

Background Study for Ecuador's Country Economic Memorandum

Review of Ecuador's Agri-Industries Global Value Chains Bottlenecks and Roadmap for Implementation

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Abbreviations and acronyms

ANECACAO	National Association of Cocoa Exporters
BNDES	Brazilian Development Bank
CAOBISCO	Association of the Chocolate, Biscuit and Confectionery Industries of the EU
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
	National Federation of Autonomous Workers- Small Producers and Merchants of Ecuador
FENACOMI	
FENACOPEC	Federation of Fishing Cooperatives of Ecuador
FIPs	Fishery Improvement Projects
GBP	ISO Code for Pound Sterling
GDP	Gross Domestic Product
GPS	Global Positioning System
GVC	Global Value Chains
ICCO	International Cocoa Organization
ICT	Information and Communication Technologies
	<i>Instituto Ecuatoriano de la Propiedad Intelectual</i> (Ecuadorian Institute of Intellectual Property)
IEPI	
INEN	The National Institution of Standards
	<i>Instituto Nacional de Investigaciones Agropecuarias</i> (National Agricultural Research Institute)
INIAP	
LGAs	Loan Guarantee Associations
LIFFE	London International Future and Option Exchange
MAGAP	Ministry of Agriculture, Livestock, Aquaculture and Fisheries
MENA	Middle East and North Africa
MIPRO	<i>Ministerio de Industrias y Productividad</i> (Ministry of Industry and Productivity) <i>Ministerio de Relaciones Exteriores Comercio e Integración</i> (Ministry of Foreign Trade and Integration) - Institute for the Promotion of Exports and Investments
MRECI-PROEcuador	
MSC	Marine Stewardship Council
NAFIN	Nacional Financiera Mexico
NGO	Non Governmental Organizations
NYBOT	New York Board of Trade
OECD	Organization for Economic Cooperation and Development
PGI	Protected Geographical Indication
SMEs	Small and Medium Enterprises
SRP	Undersecretary for Fishery Resources
SWOT	Strength, Weaknesses, Opportunities and Threats
USD	United States Dollars
UTZ	Universal Trade Zone
WFTO	World Fair Trade Organization
WISTCO	West Indies Sugar & Trading Company Ltd.

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Abstract

This chapter examines agricultural GVCs in Ecuador and the major bottlenecks to upgrading. In order to meet the goals of “*Ecuador Productivo 2025*” deep analysis of these chains, and implantation of an upgrading roadmap are required. We examine both the cocoa and mahi mahi value chains in Ecuador as well as literature on implementation to develop a roadmap to help Ecuador meet its goal in the agriculture sector by 2025. Specifically, policies should focus on six pillars which should be developed in order to maximize the likelihood of success: institutional, human capital, financial, infrastructure and services, markets and diversification, and innovation. While all of these are crucial, institutional development, which focuses on stakeholder engagement and participation in planning, as well as, market development that links agriculture to other industries are most crucial for Ecuador to meet the mandates laid out in “*Ecuador Productivo 2025*.”

1 Introduction

The Government of Ecuador is undertaking a national economic diversification program to reduce reliance on hydrocarbon exports by developing higher value products in other sectors including agriculture and services. “*Ecuador Productivo 2025*,” the detailed strategy for industrial policy diversification identifies strategic value chains for development (Ferro, 2015). The plan focuses on the development of the primary sector (chocolate and cocoa, palm derivatives, processed coffee, wood panels, derived from fisheries and aquaculture, flowers, dairy, etc.). Economic impact of the plan in 10 years includes creating 13,500 USD in sales revenues; and 5,000 million USD in trade. The Ecuadorian government estimates that in 10 years “*Ecuador Productivo 2025*” will produce 312,000 jobs and investment will reach 10,500 USD million (Basantes, 2015). The plan aims to increase entrepreneurship and the number of exporting firms of its 75 000 small and medium enterprises (SMEs), of which currently only about 8 percent are exporting (“Nathalie Cely: En el 2025 incrementaremos las exportaciones,” 2015).

In order to meet these goals, rigorous studies of strategic GVCs and the implementation of policies that spur upgrading are necessary. This paper examines two agriculture GVCs, cocoa and mahi mahi, both identified as priority subsectors by the government to assess Ecuador’s role in the industry as well as provides a road map for upgrading in the agro-industries. Through a correct mixture of stakeholder input, market analysis and policy planning Ecuador can meet the goals laid out in “*Ecuador Productivo 2025*.”

This paper is divided into the following sections. We first introduce the GVC methodology and give a brief overview of agriculture value chains. Focus then shifts to the ideas of upgrading and increasing competitiveness in chains. Section three presents two agricultural GVCs of interest, cocoa and mahi mahi and highlights the organizations of these industries as well as the bottlenecks and leverage points for these chains. The remainder of the paper discusses a roadmap to implement policies that address the main bottlenecks in the chains and increases competitiveness in Ecuador’s agriculture sector. Considering the time available, this study should be regarded as a quick market scan. A more in-depth market study will be necessary to give detailed strategies on cocoa and mahi mahi investments and policy recommendations. For example, pricing, quality, and volumes should be extensively studied. Also, how linkages can be made with other niche markets, such as the organic market for sustainable cocoa and the tourism sector for mahi mahi.

2 Methodology

To analyze Ecuador's position in two agriculture subsectors - cocoa and mahi mahi- and possibilities for increased competitiveness, this report utilizes the global value chain framework. Global value chains (GVCs) refer to the sequence of value-added activities that comprise the creation, delivery, and end-use of a given product or service. The framework examines actors, activities, policies and transformations that occur in global and local food production networks and their economic, social and environmental impacts. Moreover, the analysis evaluates the fragmentation of GVCs where transnational corporations divide production processes and locate them in different places around the world to enhance their competitiveness, manage risk and leverage shifts in supply and demand. Such global production arrangements can be found in many sectors including commodities, tourism, and business services outsourcing and have implications on how countries participate in GVCs (Staritz, Gereffi, & Cattaneo, 2011).

Governance is a centerpiece of GVC analysis. It shows how corporate power can actively shape the distribution of profits and risks in an industry, and identifies the actors who exercise such power (Gereffi, 2014) and capabilities in the supply-base. In their seminal work, Gereffi, et al (2005) identify five distinct forms of governance ranging from high to low power asymmetries and coordination based on three variables: 1) the complexity of transactions, (2) the ability to codify transactions, and (3) the capabilities in the supply-base. Governance forms vary across industries and impact the opportunities for upgrading and growth.

3 Agriculture Global Value Chains

The agriculture GVCs are complex, volatile, expanding the use of biotechnology and information systems, and are under pressure to improve traceability and production standards (KPMG, 2013). Factors such as linkages between energy markets, financial speculation in agricultural commodities, and fragmentation in supply chains are making these chains more complex.

Challenges such as environmental stress, trade restrictions, political and social turmoil increase supply uncertainty and price volatility in agribusiness. Demand for year round access to seasonal crops, growing consumption and addressing challenges that impact production such as pests spurred innovation and genetic modifications. Moreover, the digital revolution in agriculture is impacting the entire chain by addressing information asymmetry and production constraints while raising productivity. For example, startups emerged in the United States that are using sensing technology to make farms more "intelligent" and connected through "precision farming" or "smart farming" to monitor water use, lower energy costs, collect weather and soil data, and monitor plant and animal health (Guerrini, 2015). Finally, concerns over food safety, the use of genetically modified crops, and consumer demand for information on food origination, production, and sustainability prompted an array of private and public standards on food. These dynamics are impacting the ability of producers in developing countries to participate in agricultural GVCs and impact upgrading strategies firms and countries need to adopt to take part in higher value segments in GVCs.

3.1 Governance in Agricultural GVCs

Agriculture GVCs are highly concentrated with large multinational firms in North America and Europe dominating the high value segments such as agrochemicals, processing and marketing. Generally agriculture GVCs are buyer driven. Factors such as demand and product specifications and actors such as international commodity traders, and retailers from North America and Europe shape the relationships in the chain. At the same time, emerging shifts in the geographies of supply and demand in these chains is

creating new opportunities and challenges. For example, Russia and Ukraine are now the leading suppliers of grains to emerging markets in the Middle East and North Africa (MENA) region and Asia (Ahmed, Hamrick, & Gereffi, 2014). Also, growing demand from countries in MENA and Asia is putting pressures on global supplies of food and creating a new set of consumer preferences (Ahmed, Hamrick, Guinn, Ajmal Abdulsamad, & Gereffi, 2013). These shifts are creating a new set of actors in the emerging supply and demand regions and pushing a number of multinational corporations to develop the logistics, processing and marketing segments in GVCs in countries such as Russia, Indonesia, Egypt, and Nigeria to be closer to demand markets. For example, Glencore investment in export terminals in Russia is increasing its capacity to export grains; Cargill is investing in soybean processing in Egypt; and Olam is now in many countries in West Africa with sourcing, processing and marketing operations covering a wide range of products (Ahmed et al., 2014).

3.2 Upgrading in the chain

Participation in GVCs encompasses achieving market requirements such as quality, lead times, flexibility, and compliance with process, product, and sustainability standards. Firms and countries that seek involvement in GVCs must improve their competitiveness, develop their enabling business environment and initiate upgrading processes to capture opportunities in global markets and address challenges.

Upgrading refers to moving from lower- to higher-value activities to increase the benefits from participating in global trade and production (for example, profits, and improved skills and capabilities) (Bair & Gereffi, 2003). According to Humphrey and Schmitz (2001) there are three main upgrading strategies:

- Process upgrading: where firms improve efficiency by re-organizing production systems, streamlining operations, or introducing new technology.
- Product upgrading: where firms move into more sophisticated product lines.
- Functional upgrading: where firms in the chain acquire new functions such as design and marketing that are higher-value tasks.

Table 1 Upgrading in agricultural GVCs

Upgrading Trajectory	Description	Conditions
Functional Upgrading	Increasing value added by changing the mix of activities conducted within the firm or moving the center of activities to different links in the value chain. Variables include: type and number of new activities absorbed or outsourced, new marketing or logistics functions or a change in management.	Chain coordination Developing business friendly policies Incentives e.g. taxes Private sector development Access to finance
Product Upgrading	Developing higher value products for example by moving from production and trade in agriculture commodities to production of intermediary products. Variables include: investment in upgrading activities (as a percentage of the total costs) and new products developed.	Developing human capital Adopting new technology and innovation Understanding supply and demand markets
Process Upgrading	Developing production processes, reducing waste, and increasing quality and efficiency. Activities include: improving inputs, production practices, post-harvest management, improving logistics, and quality standards. Tools include: technology applications, training and sustainability certification.	Developing marketing strategies Infrastructure development Developing, adopting and enforcing standards and certifications

Source: Authors

Process, product and functional upgrading can boost value chain productivity and competitiveness of agriculture and actors in the chain. Upgrading stages are not linear and can leverage models such as outsourcing to facilitate upgrading and focus on the competitive advantage of countries and firms.

Upgrading encompasses improvements in the ecosystem of production including investments in people, know-how, processes, equipment and favorable conditions that include policy, financing, business, and firm level environments. Table 1 below summarizes upgrading trajectories in GVCs.

In the following sections we examine two GVCs that are important for Ecuador: cocoa and mahi-mahi (fisheries). We will provide an overview of the global industry and trends and the position of Ecuador in these chains.

4 Cocoa Global Value Chain

4.1 Overview of global industry and trends

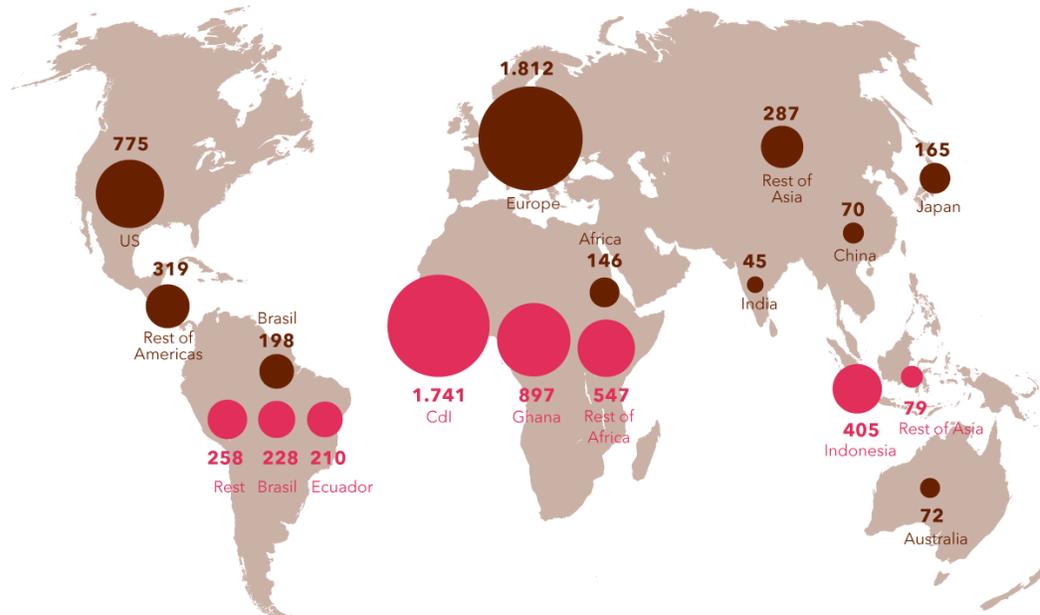
Cocoa trees grow in tropical, hot and rainy climates primarily in Africa, Asia and Latin America (World Cocoa Foundation, 2014). There are two categories of cocoa beans: “fine or flavor” cocoa beans, and “bulk” or “ordinary” (Amores et al., 2007).¹ Ninety-five percent of global cocoa production is ordinary or bulk cocoa (Healy & Ng, 2014).

