Services Company (Empresa de Servicios Públicos de Heredia, ESPH) is limited to a maximum of 49% of the capital stock.

In Guatemala the Wholesale Market Authority (Administrador del Mercado Mayorista, AMM) - an independent private, non-profit organisation created under the General Electricity Law- coordinates the operation of the generators, international interconnections, and transmission lines that form the National Electric System. The AMM is responsible for overseeing the safety and operation of the National Electric System and the efficient dispatch of energy, and is tasked with minimising operating costs (including costs from losses, and compliance with service quality requirements). The AMM can also establish market prices in the short-term for the transfer of power and energy among generators, transporters, and distributors, when they do not correspond to long-term contracts, freely arranged.

From another perspective, the opposition presented by the Guatemalan indigenous communities that are affected by new generation projects, especially regarding hydro power plant projects, is currently considered the main obstacle to the development of renewable energy in the country.

In Panama, the State power transmission company (Empresa de Transmisión Eléctrica, ETESA) currently has a legal monopoly over electricity dispatch and is responsible for demand-generation planning, under a renewable concession granted by National Public Services regulator (Autoridad Nacional de los Servicios Públicos, ASEP) that expires in 2025. One proposal under review looks to allow the participation of other companies under the build, operate and transfer model. In addition, Panama recently announced a legal initiative to increase power sector oversight which aims to ensure that permanent and quality grid maintenance is carried out.

### **3.2. Sustainable urban mobility**

One key limitation to the development of this sector is the lack of a cohesive policy and a supportive regulatory framework, as well as the absence of integrated mobility strategies in most of the countries, that prevent the design of long-term plans, comprehensive pipelines and result in fragmentary approaches and isolated initiatives across the region. This situation may deter new entrants, whose strategies may be handicapped or become inefficient due to the absence of economies of scale and incapacity for long-term planning and investments.

Other key barriers are related to limited regulatory development of PPP schemes and constrained capacity of public financing across the region, which in some cases has resulted in the discontinuation of some projects. From a complementary perspective, the fact that many projects are being funded by international financial institutions facilitates a more level playing field for EU suppliers.

On another note, opposition -or at least reluctance- from public transportation concessions holders, as well as the abundance of informal operators, may deter government initiatives to implement innovative public mobility strategies.

### **3.3. Innovation for sustainable agriculture**

While there are no significant restrictions on the importation or marketing of chemicals and fertilizers, exporters often complain about overly burdensome bureaucratic obstacles, and less-than-transparent processes. In some cases, individual countries have blocked registration of new products during longer (Costa Rica, 10 years) or shorter periods of time. In any case, it seems that most countries in the region are adopting more flexible registration requirements and facilitating mutual recognition. The best market entry strategy is to find a reliable and

qualified local distributor or representative that is knowledgeable on the requirements and can expedite the processes before the relevant authorities.

From another perspective, many well-established local distributors are used to being offered favorable credit terms by US exporters (very often 30 to 60 days open account credit terms). While this is not per se an entry barrier, working under these same terms may prove challenging to EU exporters, who normally require cash in advance or irrevocable letter of credit. US exporters also benefit from lower freight costs -even for small purchases, and shorter delivery times.

### **3.4. Green logistics**

There are no significant, specific entry barriers, besides the so far limited development of the sector across the region. Indeed, lack of a supporting regulatory framework (encompassing from trucks emissions standards to packaging recycling or the broader scope of the circular economy) may deter EU exporters from considering Central America an attractive market in the medium-term.

However, it is worth noting that this has been no impediment for larger corporations to undertake initiatives autonomously, driven by demand in developed countries and the growing overseeing of suppliers along the value chains. Equally relevant, international logistics operators have recently entered the market, which should gradually contribute to upgrade the sustainability standards of the entire value chain.

### **3.5. Cybersecurity**

As a cross border, IT services sector, there are very few -if any- significant entry barriers affecting cybersecurity suppliers. One relevant challenge that is worth considering, is often related to the withholding tax that is usually paid in the country where the service is provided, i.e. where the client resides.