Cocoa is the fourth largest traded tropical crop behind palm oil, rubber and bananas. The traded value of cocoa is approximately 12 billion USD annually, behind palm oil products at about 60 billion USD, natural rubber at around 29 billion USD, and bananas at almost 15 billion USD (Hawkins & Chen, 2014). The primary suppliers of cocoa beans globally are Côte d’Ivoire, Ghana, Indonesia, Nigeria, Brazil, and Ecuador (see Figure 1). West Africa is the major supply region accounting for about 68 percent of production (World Cocoa Foundation, 2014). The global market share of ‘fine or flavor’ cocoa is just around 5 to 7 percent of the total cocoa production. The Latin American and Caribbean region supplies about 80 percent of the world fine cocoa, followed by Asia and Oceania (18%) and Africa (2%) (Amores et al., 2007). Ecuador is the biggest supplier of fine cocoa in the world.

Confectionary manufacturers in the United States, Germany, France, Britain, Japan, Italy and Brazil drive demand for cocoa (International Cocoa Organization, 2014). However, rising disposable income in emerging economies is quickly increasing demand on cocoa with Brazil, China, Colombia, India, Russia, South Africa, Turkey and Vietnam driving 70 percent of global confectionary growth (KPMG, 2014). In 2014, the world confectionery industry revenues were approximately 170 billion USD with chocolate confectionery at about 110 billion USD (Euromonitor International, 2015; Hawkins & Chen, 2014).

¹ Generally fine or flavor cocoa beans are produced from Criollo or Trinitario cocoa-tree varieties. Bulk cocoa beans come from Forastero trees except for National trees in Ecuador that are considered to be Forastero-type trees and produce fine or flavor cocoa. (Amores et al, 2007)

Figure 1 Global Cocoa Production and Consumption
Production / Consumption



Source: Cocoa Barometer, 2015

Cocoa prices on global markets are determined by two major trading platforms in the markets of London (LIFFE or London International Future and Option Exchange) and New York (New York Board of Trade or NYBOT) (Cepeda et al., 2013). Prices are highly volatile and often spike upwards due to supply disruptions in producing countries from bad weather, disease, and political turmoil. For example, concerns about supply deficits in the 2013/2014 cocoa season rallied prices up by March of 2014 to a two and a half year high to 1,896 GBP per ton in London and at 3,031 USD per ton in New York. In April 2014 prices dipped in response to the release of the first quarter European grindings data showing an increase of only 0.4 percent. However, prices rallied back up from May to June 2014 and reached a three-year high at 3,133 USD per ton in New York and 1,940 GBP per ton in London during reports that El Niño weather conditions threatened production (International Cocoa Organization, 2014). Similar to other agricultural commodities, banks, international funds and financial investors play an important role in the market by increasing liquidity. The use of derivatives and market speculation by financial investors is shifting commodity pricing away from the supply and demand fundamentals of agriculture commodity prices and some debate that it contributes to the volatility in commodity markets (Ahmed et al., 2014; Fountain & Hütz-Adams, 2015).

The industry's innovation hub is Europe, which initiated 45 percent of the new product launches between 2008 and May 2013. Asia-Pacific (23%) and the Middle East/Africa (8%) regions are becoming increasingly influential because of growing demand and the openness of their consumers to new flavors (Hawkins & Chen, 2014; KPMG, 2014). Factors such as increasing demand for cocoa in emerging Asian markets, constraints in cocoa production and demands for sustainability and transparency are driving investments globally. Table 2 below summarizes these trends based on four main categories that we identified and explored in both supply and demand countries.

Table 2 Global cocoa industry trends

Trend	Description
Market shift in processing and demand	In cocoa processing origin grindings is rising by about 7% increasing the world's share of cocoa producing countries by approximately 45%. Winners in this shift include Côte d'Ivoire, Ghana and Indonesia. Demand for chocolate confectionary is rapidly growing in countries such as India, China and Russia.
Workforce is shrinking	The average age for cocoa farmer is over 50 years old and younger generations do not want to be in cocoa. Workers in agriculture production are poorly trained and low paid. Corporate investments in training and distribution networks for fertilizer and seedlings are crucial in helping farmers become more prosperous and in safeguarding manufacturers' reputations.
Supply deficit	Ageing orchards, plant disease, climate, political unrest and growing demand could outstrip supply by more than 1m metric tons by 2020.
Growing investment by lead firms	Enhancing brand value, regulatory scrutiny and boosting productivity is driving multinational firms to invest in sustainability to mitigate supply chain risks.
Digital revolution	Big data is transforming cocoa production. Companies are using real time data analysis to provide farmers with information that will raise productivity. Gathering data about farmers, farming techniques and production to improve credit and gather cocoa genome information. A bean- to-bar tracking system to help farmers taste chocolate made from their beans and adjust their processes to ensure their harvest meets buyers' needs.
Increase in certification	The market share and total production of certified cocoa doubled from 3% in 2009 to a little more than 6% in 2010. Private sector actors are establishing strategic partnerships with other players in the value chain in an effort to certify production and secure their supply.
Government role is crucial	Mounting pressure on governments in producing countries to improve transparency, regulation and taxation schemes to improve farmer's livelihoods, increase sustainability, certification, and develop higher value cocoa production. European countries implementing sustainable cocoa such as multi-stakeholder forum in the Netherlands, which started in 2010, is still working towards 100% sustainable cocoa consumption in the country by 2025.

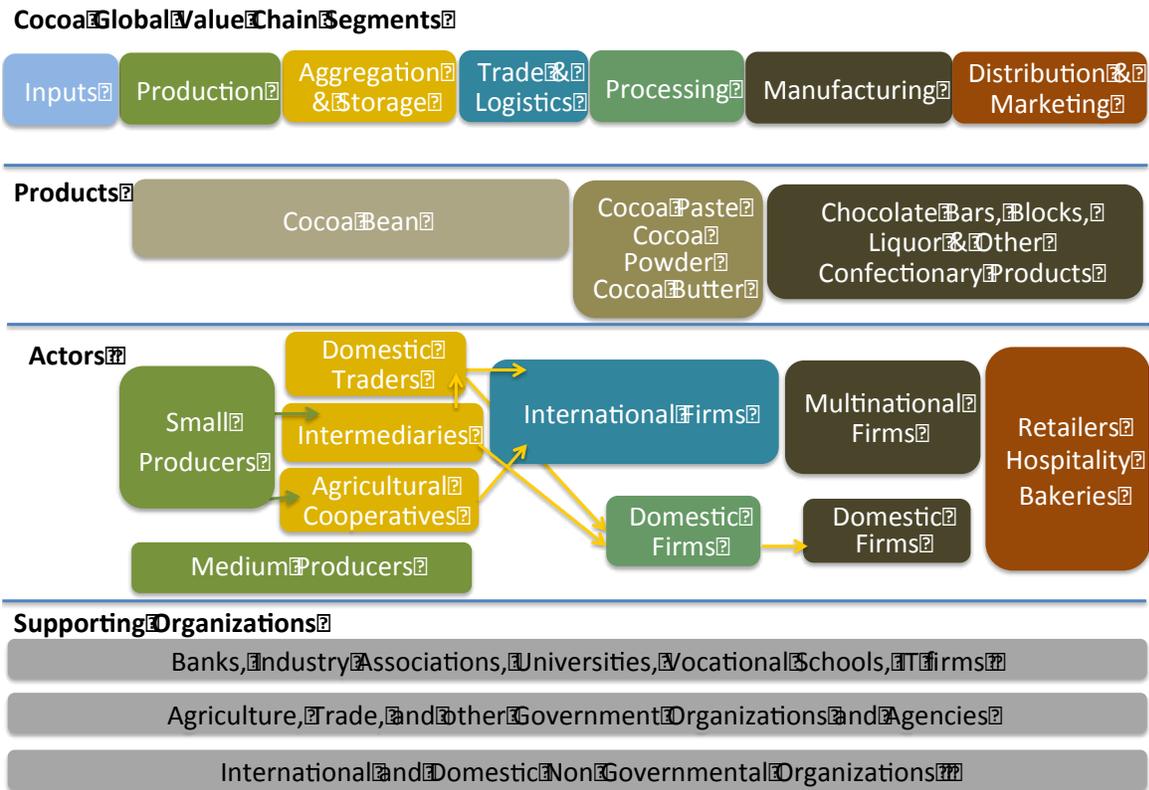
Source: Authors based on data from (Fountain & Hütz-Adams, 2015; Hawkins & Chen, 2014; International Cocoa Organization, 2014; KPMG, 2014; World Cocoa Foundation, 2014)

4.2 The cocoa global value chain

The global cocoa value chain is long, complex and concentrated. Figure 2 below outlines the primary segments in the chain and illustrates product categories and actors and the supporting organizations involved in the chain. The production segments in the chain are concentrated in Ivory Coast, Ghana, Indonesia, Nigeria, Cameroon, Ecuador and Brazil accounting for 88 percent of world production (International Cocoa Organization, 2014). Demand and cocoa processing, manufacturing and marketing is concentrated in Europe and North America by a handful of multinational players. Europe is the largest cocoa processor and consumer of chocolate.

This is a buyer driven chain with brands and factors such as consumer preferences, development of new flavors and seasonal variations influencing the market. Government intervention in the chain is common. For example, the Ghanaian government regularly uses policy interventions including export taxes, licensing arrangements and input subsidies to try to protect the industry and raise revenues. In addition, there are a number of leading organizations that partner with farmers and other value chain actors to monitor performance, sustainability and publish data on the sector. For example, the International Cocoa Organization (ICCO) is one of the leading data sources on the sector and is composed of both cocoa producing and cocoa consuming member countries. The organization publishes industry statistical information to improve transparency and provides training.

Figure 2 Cocoa Global Value Chain



Source: Authors

Inputs in the chain are low in technology and underdeveloped. Infrastructure deficit, limited access to finance, lack of farmer skills and overuse of fertilizers is a constraint in producing countries.

Production: Approximately 90 percent of world cocoa is produced on small family farms, with an estimated 20 million smallholders and rural workers depending directly on cocoa for their livelihood according to the 2012 Cocoa Barometer report. The growing and harvesting of cocoa pods, and the extraction, fermentation and drying of cocoa beans occur on or near the farm (Kaplinsky, 2004).

Aggregation and storage: Small farmers sell their crop to an aggregator or an intermediary in return for cash. These intermediaries sell the crop to a trader who works with exporting firms. Farmers often do not have direct market access due to poor infrastructure. Traders transport the beans to the ports where the cocoa is stored until shipped to the major processing ports, where the cocoa is cleaned, and warehoused in hubs in Europe and North America (Fountain & Hütz-Adams, 2015). Cocoa beans can be stored for around six months, and it is here that global trade often begins (Kaplinsky, 2004).

Trade and logistics: Multinational firms in Table 3 are lead players in commodity markets and are in the processing segments of the chain. These firms are large multinationals that have considerable experience in commodity markets and logistics. They might maintain stocks of ready inventory to assure “on- time” delivery to customers, and adopt vendor managed inventory supply models.

Processing: Roasting, grinding and pressing of cocoa beans are then roasted before being converted into cocoa butter or cocoa powder. Roasting and grinding is geographically concentrated in the three largest grinders in the Netherlands, the US and the Ivory Coast. Over the past decade significant capacity has been brought on stream in Asia and Africa. There is also significant consolidation in the grinding industry at the

corporate level. For example, the number of grinders in Europe fell from around 40 in the early 1990s to nine by 2000 (Kaplinsky, 2004). Barry Callebaut, ADM and Cargill control around 50%-60% of global grinding capacity in this segment of the chain (Hawkins & Chen, 2014). Table 3 below provides an overview of lead players in the processing segment of the chain their activities and collaborations with producers.

Table 3 Lead firms in cocoa trading and processing

Trading Firm	Type	Headquarter	Tonnage in 2013/2014	Activities
Barry Callebaut AG	Public	Switzerland	1,000,000	Trades and processes cocoa beans. Manufactures chocolate, chocolate fillings, decorations, and compounds. Has a sustainability team that includes trainers, ecologists, agronomists, geographers, controllers, and auditors to work with farmers and certify them. In Côte d'Ivoire and Cameroon, the team works with 90 cooperatives, representing 40,000 cocoa farmers, to implement cocoa sustainability programs. Partners with international organizations to improve sustainability of production.
ADM	Public	U.S.A.	500,000	Commodity trader and processor. Originates from South and Central America, to West Africa and Asia. Partners with producers to increase certifications such as Rainforest Alliance or UTZ.
Cargill	Private	USA	500,00	Has an extensive presence in cocoa growing countries. Works closely with farmer cooperatives to improve quality of beans and buys beans directly on the local market. Collaborates with organizations to train producers on sustainability.
Olam	Public	Singapore	450,000	Leading exporter of cocoa beans from Africa especially Côte d'Ivoire, Ghana, Nigeria, Cameroon, Togo, Tanzania and Uganda. Also has sourcing operations in Asia with annual procurement in excess of 100,000 tons, mainly from Indonesia and Papua New Guinea. Works with producers to improve production and certification.
Ecom Agroindustrial Corp. Ltd	Private	Switzerland	430,000	Purchases directly from farmers and processes products for export. Is in more than 30 countries. Trains farmers to attain certification (e.g. UTZ and Rainforest Alliance). Provides growers with information—from better farming practices to market data to innovations to improve output.
Touton	Private	France	275,000	Is present in Ivory Coast, Ghana, Nigeria and Cameroon. Created strategic partnerships with manufacturers operating at the origin to make cocoa liquor, cocoa butter, cocoa powder, cocoa cake for European markets, America and Asia. Established traceability and certification programs for cocoa in Ghana and Ivory Coast.
Blommer Chocolate Company	Private	USA	200,000	Supplying the confectionery, baking, dairy, pharmaceutical and cosmetic industries. Is playing an active role in the World Cocoa Foundation and promoting sustainable farming practices through its privately managed programs in Cote d'Ivoire, Indonesia and Ecuador.
Continaf B.V.	Subsidiary of Amtrada B.V.	Netherlands	150,000	The company provides pre-financing of farmers, procurement and drying of the beans, exporting and trading on the international market. Offers logistic, supply chain and risk management services.

Source: Authors based on data from Cocoa Barometer 2015 and company websites.

Manufacturing and branding: Cocoa liquor is fed into hydraulic presses to make cocoa butter and cocoa cakes. The cocoa cake can be sold into the generic cocoa cake market, or ground into a fine powder. The liquor is mixed with cocoa butter, sugar, and sometimes milk to make chocolate block molds for sale to confectioners, dairies, or bakers (World Cocoa Foundation, 2014). Approximately 53 percent of processed cocoa goes into chocolate confectionary and about 45 percent into food ingredients. Sugar and milk are important inputs in this part of the chain.

Cocoa confectionary manufacturing is also highly concentrated. The six largest chocolate manufacturers are estimated to constitute around 60-7 percent of the world market (Kaplinsky, 2004). Lead players in this segment include Mars, Mondelez, Nestlé, Ferrero Group, and Lindt & Sprüngli. Table 4 below provides a summary of the lead players in cocoa confectionary brands.

Table 4 Lead cocoa confectionary brand manufacturers

Confectionary Brand Company	Type	Headquarter	Net Confectionary Sales 2013 (millions USD)
Mars Inc.	Private	USA	17,640
Mondelez	Public	USA	14,862
Nestlé	Public	USA	11,760
Ferrero Group	Private	Italy	10,900
Meiji Holdings Co Ltd	Public	Japan	9,838
Hershey	Public	USA	7,043
Arcor	Private	Argentina	3,700
Lindt & Sprüngli	Private	Switzerland	3,286
Ezaki Glico Co Ltd	Private	Japan	3,018
Yildiz Holdings / Ulker Biskuvi Sanayi AS	Public	Turkey	1,320

Source: Hawkins & Chen, 2014

4.3 Certification and standards in the chain

The general standards criteria for high quality cocoa beans are fine flavor notes, large bean size, high fat content, proper fermentation and adequate drying. Consistent batches of cocoa beans must contain a low percentage of diseased, mold, germinated, adulterated, broken, flat, clumped and smoky beans with little waste material, such as placenta fragments and stones (ICCO 2009; CAOBISCO 2002). The standards applied at the fine-flavor market are much more stringent than the standards utilized at the market for bulk cocoa (Saxbøl, 2014).

There are three major private standards in cocoa that buyers are using– UTZ Certified (Fountain & Hütz-Adams), Rainforest Alliance/SAN (RA), and Fairtrade International (FT). These are voluntary standards that focus on labor practices, sustainability, training, and traceability. Certification process among the three bodies is similar but differ in their specific focus and requirements. Differences in requirements have a direct impact on the costs and benefits at farm level which influences their attractiveness for actors in the value chain (KPMG, 2012). Certified chocolate is typically regarded as a premium and fetches a higher price than standard chocolate (Hawkins & Chen, 2014). Table 5 below provides an overview of the cocoa certification schemes and Box 1 gives an example of corporate stewardship towards 100% sustainable cocoa.

Table 5 Cocoa standards

Certification	Description	Volume certified cocoa in tons	
		2011	2013
Fair Trade	Promote better trading conditions and empower producers. Focus on a wide range of commodities and gold.	46	60
Rain Forest Alliance	Biodiversity conservation and sustainable livelihoods of farmers. Focus on increasing productivity and covers tropical commodities and tourism.	65	279
UTZ Certified	Professionalize agricultural practices and operational management. Focus on increasing productivity. Covers coffee, tea and cocoa.	43	279

Source: Authors based on data from (Fountain & Hütz-Adams, 2015; KPMG, 2012)

Box 1 Hershey targeting 100% sustainable cocoa

Some of the cocoa confectionary manufacturers/brand owners have committed to only use sustainable cocoa certified by independent third party agencies in their businesses. For example, Hershey announced that it would use 100% sustainable cocoa, 3rd party certified by 2020. On its website Hershey lists the standards and practices that it is most concerned to have independently audited in the following order: 1) Established standards of labor; and 2) Environmental and sustainable farming practices.

Hershey noted that at end 2012 only some 5% of the global production of cocoa beans was certified. This presents an opportunity for the agro-industrial producers to address. Hershey is aiming for certified cocoa to form 10% of its purchases by end 2013, 40%-50% by end 2016, and 100% by end 2020.

Source: (Hershey, 2015)

4.4 Upgrading in the cocoa global value chain

Upgrading in the cocoa global value chain is quite complex primarily due to the length and concentration in the chain. Nevertheless by implementing the right mix of policies, coordination of chain actors and leveraging emerging challenges in the chain, upgrading can occur. For example, Indonesia was able to move from cocoa raw bean production and trade to processing by developing its bean crushing capacity and raising taxes on cocoa raw bean exports. Upgrading in the chocolate confectionary is concentrated in Europe and North America. However, countries such as Turkey and Brazil are growing in this segment. Countries such as Ecuador has a number of quality niche market chocolatiers that emerged, that has a small market share but can potentially grow.

4.5 Ecuador in the Fine Cocoa Global Value Chain

4.5.1 Overview of Ecuadorian cocoa and trade

Ecuador produces two main varieties of cocoa: 'National' or 'Arriba' and the *Colección Castro Naranjal* (CCN-51) Forastero clone². The country is the largest producer of "fine or aromatic" cocoa accounting for about 60 percent of global exports of this specialty type (Hernández, Jorge Mario Martínez-Piva, & Mulder, 2014). Fine cocoa is used for making high quality chocolate products, and has a floral scent, which affects the final product. The ICCO reduced Ecuador's cocoa rating from 100 percent to 75 percent fine aroma because of mixing the traditional variety National with CCN51 (Kooij, 2013). The use of CCN51 is controversial in fear of displacing rich and flavorful traditional varieties (Josephs, 2014).

² Arriba Superior Época (ASE) accounts for 37 percent of production followed by Colección Castro Naranjal (CCN-51) with 36% (Vega & Beillard, 2015).

In 2014, Ecuador produced about 240,000 tons of cocoa (Bain & Company, 2015). Approximately 88 percent of raw cocoa production goes to the export market and only 12 percent is processed.³ Aromatic cocoa is 75 percent of total Ecuador's exports (Amores et al., 2007). Just 5,000 tons (2%) of cocoa go into Chocolate and food production and only 1 percent of the chocolate goes into exports (Bain & Company, 2015).

The cocoa segment is one of the high priority agriculture chains for Ecuador to develop. Ecuador is investing over 80 million USD in the next 10 years to develop the sector (Cepeda et al., 2013). The government expects exports to reach 300,000 tons by 2016 that will make it the fourth-largest cocoa grower in the world. Brazil has a growing cocoa processing industry and is Ecuador's primary competitor in the western hemisphere (Vega & Beillard, 2015)⁴. The United States is the largest importer of Ecuadorian cocoa (42 %) followed by the European Union (27 %) and Mexico (11%). In 2014, Ecuador exported to the United States a record 236 million USD in cocoa beans and 20.5 million USD in cocoa paste and butter (Vega & Beillard, 2015).

Ecuador imports around 40 million USD in finished cocoa annually. Almost 80 percent of these imports come from Brazil, Chile, Colombia, and Peru with which Ecuador maintains preferential market access agreements. Approximately 10 percent of its cocoa product imports originate in the EU and nine percent from the United States (Vega & Beillard, 2015)

4.5.2 Ecuador participation in the chain

The production segment of the chain is fragmented and concentrated with small and medium size farms that are also mostly underdeveloped. Ecuador improved its production, increased its global exports and is aiming to become the fourth largest exporter by 2016. However, most of its activities continue to be in the lower value segments of the chain in the production and exports of raw cocoa beans. Its grinding capacity is small compared to its competitors who managed to attract investments by multinationals through tax incentives and other schemes. Ecuador is exporting some intermediary cocoa products and finished products but this is a very small segment in its exports compared to trade in raw cocoa bean. Figure 3 below illustrates Ecuador's position in the cocoa global value chain compared to lead players in the chain segments.

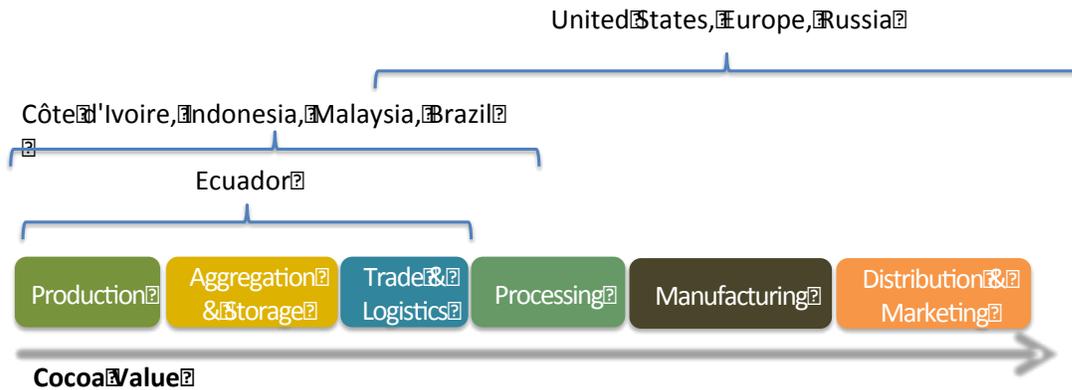
Industrial organization in the chain

The ministry of agriculture, livestock, aquaculture and fisheries (MAGAP) facilitates, regulates and manages agricultural production in Ecuador. Industrialization and export promotion is managed by the ministry of industry and productivity, ministry of foreign relations commerce, and ProEcuador. The National Institution of Standards (INEN) controls the quality of cocoa beans. There are a number of associations that are promoting the development of cocoa including the National Association of Cocoa Exporters (ANECACAO) is the largest association that represents exporters. It provides a range of services including industry data, technical assistance, marketing of Ecuadorian cocoa, and provides policy advice. Other lead actors in the chain are discussed below.

³ Ecuador is a supplier of fine cocoa. Fine cocoa is only 5 -7 percent of the cocoa global market.

⁴ Brazilian cocoa bean production reached about 210, 000 tons in 2013/2014 and grindings estimated at 245,000 tons (International Cocoa Organization, 2014).

Figure 3 Ecuador's position in the cocoa global value chain



Source: Authors

Production

Cocoa is grown on 11 to 50 hectare farms (middle-sized farms) employing hired labor and smallholders with about 2 hectare farms in the mountains and 10 hectares at the coast (Cepeda et al., 2013). Small farmers account for about 90 percent of Ecuador’s cocoa bean production. The majority of these farmers employ undeveloped, traditional production methods. The inability to access modern fertilizers, as well as crop protection products (i.e., insecticides and fungicides), often limits production output (Vega & Beillard, 2015).

Aggregators

Harvesters and collectors, many from small villages and work on individual plots of land, sell cocoa beans to local middlemen (Eduardo, 2012)The local middlemen move an average of 72,000 MT of cocoa annually. The 2008 census estimates that there are 361 middlemen and aggregators in country with 89 percent of them operating within 4 regions (Manabi, Los Rios, Guayas, and Esmeraldas). They range in size from local middlemen to large national level ones with over USD one million operations. After sourcing from various producers, middlemen then sell to aggregators or exporters. Major aggregators are listed in Table 6 below.

Table 6 Aggregators in Ecuador's cocoa

Aggregating Firm	Location	Number of Employees	Sales (million USD)
Agrobanda	Los Rios	50	8
Agroxven	Los Rios	16	8
Comercial Autocay de Esmeraldas	Esmeraldas	25	8
Comercial Cia. Ltda.	Pichincha	14	4.7
Expocafe	Pichincha	11	4.7

Source: Eduardo, 2012

None of the leading aggregators produce their own cocoa, instead they buy from producers, local middlemen and in some cases from associations of producers.

Domestic exporters often receive cocoa directly from local aggregators (65 % of exports), cocoa producers (20 % of exports) vertical operations (23 % of exports) or producer associations (3%). Most exporters are located Guayas. Approximately 10 percent of exports are completed through organizations such as UNOCACE, APROCANE, FORTALEZA DEL VALLE, which process the cocoa and ensure requirements for exports are met. They work with brokers as well as directly with importers. The largest buyers of Ecuadorian

cocoa are Blommer Chocolate, ADM, General Cocoa Company, Walter Matter S.A., Transmar Commodity Group, Albercht & Dill, Agroindustrias Unidas de Cacao S.A. de CV, and Barry Callebaut (Cepeda et al., 2013).

Processing

Processors use 95 percent of cocoa that is sourced from aggregators and 5 percent directly from producers, associations, or operations owned by processors. According to the latest census (2008) there are 11 large processors located across the country, principally in Guayas. Global processors include La universal, S.A., Nestle del Ecuador S.A., Indexa, Confiteca, Ecuacocoa, Triari S.A. y Navolli S.A., Ecuatoriana de Chocolates (Eduardo, 2012; Kooij, 2013).