The Central American client will usually withhold a percentage of the total invoice, around 15% or higher (up to 35%), in many cases unknowingly to the EU exporter until the payment is received.

Besides a general recommendation of gathering accurate information on withholding (and other) taxes before quoting for required services, it is also advisable to identify which EU countries may have signed double-taxation avoidance agreements with Central American countries, in order to limit or avoid the impact of this tax.

Another barrier that new entrants may face relates to the limited number of qualified human resources and dynamic start-ups in the cybersecurity sector, which are necessary to facilitate technological cooperation and alliances in the sector. Although some countries -notably Costa Rica- are developing environments favorable to the development of cybersecurity, there are some constraints at the regional level.

### **3.6. Health**

While there are no significant restrictions on the importation or marketing of medical equipment and pharmaceuticals, EU exporters often raise concerns with overly burdensome bureaucratic obstacles, and less-than-transparent processes applied by each individual country. This also limits intraregional trade, which fragments the markets, increases the registration costs, and therefore reduces the attractiveness of the region for EU companies and, particularly, SMEs.

The best market entry strategy is to find a reliable and qualified local distributor or representative that is knowledgeable on the requirements and can expedite the processes before the relevant authorities.

Considering that the public sector is a key purchaser in the medical sector across the region, in some cases there may exist some additional challenges derived also from the not-very-clear procurement processes and the specifics of some contracts.

From another perspective, many well-established local distributors are used to being offered favorable credit terms by US exporters (very often 30 to 60 days open account credit terms). While this is not per se an entry barrier, working under these same terms may prove challenging to EU exporters, who normally require cash in advance or irrevocable letter of credit. US exporters also benefit from lower freight costs -even for small purchases, and shorter delivery times.

On another note, import of contraband and counterfeit pharmaceuticals -reportedly from India and China primarily, may also degrade the market and hinder introduction of products in the formal distribution channels, as there is a growing availability of substandard, falsified, and unregistered medicines.

*Table. Entry barriers assessment*

H=high; M=medium; L=low

Type of barrier	Export & Import controls	Customs tariffs & Taxes	Government subsidies	Regulatory disincentives & monopolies	Economies of scale & logistics
Sector					
Renewable energy	L	L	L	M	L
Health	M	L	L	L	M
Sustainable urban transportation	L	L	L	H	M
Cybersecurity	L	L	L	M	L
Green logistics	L	L	L	H	M
Innovation for sustainable agriculture	M	L	L	L	M

## 4. Competitive environment

The following SWOT tables summarize the information analyzed in the previous sections of this document. They aim to facilitate comparison of the 6 sectors, by presenting the key results of the analysis in a succinct, structured manner.

As it is well known, a SWOT analysis of a sector or an industry aims to provide a breakdown of the Strengths, Weaknesses, Opportunities and Threats facing the firms and various actors operating in the area, in terms of internal and external components. In this case, it seeks to help with both strategic planning and decision-making by the EU and relevant stakeholders, as it introduces opportunities as a forward-looking bridge to generating strategic alternatives.

Accordingly, the SWOT analysis presented below uses the following scopes:

- Strengths: positive, favorable features of the current development of the sector, and that make it attractive to EU businesses (e.g., favorable regulations or incentives, etc.)
- Weaknesses: constrains or negative features of the current development of the sector, that as result make it less attractive to EU businesses (e.g., small market size, costs of logistics of exports from the EU, etc.)
- Opportunities: external factors to the sector itself, or currently absent in the corresponding market, that may increase the attractiveness of the sector for EU businesses (e.g., growth drivers)
- Threats: external or potential, negative factors that may reduce the attractiveness of the sector for EU businesses or hinder their competitiveness (e.g., increasing competition)