Table 7 Lead chocolate brands in Ecuador

Brand Name	Location of production	Types
Chchukululu	Tulicorp	55% cocoa, 75% cocoa
Caoni	Manabi, Esmeraldas, Los Rios	
Pacari (award winning)	Quito	60% cocoa 65% cocoa 72 cocoa
Cocoayere	Pichincha, Amazonia, Bolivar, Esmeraldas	
<i>República del Cacao</i>	Los Rios y Manabi, El Oro	
Alteza	Part of Ecuacocoa	

Source: Eduardo, 2012; Kooij, 2013

Manufacturing and branding

Major cocoa products exported from the country include dark chocolate (33.5% of total), confectioneries (25.2%), other products (29.7%) and white chocolates. Major chocolate makers in the country include Nestle Ecuador, with 160 workers and the main exporter of cocoa butter, liquors, cocoa powder and chocolates. Transmar Ecuador, Ecuacoffe, Ecuacocoa y Triari S.A., Chocolates Noboa, and Ferrero *del Ecuador* all have a large presence in country. Nestle is the largest chocolate producer. Many companies mix the flavorful Ecuadorian beans with less expensive types of cocoa, which might change soon as demand for fine chocolate grows (Anywhere Ecuador, 2015). Recently, Nestle spent 16 million USD on a line of fine chocolate made with high-quality Ecuadorian cocoa (Nestle, 2015). Major Ecuadorian brand names are in the Table 7 below. These firms are small batch chocolatiers that produce high quality chocolate for high-end retailers.

4.5.3 Policies that target upgrading in cocoa

The state plays a key role in institutionalizing and fostering coordination between chain actors. The *Consejo Consultivo de la Cadena Agroindustrial Cacao y Elaborados*, was formed to define, recover, and protect the special position of Ecuadorian cocoa in the world market. In 2005, the government passed a decree that defines that specialty coffee (*'Arriba'*) has to be marketed separately forms the new CCN51. Some of the government initiatives that directly targets improvements in cocoa are summarized in Table 8 below.

Table 8 The Ecuadorian government initiatives in the cocoa sector

Initiative	Description	Policy Gap
National Cocoa Plan	<ul style="list-style-type: none"> To establish links with organizations working towards the commercialization in cocoa such as: INIAP (Investigation), MAGAP (Production), MIPRO (Industrialization), IEPI (Denomination of Origin) and MRECI-PROEcuador (Promotion of exports and commercial protection) 	<ul style="list-style-type: none"> Transparency and communication of standards Training in the chain Collaboration with private sector Incentives that promote upgrading Incentives that promote start ups Financing
National Program of Fine Aroma Cacao	<ul style="list-style-type: none"> To position Ecuador as the leading producer and exporter "Cocoa Arriba" Increase sustainable production, productivity and export of 'Arriba' cocoa Develop and implement efficient quality processes in the value chain. Promote national industrialization and "Cocoa Arriba", and promote domestic consumption. Increase international market share and diversification 	
Cocoa Law	<ul style="list-style-type: none"> Linked to the establishment of the National Committee on Fine Flavor Cocoa Responsible for setting up governance for "Cocoa Arriba" 	
Abidjan Cocoa Declaration	<ul style="list-style-type: none"> Ecuador signed the declaration to improve sustainable cocoa economy 	
Geographical Indication (PGI) Status for 'Cacao Arriba'	<ul style="list-style-type: none"> Applied to the EU commission Part of negotiations to add Ecuador to an existing trade agreement between European Union member states and Colombia and Peru 	

Source: Authors based on Cepeda et al., 2013; Kooij, 2013

4.5.4 Upgrading in the Ecuadorian value chain

Ecuador is the largest global player in fine cocoa exports. Almost 88 percent of its exports are cocoa beans which indicates that country's upgrading into higher value segments in cocoa crushing is small. Chocolate confectionary is even smaller at 2 percent with only half of production going to export markets which implies that upgrading in niche markets chocolate that uses fine cocoa is underdeveloped and limited to a handful of players such as Pacari.

Table 9 provides a summary of Ecuador's cocoa upgrading and constraints and Box 2 provides an example of product upgrading into the chocolate confectionary in Ecuador.

Box 2 República del Cacao of Ecuador

Small artisanal chocolate producers like República del Cacao of Ecuador are following in the footsteps of well-known fair trade chocolatiers such as the UK's Green & Black's, which was recently acquired by Kraft Foods. Unfortunately, the amalgamation of formerly small companies into global agribusiness corporations raises questions about the continued social and ecological viability of their products. For those who desire a truly authentic and responsibly sourced chocolate experience, República del Cacao produces single-origin chocolate sourced from small, family owned farms in a few Ecuadorian provinces. Each bar of República del Cacao chocolate is produced from cocoa beans grown on a single hacienda, and has the GPS coordinates of the hacienda printed on the label. This transparency allows consumers to experience their chocolate from bean to bar, and ensures good relationships with the farmers who make the chocolate possible.

República del Cacao has already opened six of its own stores in locations throughout Ecuador, including Quito and the Galapagos Islands. It has plans to expand its retail outlets to neighboring Peru and Chile. República del Cacao chocolate is also available internationally at high-end supermarkets such as Food Emporium in New York City. The company is currently in negotiations with the Whole Foods supermarket chain. Its next step will be to open its own stores in the United States and Europe. The company's annual sales are growing at a rate of 50 percent, and are expected to reach \$40 million within the next five years. República del Cacao is among the first Ecuadorian chocolate brands to sell its product internationally.

Source: Schipani, 2013

Table 9 Ecuador cocoa upgrading and constraints

Trajectory	Description	Impact	Constraint
Functional Upgrading	<ul style="list-style-type: none"> Grinding cocoa bean into semi-finished products and export cocoa liquor, butter, and powder instead of raw beans Market linkages to tourism Retail 	<ul style="list-style-type: none"> Only about 12% of cocoa is processed Most cocoa is exported as raw Underdeveloped end market opportunities 	<ul style="list-style-type: none"> Low investments in R& and market development High capital investment Low collaboration from multinationals Uncertainty in policy environment Low private sector development and high firm exit Limited access to finance Low human capital and innovation development
Product Upgrading	<ul style="list-style-type: none"> Developing semi-finished cocoa products Chocolate, other confectionary and cocoa product Products in hot drinks, health and specialty markets 	<ul style="list-style-type: none"> Only 2% of cocoa Emerging small artisanal chocolate makers Underdeveloped new product opportunities 	
Process Upgrading	<ul style="list-style-type: none"> Improving cocoa production and quality Linking farmer organizations and linking small farmers and buyer companies in development projects Defining and certifying “cocoa Arriba” 	<ul style="list-style-type: none"> Certified farmers Linked farmers directly to buyers Farmers capturing higher prices and improving cocoa production 	<ul style="list-style-type: none"> Limited to the handful of projects Irrigation practices and other inputs are in need of improvement Extension services and training are limited Mixing of "Cocoa Arriba" with “CCN51” is very common Estimates of CCN51 cultivation is at about 50% of cocoa Younger farmers are not entering cocoa Access to finance and infrastructure is problematic Technology is low Poor farm Management

Source: Authors

4.5.5 Bottlenecks in Ecuadorian cocoa GVC

Transparency and quality problems are among the top constraints in the production segments. Traders use this information vacuum to give farmers lower prices for reasons by asserting lower weights for cocoa sacks, and claiming high moisture content and extraneous matter which are often higher than they are (Cepeda et al., 2013). An overview of strengths and weaknesses in the Ecuadorian cocoa is provided in

Table 10.

Weak institutions are constraining the incentives to invest in high quality cocoa. The lack of understanding and standards in cocoa grades and standards and monitoring of those grades and standards. The differentiated world market for cocoa (high quality vs. commodity), is not reflected in INEN standards. Participation in sustainability certifications is quite low but some buyers are working to improve cocoa quality by training and certifying producers (see Box 3).

Box 3 Sustainability certification in Ecuador

In 2012 there were 10 Fairtrade (Florida Museum of Natural History) certified producer organizations in Ecuadorian cocoa (four are traders and six are producer organizations), and 3 World Fair Trade Organization (WFTO) certified cocoa organizations, plus 1 Ecocert certified cocoa organization and three RA certified and 7 RA verified cocoa organizations. There were also two Utz certified cocoa organizations and various organic standards – with BCS (BCS ÖKO-GARANTIE GMBH) being the most common. In Ecuador, there are two UTZ CERTIFIED cocoa certificates with Nestlé Ecuador.

Source: Cepeda et al., 2013

Table 10 SWOT Analysis of Ecuadorian Cocoa

Strengths	Opportunities
<ul style="list-style-type: none"> • Unique product at the global level (fine aromatic cocoa), recognized by the industry • Cocoa associated with a history, culture and biodiversity • Good examples of direct associative commercialization to specialty markets 	<ul style="list-style-type: none"> • Growing demand in the chocolate industry (both for the common product as well as for fine aromatic cocoa) • Fast-growing niche markets (for example organic, origin, fair trade) • Feasibility of further differentiating the cocoa product through certifications and its productive, cultural and environmental qualities
Weaknesses	Threats
<ul style="list-style-type: none"> • Insufficient orientation toward product quality (lack of certifications, problems with mixing varieties, non-uniform, post-harvest handling and treatment) • Low productivity on plantations • Mistrust and/or bad commercialization experiences (contractual insecurity, inadequate regulatory framework) • Weak and insufficient associations and collaborations • Lack of finance across the chain • Insufficient services 	<ul style="list-style-type: none"> • Competitor countries could replace the supply that Ecuador cannot develop. • The mix of cocoa varieties could result in penalties for the country

Source: Lehman & Springer-Heinze, 2014.

5 Mahi-Mahi Global Value Chain

5.1 Overview of global industry and trends

An estimated 15 percent of animal protein consumed globally comes from seafood (FAO, 2009, 2011) and demand is increasing. By 2025 a 500 percent increase in seafood stocks is necessary to meet projected global demand (FAO, 2009; U.S. Department of Agriculture, 2008). While the bulk of this increase will come from aquaculture, or pond raised fisheries, an increase in sustainable and efficient use of wild caught stocks is also necessary. Approximately 40 percent of all seafood is traded globally (Wilkinson, 2006) with 50 percent of seafood products coming from aquaculture while the remaining is commercial fishing also referred to as wild caught (FAO, 2009; U.S. Department of Agriculture, 2008). The high volume of commercial fishing often raises concerns about sustainability. Current estimates project that 32 percent of global fishing stocks are overexploited or need to be rebuilt to ensure sustainability (FAO, 2011).

Figure 4 Mahi mahi fishing range



Source: Florida Museum of Natural History

Mahi mahi (*Coryphaena hippurus*), a wild caught fish, is growing in popularity outpacing many traditional fish exports from Ecuador including shrimp and tuna. Between 2002 and 2012 exports of frozen mahi mahi to the United States increased 432 percent and Ecuador became the US’s leading trade partner in fresh mahi mahi with 42.1 percent of the market share (Anhalzer & Nanninga, 2014). Water temperature requirements limits the areas of fishing to tropical and temperate zones (Figure 4) and the migratory nature of the species restricts fishing seasons. In Ecuador, mahi mahi is caught primarily from November to April when the species is most abundant (Abo-Tubikh, 2014). The remainder of the year, stocks are higher in the Asian Pacific, namely Taiwan. While regional fishing requirements are needed to prevent overfishing, and official stock taking is difficult, studies indicate that the species is more adapt to high levels of harvesting than other seafood species due to the speed they reach maturity and rapid growth rate (Whoriskey, Arauz, & Baum, 2011). The species is especially abundant in the tropic pacific, including the coast of Ecuador (FAO, 2013). Table 11 below summarizes these trends based on six main categories that we identified and explored in both supply and demand countries.

Table 11 Global mahi mahi trends

Trend	Description
Market growth in demand	Increased seafood consumption means higher demand across the globe and pressures on many stocks. While mahi mahi is not considered an overfished species, sustainable practices are important to avoid future shortages. Demand for mahi mahi is growing , Since 1950 global mahi mahi landings increased by 746 % (Woriskey et al. 2011) with major markets including the United States, Japan, and Taiwan. Growth in fresh and frozen mahi mahi is reported.
Fragmented Workforce	The majority of mahi mahi fishing is artisanal . Consequently fishing is fragmented compared to other industries with higher degrees of coordination, making implementation of innovations more difficult.
Unknown stocks	Unavailable stock information and sparse landing data makes monitoring difficult. However, experts agree that mahi mahi is not overstressed and the fast maturation rate will help keep supplies high.
Infrastructure issues	Infrastructure challenges hinder many artisanal producers from accessing markets. As a result, many depend on aggregators to help them access processors and exporters.
Increase in certification	Increasing concerns regarding sustainability as well as consumer demand to know where food is coming from is driving the requirement of certification in order to reach end market.
Regional cooperation is crucial	Migratory patterns across national borders mean that regional strategies of conservation are necessary to avoid over fishing.

Source: Authors

5.2 The mahi mahi global value chain

Figure 5 shows the GVC map for mahi mahi and the various products and actors involved along the chain. Similar to other agriculture products, mahi mahi has several health and safety regulations and packaging is a major area of importance and in need of further development to increase the competitiveness of the industry. However, unlike many additional products, mahi mahi, and seafood in general, require lower levels of processing and manufactured products are currently limited.

The value chain is buyer driven chain with retailers, such as Walmart, dictating the organization of the industry, specifically around certifications for sustainability and safety. Many retailers and restaurant chains, which serve as the gatekeepers to consumers, have mandated that all of their products must meet certain safety and environmental standards that then shapes how fisheries operate.

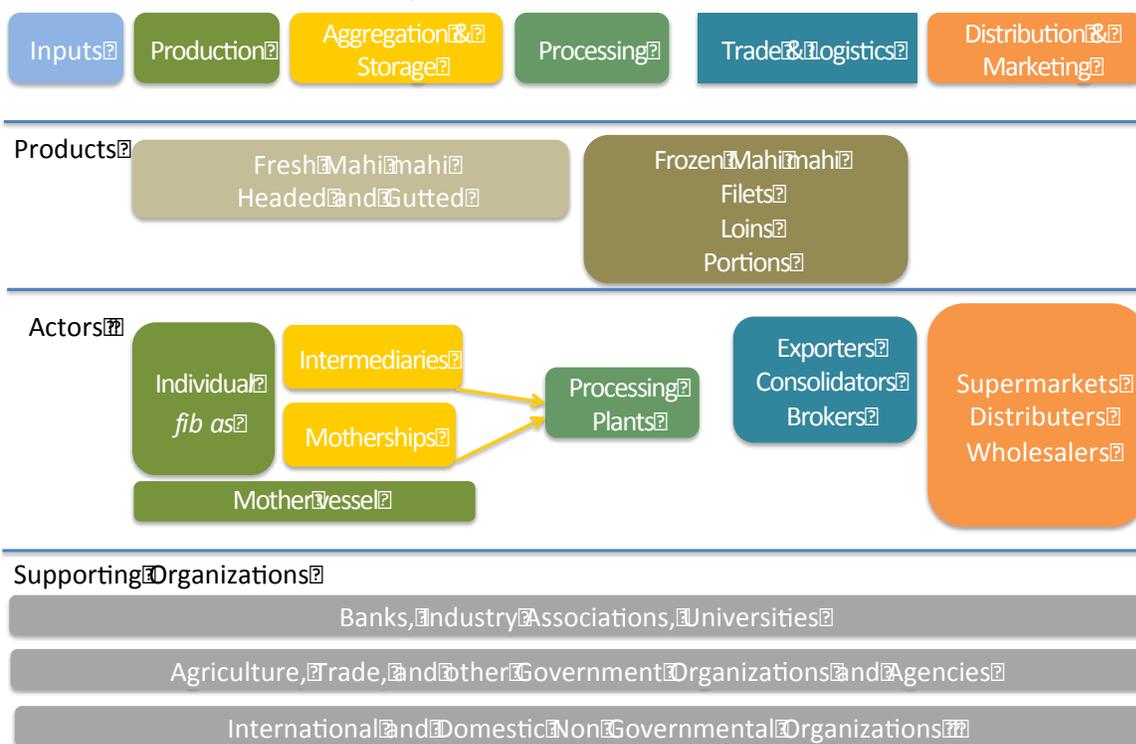
5.3 Certifications and standards in the value chain

The Marine Stewardship Council (MSC) Certification is a primer sustainability certification in seafood. Emerging from a partnership between Unilever and the World Wildlife Fund, the MSC is charged with setting and monitoring sustainability standards in seafood. Fisheries granted the label are able to demonstrate they have met minimum requirements in sustainability and traceability. This is achieved

through demonstrations of data collection and a system of landings monitoring, sustainable fishing practices and use of equipment that is minimally disruptive to endangered species, such as sea turtles. Additionally, the Traceable Chain of Custody, a feature of MSC certification, allows for traceability of stocks along the value chain letting the end consumer know fish originated from sustainable fisheries. Certification, while voluntary, is increasingly seen as a requirement to access markets. As many lead firms, such as Wal-Mart, adopt MSC certification as a requirement for supplier it is increasingly seen as necessary to remain competitive.

The lack of coordination among artisanal fishermen in many countries including Ecuador and the considerable costs involved in receiving MSC certification presents challenges to the mahi mahi industry. Further, certifications are often harder to adopt in developing nations where governments have limited capacity to enforce regulation or support the management of the fishing industry (Ponte, 2008). Support by NGOs, as well as development of the public sector and funding mechanism is necessary for successful MSC certification.

Figure 5 Ecuador’s Mahi mahi Value Chain



Source: Authors (adopted from Anhalzar and Nanninga 2014)

5.4 Ecuador’s mahi mahi value chain characteristics

Seafood is the second most valuable export industries for Ecuador behind oil, with profits of 2.9 billion USD in 2012 (FAO 2013). While the market is traditionally associated with shrimp and tuna, growth in mahi mahi, or *dorado* fish, exports and strong trade relationships with major importers, such as the United States indicate the subsector has great opportunity for further growth and increased competitiveness. Furthermore, unlike the more industrial shrimp and tuna industry,⁵ mahi mahi is an important catch for

⁵ Mahi mahi was chosen instead of other markets such as tuna and shrimp because of the growing demand in North America and Europe as well as the potential for sustainable fisheries management programs that allow Ecuador to grow in both scale and quality.

artisanal fishers, who account for 8 to 19 percent of all Ecuadorian seafood landings (Anhalzar and Nanninga 2014). As a result, focus on mahi-mahi creates opportunities for wealth generation among micro and small operations as well as larger, industrial firms. Finally, the migratory nature of the species reduces price competition from South Asia.

Inputs: Fishing inputs are minimal compared to other industries with a fishing vessel, ice, and fishing equipment being the primary requirements. These can be obtained by artisanal fishers from a variety of sources and also in some cases provided by buyers and motherships in exchange for the catches.

Production: Catching and harvesting in the mahi value chain is divided into two types of fishers: individual *fibras*⁶ and mothership; Artisanal fishers work on the 1,500 fishing *fibras* in the country and total employment exceeds over 55,000 people (FAO 2013). Over 65 percent of landing for mahi mahi is from artisanal fishers (Martinez-Ortiz & Guerrero-Verduga, 2013). *Fibras* primarily work close to shore venturing no further than 80 miles off the coast. Unlike small *fibras*, motherships are larger vessels capable of pulling up to ten *fibras* into further offshore, as far as 400 miles off the coast⁷. They are owned by processing firms or local owners, who can have fleets of up to three motherships. The ships provide fishers with inputs and food as well as pull the smaller *fibras* out to sea for longer excursions, up to three weeks (Anhalzar and Nanninga 2014). Motherships were not introduced until the 1990s and have increased catch volume. Artisanal fishers are organized under the Federation of Fishing Cooperatives of Ecuador (FENACOPEC) though many fishers are not active in the association (Anhalzar and Nanninga 2014).

To help grow the seafood industry, including mahi mahi, the government has implemented several subsidies to help minimize the cost of production. Subsidies vary from those geared almost exclusively to artisanal fishers helping to overcome key bottlenecks such as infrastructure deficits and covering the cost of inputs. Remaining subsidies are focused on all actors involved in fishing help to lower the cost to import required machinery and supplies and provide loans to develop the business (see Table 12).

Table 12 Select Fishing Subsidies

Fishing Sector Subsidy	Annual Amount (thousands USD)	Geared exclusively at artisanal production
Tariff deferment for import of capital goods, raw materials, and supplies	2,000	no
General loans to fishery sector	170	no
Subsidy for Satellite Monitoring Device for minor vessels	524	yes
Fuel subsidy	12,000	yes
Infrastructure Development Program	50,000	yes

Source: Moltke, 2011

Aggregation and Storage: Once caught fish is bought by fish buyers. Fish buyers are organized under the National Federation of Autonomous Workers- Small Producers and Merchants of Ecuador (FENACOMI) and vary in size. The Directorate General for Fisheries regulates all buyers and permits are required to buy commercially caught fish (Anhalzar and Nanninga 2014). Manta receives the majority of mahi mahi landings (62 percent) with Anconcito, Santa Rosa and Esmeraldas being the other major landing areas in country. After landing, mahi mahi goes to processing plants.

It also was selected because of the geographic advantages Ecuador has compared to other seafood commodities. However, due to limited data this section is shorter than the cocoa GVC and less detailed. A deeper dive into the GVC would be required before solidifying upgrading plans

⁶ Fibras refers to the fishing vessels used in mahi mahi commercial fishing. They are constructed primarily of fiberglass, have smaller engines and storage of 200 Kg each. They are owned by individual fishers, buyers, or mother vessels.

⁷ The number of mother vessels is not known, but estimates are around 80 of these ships exist.

Processing: Processing plants are located across the country with most concentrated in Manta and Guayaquil. Manta has the largest processing operation with an estimated 17 processing plants. Fresh mahi mahi, sourced mainly from independent *fibras*, requires minimal handling (de-heading, gutting, and cleaning). Frozen mahi mahi, often caught by motherships, requires further divisions into filets, loins, or other portions. The high profit margin of mahi mahi makes it an important catch for processing plants (Anhalzer & Nanninga, 2014). Health and sanitation regulations, established by the Fisheries and Fisheries Development Law, are overseen by the National Fisheries Institute who also give operating permits to processors.

Trade and Logistics: Mahi mahi is primarily an export catch in Ecuador; with about 80 percent sent abroad and generating 6.5 million USD each year (Martinez and Guerrero, 2013). The United States is the primary market receiving over 97 percent of fresh mahi mahi exports and 61 percent of frozen. Table 13 below highlights export destination of Ecuador’s mahi mahi.

Table 13 Export Destination by type

Destination	Fresh	Frozen
United States (including Puerto Rico)	98%	61
Colombia	2	25
France	-	7
Brazil	-	4
Other	-	3

Source: Martinez and Guerrero, 2013

Distribution and Marketing: Once exported, the final retail market consists of supermarkets, such as Walmart and Kroger, distributors, and wholesalers who sell to restaurants and smaller stores. Retailers, the lead firms in many seafood value chains, are demanding sustainability and traceability information from their suppliers in response to the growing consumers’ preference for sustainable seafood. For example, Kroger and Walmart are in the process of only sourcing from seafood suppliers that are certified by the Marine Stewardship Council, an organization discussed in detail in the leverage points section below (Kroger Company, 2015; Walmart, 2015).

5.4.1 Certifications and standards in Ecuador

The fragmented nature of the Ecuadorean mahi mahi industry makes coordination difficult and the certification process problematic. To assist with the process, actors (public, private and NGOs) often work collectively in fishery improvement projects (FIPs). These projects are geared towards the long-term goal of gaining certification. In Ecuador, a 2009 study of the mahi mahi industry showed that fisheries in country would not be able to gain certification. As a result, the undersecretary for Fishery Resources (SRP), the Association of Whitefish Exporters, and the National Federation of Fishing Cooperatives of Ecuador implemented programs designed to increase data collection, reduce by catch and beginning to implement standards under the National Action Plan for Dolphinfish or PAN Dorado, which will eventually become state policy. Major retailers in the United States have committed to increase sourcing from Ecuadorian fisheries that are certified or actively engaged in FIPs, like PAN Dorado, making them a crucial step for industry growth.

5.4.2 Upgrading in the mahi mahi global value chain

Within mahi mahi, there are several possibilities for upgrading, highlighted in Table 14. Current policies are exploring many of these possibilities, in addition to improving efficiency of fishing practices and sustainability. Additionally, growing demand presents opportunities for higher volumes of both frozen mahi mahi, including the expansion into ready-made meals and also higher value fresh mahi mahi through continued improvements in infrastructure. Finally, working towards improvements in health and safety

certifications, as well as sustainability initiatives through fishery improvement projects will help to increase the country's brand value.

Table 14 Upgrading possibilities in Ecuador

Upgrading Trajectory	Description	Constraint
Functional Upgrading	<ul style="list-style-type: none"> Move into tourism GVC with recreation fishing Development of technologies to help monitor catch information for future regulations of stocks 	<ul style="list-style-type: none"> Acquire health and sanitary certification Limited interactions between academia and seafood sector in country Underdeveloped private sector and entrepreneurship Limited infrastructure and logistics
Product Upgrading	<ul style="list-style-type: none"> Continued growth in frozen products Continuing to build infrastructure for fresh mahi mahi 	<ul style="list-style-type: none"> Competition Stocks variable and declining due to climate change Underdeveloped private sector and entrepreneurship Limited infrastructure and logistics Limited capacity for higher value packaged meal preparation
Process Upgrading	<ul style="list-style-type: none"> Reinforce health and safety certification for fresh mahi mahi Work towards MSC certification for sustainability Shift mahi mahi into processed frozen meals 	<ul style="list-style-type: none"> Costs in achieving certification limits many smaller fisheries Lack of tracking and monitoring needed at country and regional level Limited infrastructure and logistics

Source: Authors

Mahi mahi, and seafood in general presents opportunities to enhance competitiveness and economic growth in the country and continued work towards certifications, like MSC, and building the processing capacity in country is important. However, constraints, including climate change and emerging competition from other countries will also impact Ecuador's position in the mid-to long term. As a result, a push toward competition in value over quantity is necessary for sustainability. Table 15 below presents the SWOT analysis for mahi mahi in Ecuador.

Table 15 SWOT of Ecuador's mahi mahi industry

Strengths	Opportunities
Strong market share of the United States Geographic position gives its preferential access to mahi mahi Less risk of over-fishing of mahi mahi compared to other species	Expansion into higher processed mahi mahi goods Further entry into new markets, such as Europe Develop mahi mahi fishing and "sea to plate" excursions as part of tourism
Weaknesses	Threats
Fragmented organization of artisanal vessels can limit access to markets Seasonal product means substitute needed during off season Lack of certification Weak and insufficient associativity Insufficient infrastructure	Competitor countries could replace the Ecuador as leading exporter to US. Rising water temperatures threaten global stocks and geographic advantages of Ecuador

Source: Authors

5.4.3 Bottlenecks and leverage points

Ecuador as a global leader in mahi mahi exports should continue to leverage its proximity to the United States. The geographical proximity to end markets helps cost remain competitive and quality high, though

competition is growing from Central American countries such as El Salvador, Guatemala, and Nicaragua. However, the established history of quality and safety helps Ecuador retain a large market share in the United States compared to emerging competitors (Anhalzar and Nanninga 2014).

Improvements in infrastructure have helped the industry's competitiveness and reduced waste but further development is needed to increase growth. Specifically, certifications for sustainability and transportation barriers are two major bottlenecks in the Ecuadorian mahi mahi chain. However, transportation and logistics remain an obstacle to many artisanal fishers. Similar to cocoa, fishers report having difficulty accessing processors and end markets in country (Personal Communication). Fresh mahi mahi, which has a higher profit margin, requires more highly developed transportation and logistics operations. Fresh mahi mahi is exported from Quito by air to avoid spoilage and improvement is necessary to keep quality high and continue to be competitive in exports. As it seeks to further develop the industry, it is important that it continue to develop seafood infrastructure and logistics to be able to enter new markets including the European Union.