#### 4.1. Renewable energy

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>– Medium and long-term policy priority</li> <li>– Policy and regulatory supportive framework</li> <li>– Abundant resources</li> <li>– Increasingly diversified matrix</li> <li>– Development of regional/ and with Mexico interconnectivity: (Sistema de Interconexión Eléctrica para Países de América Central-SIEPAC/ Mercado Eléctrico Regional-MER)</li> <li>– Clean Energy Corridor of Central America (CECCA)</li> <li>– SICA's 2030 Central America Sustainable Energy Strategy</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>– Limited market size</li> <li>– In some cases, underdeveloped regulatory framework</li> <li>– In Costa Rica, ICE's monopolistic position</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>– Hydropower projects pipeline and small hydropower plants</li> <li>– Photovoltaic converters (EU quality)</li> <li>– Geothermal potential largely unexplored: creation of the Regional Geosciences Technical Group for the development of harmonized strategies and regulatory frameworks across the region</li> <li>– Tidal energy (largest patent share is EU)</li> <li>– Biomass and Waste to energy (EU competitive advantage)</li> <li>– Energy efficiency: ongoing discussions for the development of regional regulations for import of solar panels and lighting (Regional Technical Group on Energy efficiency) may support EU competitiveness</li> <li>– Energy storage: Hydrogen batteries for energy storage and use in heavy transportation</li> <li>– Development of microgrids for sustainable, smart energy communities</li> <li>– In Guatemala, updating of renewable energy resource maps (geothermal, solar, wind)</li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>– Increasing competition (US share and growing Chinese presence, mainly in hydroelectric, solar and wind projects. Also, US and Japan in hydrogen batteries)</li> <li>– Political instability may increase legal uncertainty for contracts</li> <li>– In Costa Rica, potential short-term saturation of renewable sources</li> <li>– In some countries, opposition by indigenous groups (in particular regarding hydropower)</li> <li>– Reliance of MER on carbon generators in Guatemala (more competitive than renewable) generates political lobby across the region</li> <li>– Full development of MER threatened by energy supply from Mexico to Guatemala (cheaper than energy produced in Guatemala and supplied through MER to the region)</li> <li>– Potential impact from climate change (except geothermal)</li> </ul>

## 4.2. Sustainable urban mobility

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>– Growing urbanization and pressing mobility challenges</li> <li>– PIMUS in Costa Rica and Panama and ongoing, individual initiatives across the region</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>– Limited market size</li> <li>– Weak regulatory frameworks</li> <li>– Lack of integrated transportation planning (with few exceptions)</li> <li>– Weak public funding</li> <li>– Urban design increases the challenges</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>– 2030 Agenda national commitments</li> <li>– Specific projects in individual countries               <ul style="list-style-type: none"> <li>• In Costa Rica, comprehensive, ambitious strategy (SITGAM, Costa Rica) and the Electric Transportation National Plan</li> <li>• In Panama, Integrated Transit System, and development of the Metro</li> </ul> </li> <li>– Electric mobility initiatives across the region               <ul style="list-style-type: none"> <li>• Ongoing discussions on the development of regional regulations on electric mobility</li> </ul> </li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>– Strength of private transportation bus operators (concession holders)</li> <li>– Fossil fuels more competitive short-term than investments in renewables sources for private operators</li> <li>– Unregulated/ informal sector</li> <li>– Unplanned urbanization</li> </ul>

### 4.3. Innovation for sustainable agriculture

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>– Weight of agricultural production on GDP and exports</li> <li>– Productivity enhancement in agriculture is a key issue for governments across the region</li> <li>– Policy and regulatory supportive framework</li> <li>– Rich institutional ecosystem</li> <li>– Climate change impact on strategic crops is a pressing issue</li> <li>– Strong IP protection (registration data protection) for agrochemicals</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>– Limited market size, high investments required due to registration bureaucracy and long distribution chains</li> <li>– Challenges to achieve economies of scale</li> <li>– Slow adoption of technologies</li> <li>– Weak linkages of producers to international markets/ Unstable income of largest share of producers/ Low purchasing power</li> <li>– Bureaucratic obstacles, and less-than-transparent registration and authorization processes for fertilizers and chemicals</li> <li>– Products registration times/ even between Central American countries</li> <li>– Limited connectivity in rural areas</li> <li>– Logistics costs (from EU)</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>– Organic, natural production as a product differentiation strategy</li> <li>– EU MRLs on pesticides may increase demand for innovative products</li> <li>– Ongoing initiatives in most countries</li> <li>– Development of innovation-favorable regulatory frameworks (GMF, recovery of native seeds, etc.)</li> <li>– Active ingredients registration regulation in Costa Rica should shorten registration process to 41 days</li> <li>– Incentives to anything “green” (e.g., CINDE Costa Rica)</li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>– Familiarity with US technology and available technical support</li> <li>– Growing competition from India and China (machinery)</li> <li>– Contraband agrochemicals</li> <li>– MRLs on pesticides may challenge producers’ linkages to EU markets in the short term</li> </ul>