6 Roadmap for economic upgrading of Ecuador's GVCs

Upgrading Ecuador's cocoa and mahi-mahi industries to achieve the objectives outlined in "*Ecuador Productivo 2025*" requires the development of six areas that we anticipate to have the highest impact on the value chain. Table 16 summarizes these six priority areas and Ecuador's current situation based on our value chain assessments and a review of upgrading and competitiveness literature.

The roadmap below can potentially be implemented and scaled over a 10-year-timeframe. This is not a comprehensive set of strategies but steps that will potentially phase adoption of specific programs that will drive upgrading by promoting broader collaboration and private sector involvement. The objective of the road map is not only to overcome the current constraints that we identified but also to build on current strategies in agribusiness by promoting higher private sector participation and improve market participation in higher value added segments.

Institutional development. Before any reform can occur, it is critical that the government identifies and works with stakeholders on policy priorities that will improve production and spur growth in the processing and higher value segments. Our research shows that bringing established firms, startups and government and nongovernment actors to identify and agree on sector and policy priorities are critical to upgrading. This step serves as the launch pad for any successful GVC implementation. For a timed roadmap for this step please refer to Annex 1-5.

- **Conduct a stakeholder/cluster meeting** with firms, associations and government representatives to establish priorities and identify key stakeholders to upgrading strategy. This meeting will use innovation cluster maps (annex 1) to identify the group of actors involved in the chain and who should be involved in subsequent stakeholder meetings. From the innovation cluster map a group of 25-30 stakeholders from various sectors (public, private, academia, and NGO) to participate in subsequent meetings (see annex 2). It is crucial that stakeholders are representative of all value chain activities currently underway in the country.
- **Selecting the correct stakeholders is essential for success** in these first two steps as participants need to be innovators and industry champions in the country and also be capable of mobilizing others to join in the upgrading initiatives. Box 4 documents a case of a local champion in the Mozambique cashew market

Table 16 GVC Growth Impact Areas

Pillar	Current Status in Ecuador	Intervention Tools	Expected Result
Institutional Development	<p>Low collaboration, transparency and trust among stakeholders</p> 	<p>Stakeholders Involvement Development of policy priorities</p>	<p>Complete GVC base map and identified priority areas and actors Working group with representatives from all stakeholder Private sector participation and stakeholder driven upgrading strategies developed Policies priorities identified and action plan developed to lower barriers to upgrading and firm entry/growth</p>
Human Capital Development	<p>Skill gap. Education does not meet developments in global industry demand and shifts in private sector requirements</p> 	<p>Farmer Education Small Business Education Food Science Education Promoting certifications among producers Develop exchange programs for knowledge transfer</p>	<p>Improved knowledge on farm management Increased understanding of sustainable farming Increased awareness of product quality and traceability programs Improved knowledge transfer</p>
Financial Market Development	<p>Lack of finance and innovative credit instruments to producers and SMEs</p> 	<p>Develop financial instruments that meet SME's and farmers needs in priority GVCs (e.g. create special credit lines, tax incentives, and co-financing models)</p>	<p>Improve access to finance Lower barriers to SMEs, startups and other actors to finance Enhance investment in upgrading</p>
Infrastructure and services	<p>Recent investments in infrastructure have been good. Producers access to markets is a constraint (roads and transport) Data and internet use need to be enhanced</p> 	<p>Improving rural access through roads and transportation systems Invest in key infrastructure development projects based on priorities identified in stakeholder meetings Connect SMEs and farmers to government support regarding key issues (improved mobile and internet services plans)</p>	<p>Targeted investments with stakeholders support Improved access to market Leverage access to technology for upgrading Enhanced institutional support for upgrading</p>
Market Development	<p>Most activity is in low value export. Private sector is under developed.</p> 	<p>Link to new and emerging high value market activities (e.g. tourism and technology) Lower barriers to investments by private sector in target segments Develop processing segments through public/private partnerships Study potential for new market entry via retailing</p>	<p>Establish a country brand and strategy Developing/ improve processing cluster region for priority GVCs Better understanding market dynamics consumer preference in key end markets New markets developed Enhanced private sector Increase investments and firm entry</p>

		Develop tax incentives for private sectors to further investment in processing Explore different strategies to target upgrading	Leverage new business models that target upgrading
Innovation	Lack of finance, low investment in R&D and low levels of startups 	Organizational collaborations and public private partnerships Develop sector specific software and mobile application solutions by linking to information technology Create/ strengthen incubator and accelerator cluster that promotes startups in priority GVCs Increase and provided incentives for R&D	Development of technologies to address sector specific issues (e.g. fertilizer use, traceability and market information) Increase number of start ups in GVCs through incubator and accelerator cluster programs Increased innovation

Source: Authors

Box 4 Local Champions in GVCs

The global cashew market is extremely competitive and often firms struggle to be competitive. To help with industry upgrading, Mozambique identified an entrepreneur, Antonio Miranda, who possessed many of the characteristics hoped for in an entrepreneur. He was innovative, thrifty, socially conscious, and had vision. With technical assistance Miranda Caji Ltd., a small- to medium-scale hand processor, was established in 2001 on the grounds of a previously closed facility. The building was reconstructed using local labor, which provided jobs to the surrounding community. Mr. Miranda also raised funds for seed and working capital (US\$47,000) in the form of a guarantee fund from Mozambique’s National Cashew Institute.

Within months, the processing plant was selling to a major buyer in Holland. Not only was the plant making a profit, but Miranda Caju workers on average earned, 300 USD/years above the average of subsistence farmers (8 USD/year).

Recognizing the potential for additional small and medium processors to enter the cashew sector, TechnoServe arranged for other entrepreneurs to be trained on the Miranda Caju premises to learn first-hand how to run a cashew plant. Mr. Miranda was instrumental, providing day-to- day experiences and lessons to the entrepreneurs learning the business. His ability to share lessons learned on a variety of topics including operations, cost savings, plant location, financing, hiring practices, and sourcing raw nuts from growers provided a solid foundation for other entrepreneurs to launch their own processing facilities

Source: Webber & Labaste, 2010

- **Conduct a stakeholder meetings to address bottlenecks and create a policy reform agenda** that tackles key obstacles and opportunities to value chain upgrading. The first meeting, 13 day event (annex 3) is performed on a very high level and geared towards identifying policy priorities in the GVC as well as drafting high level budgets estimates for deployment. Following the initial stakeholder meeting, representatives will solicit feedback from others and then reconvene for a final meeting (15 day) to finalize plans, set detailed goals and budgets as well as a stakeholder-owned map for development (annex 4-5). In addition to finalizing the implantation strategy, this meeting is designed to generate excitement and buy-in from all stakeholders.

- **Establish a value chain upgrading committee** that will oversee and promote policy implementation and address challenges to upgrading. The committee should be comprised of government, private sector and association representatives. Some of the committee priorities will include:
 - Policy framework and strategy that can reestablish investor’s trust
 - Develop policies that target priority sectors and support domestic and foreign investments in these sectors
 - Reduce regulatory burdens to facilitate the construction and operation of processing facilities
- **Formalizing collaboration between actors in the chain** is critical, not only between private companies but also between the public and private sectors. These partnerships are beneficial for several reasons including:
 - Greater and more nuanced understanding of supply chains
 - Improve business environments
 - Enhance skill and promotes innovation

Many varieties of collaboration exist (see Table 17 Collaboration models to upgrade or strengthen position in the GVCs). For example mergers between companies, for diversification or vertical integration to obtain more control over upstream or downstream activities as well as informal collaboration between actors all help to promote chain activities (KPMG, 2013).

Table 17 Collaboration models to upgrade or strengthen position in the GVCs

	Tight Loose					
Type of Cooperation	M&A	Cooperatives	Joint Ventures	Exclusive Alliances	Non-exclusive alliances	Contracts
Reasons/benefits	Portfolio Diversification Geographic Expansion Vertical integration to secure supplies internalize margin Synergy extraction	Economies of scale Increased bargaining power	Pooling of skills Cost/risk sharing	Pooling of skills Cost sharing	Pooling of skills Cost sharing	Securing supply Extracting value adds

Source: KPMG, 2013

Invest in human capital to improve skills across the chain in cocoa and mahi-mahi.

Following the initial planning stages highlighted in pillar 1, Ecuador should move towards investments in programs that increase human capital across the chain. Specifically, it is important that Ecuador engage in programs that educate small and medium size firms as well as farmers. Focus should be on increasing efficiency and value along the chain as well as the preferences of demand markets. It is critical here to build key market skills such as entrepreneurship, demand analysis, management, marketing, and finance.

- **Agricultural education: Training and certification:** establish programs to train and certify farmers on sustainability standards, improving productivity and other areas that impact quality and production in upstream activities.
- **Small and Medium Firm education:** Training and certification to help SMEs access high value markets and learn best practices for growth. Link these firms with extension services from universities to improve productivity.

- Higher education: Develop a world-class university program in food science that focuses on food processing and packaging technologies, food safety and quality, innovation and marketing. The program will work with industry in curriculum development, research and student internships and placement. We recommend that this program would be connected to incubators and accelerators below.
- Stimulate funding in research and development. Create a higher education fund and incentives for private sector participation to increase spending in research and development. This can help improve disease resistance, create new flavors in cocoa products, new packaging solutions and others.
- Leverage and enhance other education programs in collaboration with lead firms in the areas of business management and entrepreneurship to improve workers' skills and market analysis across the chain. These programs take many forms including international exchanges where producers are able to travel to end markets and see their goods in stores as well as learn about buyers' preferences. This helps participants better organize their production towards these market goals and increase value and helps create knowledge transfers. Box 5 Developing Human Capital in the Dairy Sector highlights one example of these programs.

Box 5 Developing Human Capital in the Dairy Sector

Danone, a French dairy company, is the world's leader in fresh dairy goods production. It has created the Danone Ecosystem Fund, through which the company promotes social development and works on employee skills upgrading and the improvement of financial conditions for dairy cooperatives and rural communities. The Industrial University program provides workers with training according to the company's needs and complements their college education. The company analyses the employees' theoretical and practical skills and develops individually-tailored skill development plans for each workers. Additionally, Danone was building educational dairy farms in rural areas, to which Danone contributes the construction, equipment and machinery as well as the provision of seminars and training sessions.

Lactalis Group, an important French dairy producer with presence in the Ukraine since 1996, develops its workers' skills by sending them to study in France. Students are enrolled in a two-year professional program and spend half of the time at universities and half in the Lactalis' factories. They obtain a Master's level European degree upon returning to the Ukraine to work at Lactalis factories. Furthermore, the company requires Ukrainian workers to spend some time in their factories in Kazakhstan in order to improve their understanding of milk production in the region and improve their adaptability to different markets.

Source: OECD 2012

Develop financing mechanisms geared towards entrepreneurs in the agribusiness sector.

Access to finance is a constant challenge for upgrading, especially for SME's. The major challenge to obtaining a loan is the lack of collateral to serve as a loan guarantee and not the projects SME's are seeking to fund. Incentives, such as loan guarantee programs can help SMEs grow. Additionally, unlike large corporations with capital to use as collateral, or microenterprises with an array of policy programs to help them access finances, SMEs often are excluded from financing programs. Box 6 provides an example of a financing mechanism geared towards SMEs.

Box 6 Finance programs for SMEs

Loan Guarantee Associations in Argentina

In Argentina many large firms are founding members of closed and semi-closed loan guarantee associations (LGAs), and contribute capital to give guarantees and sometimes direct financing to SMEs.

The strong private capital presence is a peculiar characteristic of Argentine LGAs that makes this system unique in the world. It was established under Law 24.467, which determines tax benefits for founding members of LGAs, with the aim of stimulating investment of private capital in the guarantee system. Hence, large firms now have a double incentive to engage in an LGA: a fiscal incentive (tax exemptions for capital contributions to the LGA constitution) and an incentive to improve the conditions of its small and medium-sized suppliers.

Because of the fiscal incentive, private actors actively participate in LGAs in Argentina: of the 20 LGAs that existed in 2007, 17 were totally privately owned. The presence of LGAs is especially strong in the agrifood industry, with 7 LGAs. Moreover, in Argentina, these associations rely essentially on large firms' investments, unlike many countries where LGAs depend on public guarantee funds (elsewhere in Latin America) or mixed systems that have strong state subsidies (e.g. Spain).

Argentine LGAs differ from guarantee systems elsewhere in Latin America where the tendency is to cater for a larger number of small enterprises that borrow relatively small amounts. In contrast, Argentine LGAs are directed at smaller numbers of SMEs that borrow larger amounts, mainly for working capital and capital equipment.

The evidence from some sectors, e.g. dairy, poultry, stock-breeding, and wine, the participation of large enterprises is stronger through LGAs than through other guarantee systems. These value chains are structured so that a large leading firm (or cooperative) needs a critical input that is generally provided by SMEs. This feature gives the large firm stronger incentives to improve conditions for its SME suppliers.

Source: Navas-Alemán, Carlo Pietrobelli, & Kamiya, 2014

Additional financing mechanisms that help SMEs include:

- **Credit for farmers-** credits to help farmers improve operations and enhance competitiveness, often organized by the government is one path. Box 7 recaps innovative credit programs development banks are using in Latin America.
- **Tax incentives** to help attract business in critical areas identified in step one. These incentives will attract investors into areas of priority growth and help attract private investment in country.
- **Hold investment conferences**, both in Ecuador and internationally to attract foreign investors and firms, address their questions and demonstrate potential opportunities in Ecuador. This is a great opportunity to showcase the advantages of the Ecuadorian market.

Box 7 The Role of Latin America's Development Banks in the financing of SME

Most Latin American countries have development banks. Until recently, these institutions performed predominantly second-tier banking functions. However, they are increasingly adopting structures that allow different models to support SMEs financing, either by becoming first-tier-only or second-tier-only banks or hybrid systems.

An increasingly common trend consists on the promotion by development banks of financial service packages that include products such as credit cards and electronic transactions. This is the case of the BNDES card, introduced in 2004 by the Brazilian Development Bank (BNDES). This card scheme seeks to help micro enterprises and SMES to access to working capital, investment and machinery. BNDES cards are issued by financial institutions while BNDES acts as a second-tier bank. Cardholders receive a revolving credit facility and they can borrow money according to the limits set by the issuing bank's financial analysis up to a maximum of 1 million Brazilian Reais (a little more than US\$ 300,000). Borrowers can purchase products from accredited suppliers. Additionally cardholders can be accredited as program suppliers and use the system as a sales channel under certain conditions such as that no

less than 60 percent of their goods and services are produced in Brazil. By 2012, the program had issued more than 250,000 cards and the system had registered 72,000 buyers and 11,000 sellers. Credit disbursements have also significantly increased from 845 million Reais in 2008 to 7 billion Reais in 2011.

Another financing instrument implemented by a development bank is the funding programs production chains, such as the one developed by Nacional Financiera (NAFIN) in México since 2002. This program promotes the inclusion of SMEs in value chain under the premise that these organizations need to cooperate and network. By using new instruments such as e-credit, NAFIN has succeeded in simplifying SME access to credit and to slow down the disintegration of Mexico's production value chains.

Source: OECD, 2012

Infrastructure and services

Ecuador should continue to develop and improve on infrastructure project identified by GVC implementation group as critical to success. These projects should be those that are needed for SMEs to access larger national and international markets. Infrastructure constraints were consistently mentioned in the literature and in interviews, especially with farmer access to markets, specifically issues with roads and transport systems.

They should also move towards formulating programs to help SMEs and farmer's have better access to services. For example programs that help improve mobile and Internet connectivity (see Box 8). Encouraging rollout of affordable quality and data plan networks can facilitate upgrading and growth in SMEs. In addition strengthening the infrastructure for trust and security, developing and expanding digital content and reducing ICT impediments can be powerful in addressing value chain constraints such as communication of quality standards, market linkages and addressing production problems.

Box 8 Broadband access and the future of business

As more applications and benefits are being discovered and developed, the importance of broadband services for economic growth and development increases. Broadband can provide access to a wide range of resources, including education, culture and entertainment, telemedicine, e-commerce, e-government, public safety, among others. A World Bank study (2009) found evidence for 120 countries that indicates that for every 10 percentage point increase in broadband penetration there is a 1.3 percentage point increase in economic growth. This effect was stronger in developing countries than in developed ones and could be strengthened when penetration reaches a critical mass.

This study also found that broadband access drives firm growth, reduces costs and increases productivity. However, performance improvements depends on the firm's ability to integrate their technological, commercial and organizational strategies. Furthermore, the World Bank study refers to a previous work by the Momentum Research Group that found that broadband expansion was associated with considerable improvements in the commercial organization of 1200 companies from six Latin American countries in Latin America (Argentina, Brazil, Chile, Colombia, Costa Rica and Mexico). Finally, the study points to evidence that for export businesses, an increase of one percent of the number of Internet users corresponds to an increase in exports of 4.3 percent.

These benefits have not gone unnoticed. Several developed and developing countries are adopting broadband development as a policy priority and are designing and implementing development strategies. In Ecuador, the National Broadband Plan seeks to create conditions for the use of the radio electric spectrum so as to allow the provision of a wide array of different wireless services. An aggressive and coordinated implementation of this plan can lay the foundations for a myriad of broadband-based applications that can substantially improve the conditions for business development in Ecuador.

Source: Cáceres, 2011

Market development and diversification

To increase revenue, Ecuador will need to not only improve existing chain activities but also expand into new segments and diversify into higher value chains as well. This will help to maximize value in country and also help to mitigate risk. This can be accomplished by programs that:

- Build linkages to other higher value chains. For example leverage production in agri-industries to build tourism through local sourcing of products, cocoa farm visits, and fishing excursions. These programs build brand recognition and help create attachment to Ecuadorean products among high-end consumers. You can also cultivate products that cater to the demands of high-end tourist seeking to gain greater appreciation for local cuisine, prefer locally sourced ingredients (see Box 9). These types of activities can be linked not only to cocoa and mahi mahi but other agricultural products.

Box 9 Building markets via tourism

In St. Vincent, Erica's Hot Sauce, an agribusiness company manufacturing pepper sauces and other food snacks. In Antigua Susie's Hot Sauce is a small cottage business producing pepper and fruit sauces. Susie's operations began in the 1960s by turning family recipes into successful products that have quickly conquered the local market and are now trying to expand and strengthen their export market. Erica's opened in the 1970s. Both are creative in commercializing local products and, starting very small, have continued expanding their product line and marketing efforts.

They are now established in their local markets, and are common names in their native island's restaurant and hotels, St Vincent and Antigua. Erica's employs 11 full-time workers, and Susie's Hot Sauce employs 6 full-time and 3 part-time workers and both have a model based on contract agreements with several farmers that supply raw materials, although consistency of the supply presents challenges. They can be considered as examples of successful entrepreneurship within their local community.

The quality of the product drives their success and the market for "Caribbean flavor" a high demand, especially among tourists helped to increase their size. They rightly identified sufficient local demand to grow their business at a commercial scale and then built on this to begin venturing into the export market, both at the regional level, sometimes as private label, and to the USA and Europe.

Source: World Bank, 2008

- Develop and launch international marketing campaign to build knowledge of Ecuador's position in strategic GVCs and emphasis quality and competitive advantage. This campaign should be part of a larger marketing strategy developed with stakeholder input.
- Study new markets for entry and how to maximize likelihood of success especially in Russia and emerging markets in Asia and the Middle East for cocoa industry and Europe for mahi mahi. This can include expanding into specialty segments of retailing, as Box 10 documents.

Box 10 Moving into specialty retailing

For several types of items, including beauty and grocery products, consumers are less willing to travel long distances. Seeing a market opportunity in Brazil, Chocolates Cacau Show expanded into the interior of the country by using a smaller-format store—Loja Light—that are designed for cities with fewer than 70,000 inhabitants. Initial investments requirements are approximately 70 percent less than that for their conventional store. Today, Loja Light stores represent more than 20 percent of the company's properties and represents a strategic market entry that maximized growth potential.

Source: Cunha, Abida, Woods, Sonneveld, & Carrera, 2015

- Build a high value brand for Ecuadorian products. Commodity brands are potentially valuable intellectual property, which can be owned by companies, countries, producer collectives or certification bodies. Building the country brand is most effective when private sector is heavily involved,

quality standards are established, communicated and enforced. Table 18 provides a summary of branding strategies that are applicable to Ecuador.

Table 18 Branding Strategies for upgrading

Branding	Description	Examples	Ownership	Regulatory Framework	Implementation in Ecuador
Vertical Branding	Distinguish between varieties of agricultural products	Pink Lady apples Tenderstem broccoli	Variety Owner public or private sector, or producers' associations	Trademark with associated patent	Low
Geographical Branding	Distinguish products by geographical origins	Darjeeling tea Idaho potatoes	Public sector bodies or regional associations	Geographical Indicator or Appellation of Origin	Ecuador applied for European for protected geographical indication status for 'cacao ariba'
Sustainability Certification	Distinguish products by ethical standards	FairTrade Rainforest Alliance Organic	Certification bodies	Trademark	Limited

Source: Authors based on Docherty, 2015

The case of sugar (see Box 11) demonstrates a branding strategy where nations develop products around their core strengths while outsourcing to avoid internal weaknesses and constraints in the market. They also targeted diverse markets including domestic, regional and global with a combination of niche and mainstream products (Docherty, 2012, 2015).

Box 11 Branding Barbados Sugar

Sugar in Barbados is a key commodity to foreign exchange earnings, rural employment and the environment. The small scale of production, high relative wages and low prices in global markets depress Barbados' competitiveness as an exporter.

In 2007, the West Indies Sugar & Trading Company Ltd. (WISTCO) was established as a partnership between the government of Barbados and the private sector, with a mission to 'build a sustainable business that supports the Barbados sugar industry through the development of a portfolio of sugar brands for profitable export'. The company pays producers more than double the typical Fairtrade price for selected large-crystal cane sugar. Prices paid to the nationalized sugar company are determined on a 'cost plus' basis, with farmers receiving a fixed percentage of revenue, to ensure that every link in the supply chain is sustainable.

Despite paying high prices, WISTCO profits from every ton of sugar sold. The key is effective branding, which lets the company pass on the high costs of production through premium pricing in upscale stores such as Harrods. In the mass market, its outsourced business model reduces downstream costs and cuts out traditional intermediaries in order to ensure commercial viability.

WISTCO takes a private sector approach to marketing and supply chains by building brands with outsourced partners for the benefit of producers. This, along their innovative approach to marketing a 'low-interest' commodity like sugar, has allowed them to compete against much larger companies in highly competitive markets. Currently WISTCO:

- Pays up to four times the world price for the branded sugar it buys, allowing the industry to cover its costs and make a profit on every ton sold.
- Will contribute \$1.2m in additional income to the Barbados sugar industry in 2014.
- Produces brands available in over 1,000 stores across the Caribbean and Europe.

Sells premium Barbados sugar as a branded ingredient to large multinational manufacturers.

Having established a solid, large-scale business with clear benefits to the sugar industry and the communities that depend on it, WISTCO is now focusing on expanding export and domestic operations through links to the tourism and wider agricultural sectors.

Source: Docherty, 2015

Innovation- Incubators and accelerators

The globalized and fragmented food industry requires the development of local innovation systems to remain competitive. One way of achieving this is by developing an entrepreneurship culture and an incubator and accelerator cluster.

Accelerators and incubators are “company builders”. They are innovative investment vehicles and business service providers that have made a novel contribution to advancing entrepreneurship around the globe, helping an entire generation of young companies, and particularly high-tech startups, to grow, prosper and thrive. These startup programs have become many young companies’ principal source of knowledge and support (The accelerator and Incubator Ecosystem in Europe). Box 12 provides an example of the potential opportunities for agriculture innovation start-ups.

Building a start-up incubator is not a one-size-fits-all process. Understanding goals, stakeholders and external landscape are essential to a strong incubator strategy.

- Key decision makers and influencers need to be involved early, ideally through a stakeholder consultation process.
- Develop a partnership between government actors, universities (domestic and international), private sectors, and industry organizations
- Policymakers should boost sector-specialized programs by ensuring minimum funding levels and developing policies that address sector challenges such as employment, ownership structures and tax incentives.
- Policymakers should increase transparency by making comparable data in key areas more widely available.

Box 12 Incubators as drivers of SME Growth

Large agriculture companies, including Monsanto, Deere and DuPont Pioneer, spend hundreds of millions of dollars on technologies that use detailed data on soil type, variety of seeds, and weather to help farmers produce more at a lower cost. But as the race for productive farming evolves, a number of small tech startups are launching competing products.

Startups use many of the same data sources such as freely available rainfall totals from the National Weather Service. They also tap data gathered by farm machines and transferred wirelessly to the cloud.

The agriculture industry is hoping to capitalize on Big Data by using new technologies to gather and analyze large and complex data sets. Startups use many of the same data sources such as freely available rainfall totals from the National Weather Service. They also tap data gathered by farm machines and transferred wirelessly to the cloud. All hope their tools can help even the most productive farms squeeze out more product, by helping producer know what to plant where and when.

These firms see great growth potential. For example, Michigan-based startup Farm Logs has enrollments for its software product, a free service, at around 15 percent of all U.S. farms. The company, which raised \$5 million in two funding rounds, declined to provide total acreage enrolled.

Most companies are currently focused on launching in the United States, the world's largest grain producer and where detailed data on soils and weather is readily available. However, they see growth potential in many modern farming regions like South America, Australia and Europe.

The industry is expected to grow fast. Monsanto called its recent acquisition of Climate Corp, a data startup, its ticket to a \$20 billion market.

The growth potential and low cost scaling up of software-as-a-service business have attracted many venture capitalists who see these companies as market “disrupters” with huge economic potential.

Source: Plume, 2014

- Clustering startups allows the provision of common infrastructure facilities and services to be economically assisted, while also helping the enterprises there to gain from other benefits of clustering in an incubator environment (Gálvez-Nogales, 2010).
- Start-ups are able to overcome informational failures (absence of informational spillovers in discovering the cost structure of an economic activity), and coordination failures (lack of coordination of investment activities with scale economies) in the agri food (see Box 13) (Rodrik, 2004).

Box 13 Agriculture Accelerators as drivers of development

Recently, Morocco has moved from generalized industrial platform development towards a new industrial strategy with more specific sector based upgrading, with innovation and R&D as centerpieces. The 2005 Industrial Plan focused on overhauling eight sectors, including agrifood, with a budget of €1,128 million for the 2009-2015 period. The Plan seeks to develop 15-flagship cluster in 8 key sectors, including agro-industry and fish processing. So far six food poles (agriculture/technology clusters) plus two fish processing hubs are operational or under development.

The expected impact is an additional 16,000 jobs and increased annual sales by €361 million. The agripoles host agribusiness activities on large tracks of land, ranging from 100 to 400 hectares. They also allow agribusiness operators to access land at competitive prices while receiving services (administration, telecommunications, logistics, accommodation, catering, certification and auditing services, etc.) and having access to specialized training programs managed by firms and professional associations, tailored to fit the specific needs of the sector.