#### 4.4. Green logistics

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>– Logistics is a key competitive factor for the region</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>– Lack of policy and regulatory supportive framework</li> <li>– Limited demand</li> <li>– Weak public funding, focus on pressing issues</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>– 2030 Agenda national commitments</li> <li>– Initiatives led by large private sector corporations</li> <li>– Reverse logistics, in particular waste to energy</li> <li>– Sustainable freight transportation</li> <li>– Logistics infrastructure projects pipeline</li> <li>– In Costa Rica, Limón electric freight train (TELCA)</li> <li>– Panama Canal plans to become carbon neutral by 2030</li> <li>– Incentives to anything “green” (e.g., CINDE Costa Rica)</li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>– Chinese support to development of regional train</li> </ul>

#### 4.5. Cybersecurity

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>- Policy and regulatory supportive framework</li> <li>- Global sector</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>- Limited institutional capacities</li> <li>- Limited supply of qualified human resources</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>- Increasing cybersecurity risks, in particular in Panama and Costa Rica</li> <li>- Insufficient supply of specialized services at the regional level</li> <li>- Central American region (in particular, Costa Rica) as a platform to reach larger markets (time zone, language, etc.)</li> <li>- Developing favorable ecosystems for cybersecurity actors and start-ups</li> <li>- Business cooperation model very attractive SMEs market entry</li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>- Limited number of double taxation avoidance agreements with EU countries to avoid impact of withholding tax may hinder potential for new entrants</li> <li>- Ongoing cooperation of Costa Rica with Israel and US</li> </ul>

#### 4.6. Health

Positive	Negative
<p style="text-align: center;"><u>Strengths</u></p> <ul style="list-style-type: none"> <li>– Limited local production (except medical devices in Costa Rica and relevant, though small, pharmaceuticals production in Guatemala and Panama)</li> <li>– Growing demand, both from the public sector and private health systems</li> </ul>	<p style="text-align: center;"><u>Weaknesses</u></p> <ul style="list-style-type: none"> <li>– Limited market size and fragmentation</li> <li>– Challenges to achieve economies of scale</li> <li>– Slow increase of purchasing power</li> <li>– Limited demand for high-tech, innovative devices</li> <li>– Bureaucratic obstacles, and less-than-transparent registration and authorization processes (also between Central American countries)</li> <li>– Governments are financially constrained/ cost containment</li> <li>– Logistics costs from EU</li> </ul>
<p style="text-align: center;"><u>Opportunities</u></p> <ul style="list-style-type: none"> <li>– Clinical trials and tests: Guatemala, Costa Rica and Panama are among the 10 Latin America countries where a highest number of registered clinical studies is carried out</li> <li>– In Costa Rica, development of a life sciences mega hub, including R&amp;D and manufacturing opportunities</li> <li>– In Guatemala, opportunities for manufacturing OTC and generic drugs and distribution across LATAM</li> <li>– Biodiversity for Health biotechnology (HBT)</li> <li>– Post-covid strengthening of healthcare networks</li> <li>– Latin America is the fastest aging region in the world</li> </ul>	<p style="text-align: center;"><u>Threats</u></p> <ul style="list-style-type: none"> <li>– Growing competition (US dominance in some areas and growing presence of LATAM and Asian firms, mainly in OTC products)</li> <li>– Increasing supply of substandard, falsified, and unregistered medicines (up to 30% of market)</li> </ul>



## 5. Decision-matrix tool

The decision matrix below shows the results of the analysis performed for each of the six sectors, based on a series of variables that are consistent with the scope and goals of this study.

Each criterion is assigned a score (1 lowest -less attractive - to 5 highest -more attractive) based on the results of the analysis and the interactions with the core stakeholders.

*Results of the scores assigned by the consultants to each sector:*

	Renewable energy	Health	Sustainable urban mobility	Cybersecurity	Green logistics	Innovation for sustainable agriculture
Potential for EU trade/ investment	5	3	3	5	2	3
Market size	5	3	2	4	2	3
Opportunities for SMEs	3	3	1	5	1	3
Market access	4	3	2	4	2	3
Policies & regulations	4	4	2	3	1	4
Environmental sustainability	5	3	5	1	5	5
<b>Total</b>	<b>26</b>	<b>19</b>	<b>15</b>	<b>22</b>	<b>13</b>	<b>21</b>

*Results of the scores assigned by the stakeholders to each sector:*

	Renewable energy	Health	Sustainable urban mobility	Cybersecurity	Green logistics	Innovation for sustainable agriculture
Potential for EU trade/ investment	87	83	77	72	69	89
Market size	66	60	66	55	56	75
Opportunities for SMEs	70	73	64	68	60	79
Market access	71	72	70	63	65	73
Policies & regulations	69	66	60	51	55	65
Environmental sustainability	85	67	74	61	69	81
<b>Total</b>	<b>448</b>	<b>421</b>	<b>411</b>	<b>370</b>	<b>374</b>	<b>462</b>

## 6. Priority sectors proposal

A proposal on the three priority sectors has been developed based on the results of the analysis, the opinions of the stakeholders and the overall EU strategy in the region. The rationale for sector prioritization and scope of analysis proposed for the 3 in-depth results to be conducted are discussed below:

### **Innovation for sustainable agriculture**

- a) Rationale:
- Key sector according to the results of the questionnaire
  - Coincidence of the results of the questionnaire and the analysis carried out by the consultants
  - Alignment with the EU's Farm to Fork' strategy
  - Priority in the competitiveness strategies of Central American countries
  - Sectoral breadth, potential for narrowing the analysis of sectoral dynamics, priorities and opportunities
  - Export potential of European SMEs
- b) Scope of the analysis:
- Analysis of innovation strategies and ecosystems for sustainable agriculture in the region
  - Analysis of sustainable development strategies of priority value chains
  - Analysis of the export and investment potential of European companies in priority areas: agrochemicals, seeds, agrotechnology, machinery
  - Descriptive analysis of the recommended market access strategies for European SMEs

### **Renewable energy**

- a) Rationale:
- Coincidence of the results of the questionnaire and the analysis carried out by the consultants
  - Alignment with the EU's Green Agenda
  - Regional breadth and current favorable regional market dynamics
  - Existence of abundant background information on subsectors and niches of opportunity
  - EU's ability to influence the structural and regulatory development of the market
- b) Scope of the analysis:
- Structural and regulatory analysis of the national and regional electricity market and the role of renewable energies
  - Analysis of regulatory and technological barriers and recommendations to achieve sustainable development of the renewable energy market in the region
  - Prospective analysis of segments and subsectors with the greatest potential for growth
  - Recommendations for action for the EU and stakeholders

### **Green logistics and urban transportation**

- a) Rationale:
- Current market dynamics at the regional level and potential of both sectors to advance the achievement of the 2030 Agenda
  - Logistics as a priority in the competitiveness strategies of Central American countries
  - Synergies in the analysis and opportunities between the two selected sectors (electric transport, last mile, etc.)

- Ability to leverage a European promotion strategy on "tractor" projects
- b) Scope of the analysis:
  - Analysis of sectoral dynamics at the regional level
  - Identification of relevant projects
  - Analysis of opportunities for European companies in the framework of the following projects:
    - Regional Mobility and Logistics Master Plan 2035 (SIECA)
    - Decarbonization of the Panama Canal 2030
    - Electric transport projects in Costa Rica
    - Other projects to be discussed