Agrotech, an agro-technological pole established in Agadir, capital of the Souss-Massa-Draâ region, is managed by the Association Agrotechnologies Souss-Massa-Draâ. Launched in 2006 with representatives from the Regional Council, local and national authorities, professional associations, financial institutions, training and research institutes and private firms. Agrotech promotes collective actions regarding the promotion of geographical indication products, such as dates, saffron, prickly pears and honey, as well as the development of the horticultural and citrus value chains. They are also setting up an incubator for SMEs specialized in agrotechnologies. French based Agropolis International, a multistakeholder knowledge platform specialized in agriculture, food, biodiversity and environment has provided technical assistance for establishing Agrotech.

Sources: Gálvez, 2010

7 Policy recommendations

Improvements to the regulatory environment with greater transparency, consistency, and alignment with sector goals and stakeholders are critical for upgrading. The above road map provided a set of crosscutting recommendations that can be implemented beyond the cocoa and mahi mai GVC. This report explored the various pillars that are needed for a successful innovation and agriculture development program and explored how this could be accomplished in two GVCs- cocoa and mahi mahi. Based on this, Table 19 outlines the recommendations in relation to upgrading.

These recommendations will help meet the mandates of “Ecuador Productivo 2025” and increase the competitiveness of the Ecuadorian agro-industry. Recommendations, based on the identified six pillars work in all segments of the value chain and also cross into other chains as needed to provide a holistic upgrading program.

Table 19 Upgrading and Policy Recommendations

Upgrading		Policy Recommendation		Cocoa	Mahi Mahi	Opportunity Pillars	
Functional Upgrading	Processing	Develop and improve business enabling environment		√	√	Institutions	
		Create investment incentives to expand existing processing facilities		√	√	Institutions Human capital Finance Infrastructure & Services	
		Provide tax incentives to encourage FDI investment in the sector		√		Institutions Finance	
		Create Incentives to for multiuse processing facilities			√	Institutions Human capital Finance Infrastructure & Services	
		Develop innovative business models for public private partnerships to expand processing capacity		√	√	Institutions Human capital Finance Innovation	
	New End Markets	Export facilitation	Develop new export end markets in CIS, Asia and MENA		√		Institutions Human capital Finance Infrastructure & Services Innovation
			Expand fresh export market to retailers			√	
			Leverage EU trade agreements		√	√	
			Expand into niche US Market		√	√	
		Invest in Linkages to Tourism	Hotels and restaurants		√	√	
			Agro tourism		√	√	
			High-end food tours		√	√	
		Regional Markets	Develop incentives to supply and expand exports into regional markets		√	√	Institutions Finance
		Retail	Develop retailing expertise and branding		√		Human capital Innovation
Invest in domestic market	Develop demand in domestic market		√	√	Institutions Human capital Finance Infrastructure & Services		
Product Upgrading	New Products	Start ups	Develop and improve business enabling environment		√	√	Institutions
			Develop ad invest in Incubators and accelerators		√	√	Institutions Human capital Finance Infrastructure & Services Innovation
			Increase spending in R&D		√	√	
			Develop international university connections and exchange programs		√	√	
			Develop and provide incentives for public private partnerships with startups and universities		√	√	
			Develop “Business in one Day” was established by Decree-Law,		√	√	Institutions

Upgrading		Policy Recommendation		Cocoa	Mahi Mahi	Opportunity Pillars	
			as a special scheme of incorporation and immediate functioning of commercial companies				
			Develop financing mechanisms and finance education	√	√	Institutions Finance	
			Evaluate import tax barriers and provide incentives on ingredients that go into new products for export or niche markets	√	√	Institutions	
	Higher value products		Invest in country quality branding	√	√	Institutions	
			Develop and create incentives for product quality and certifications	√	√	Human capital Finance	
			Develop regulatory framework to facilitate business entry, firm legal entity, and collaborations	√	√	Institutions	
			Identify, develop partnerships and invest in models that expands market share into higher value segments by building brand and competitive advantage in artisanal and niche markets	√	√	Institutions Finance Infrastructure & Services Innovation	
	Process Upgrading	Product Quality	Establish, communicate, train and enforce quality standards		√	√	Institutions Human capital Finance Services
		Country Branding	Establish, communicate, train and enforce quality standards and country branding		√	√	Institutions Human capital
		Sustainability Standards	Facilitate and provide incentives for public private partnerships, NGOs and services that help producers attain certifications		√	√	Institutions Finance Innovation
Increase Production		Facilitate public private partnerships, NGOs and services that address production problems		√	√	Institutions Finance Innovation	
Technology Adoption		Develop financing schemes and invest in innovation that improve quality and certifications		√	√	Institutions Human capital Finance Infrastructure & Services Innovation	
		Improve access and cost of data and internet across the chain		√	√	Institutions Infrastructure & Services	
		Invest and provide incentives for the development of software and mobile applications that improve sector performance, increase market linkages, and improve transparency		√	√	Institutions Human capital Finance Infrastructure & Services Innovation	
Coordination	Facilitate coordination between stakeholders and improve transparency		√	√	Institutions		

Source: Authors

8 Conclusion

In the report we have examined the agro-industry in Ecuador by analyzing two agriculture GVCs- cocoa and mahi mahi. Using GVC analysis we identify Ecuador's position in the global organization of the industry,

major actors involved in the chain, leverage points for further growth and upgrading trajectories. Using these GVCs, we then offered a roadmap to help guide implementation of policies for upgrading. We also presented various recommendations for upgrading in these value chains. While in-depth GVC analysis is needed before a true implementation plan can be constructed, this report serves as a guide for the type of considerations needed for a successful GVC development program.

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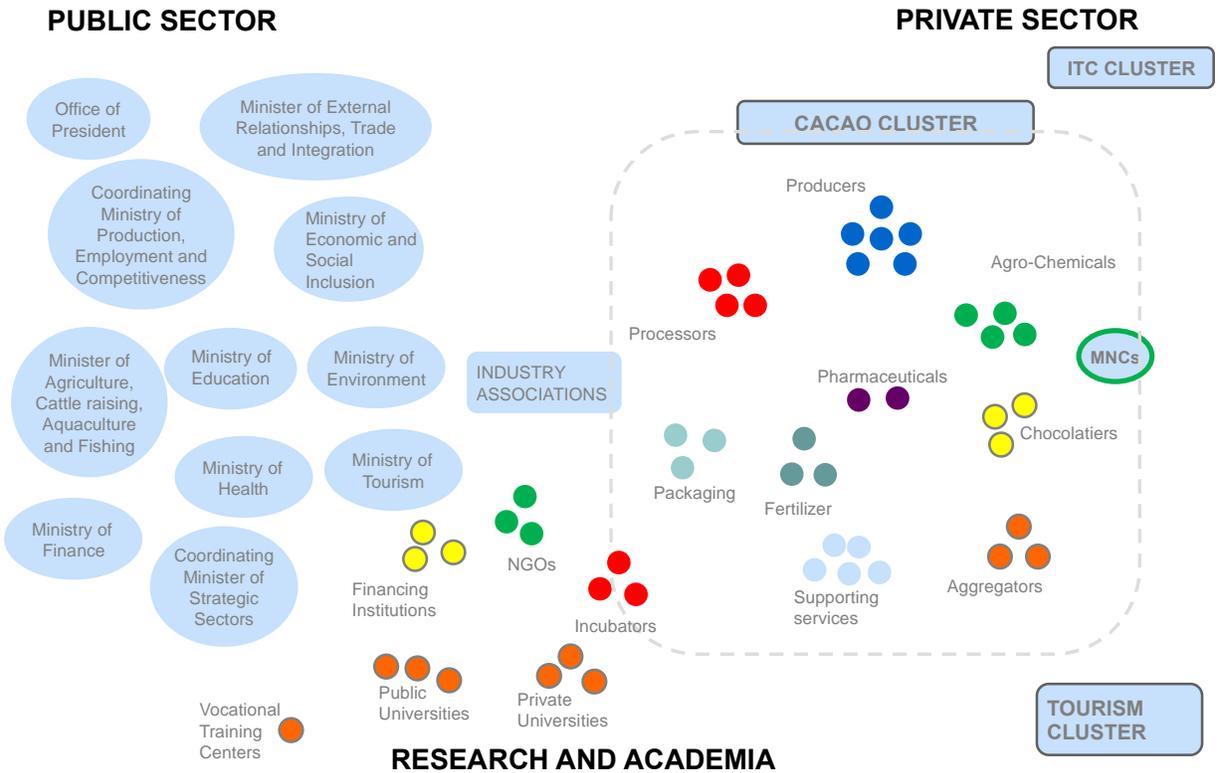
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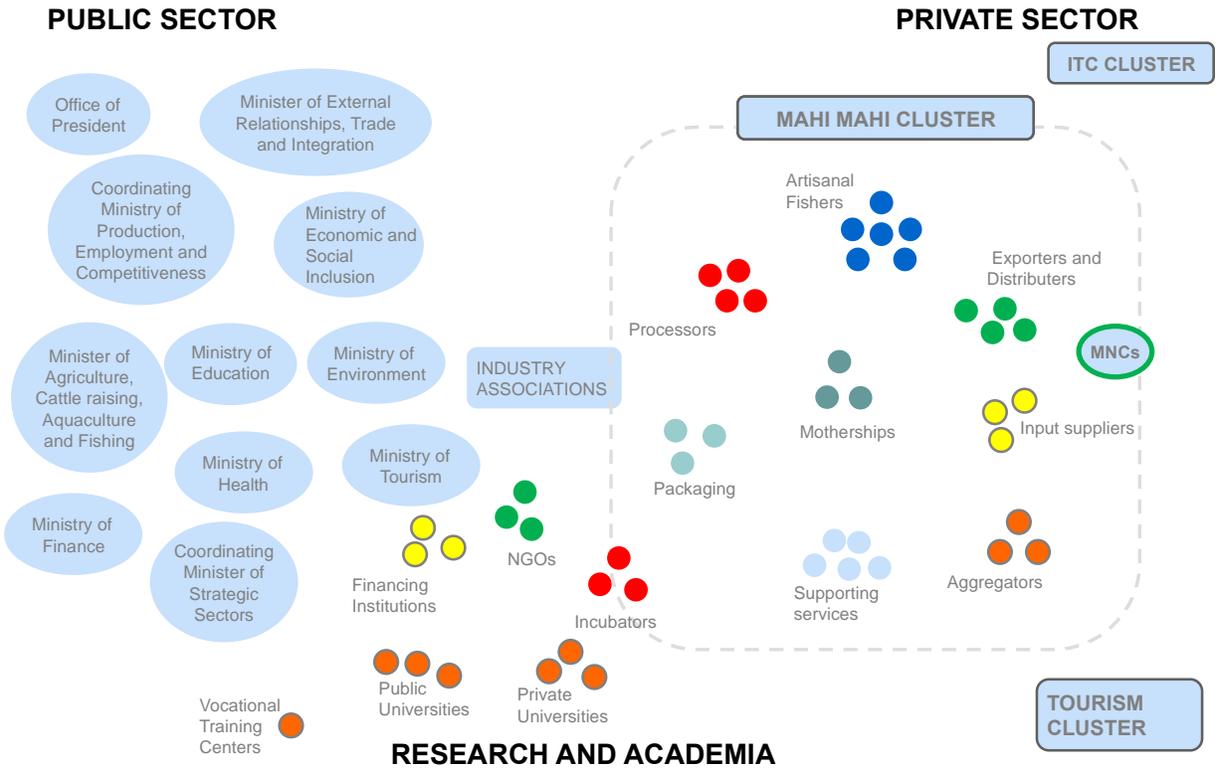
Annex 1: Innovation Network Map example for Cocoa and Mahi Mahi Stakeholder Meeting

INNOVATION NETWORK FOR COCOA CLUSTER



Source: Authors based on field work

INNOVATION NETWORK FOR MAHI MAHI CLUSTER



Source: Authors based on field work

Annex 2: GVC lab participant example set for Cocoa and Mahi Mahi

CACAO GVC LAB PARTICIPANTS

PRELIMINARY TO BE FURTHER DEVELOPED

GVC Lab participants tend to fall into 5 broad groups and encompasses all major stakeholders in the country

Participating group	Expected input to lab	Example of participants ¹
Public sector (5-7 members)	<ul style="list-style-type: none"> Ensure overall alignment with on-going strategies Test feasibility and funding commitment Tackle concerns & issues 	<ul style="list-style-type: none"> Coordinating Ministry of Production, Employment and Competitiveness Minister of Agriculture, Cattle raising, Aquaculture and Fishing Ministry of Tourism
Private sector (8-10 members)	<ul style="list-style-type: none"> Identify sector bottlenecks for private involvement Gauge interest and overall private sector approach and focus 	<ul style="list-style-type: none"> S.A., Nestlé del Ecuador Transmar Ecuador Ferrero del Ecuador República del Cacao Pacari
NGO / Bi-laterals (5-7 members)	<ul style="list-style-type: none"> Measure appetite for tech involvement Align with on-going initiatives and projects Develop sector bridges 	<ul style="list-style-type: none"> World Bank International Cocoa Organization World Cocoa Foundation Rainforest Alliance Local NGOs
University & academics (2-3 members)	<ul style="list-style-type: none"> Leverage on-going research & knowledge in strategy development 	<ul style="list-style-type: none"> Universidad San Francisco de Quito Universidad Agraria del Ecuador Universidad de Investigación de Tecnología Experimental YACHAY
Associations & Other parties (5-7 members)	<ul style="list-style-type: none"> Engage consultants and other sector participants that add value 	<ul style="list-style-type: none"> National Cocoa Exporters Association Sector consultants & independent government advisory boards

¹ – A detailed stakeholder map should be developed by each project team manager and shared with the World Bank and MGAP for alignment and coordination

Source: Authors based on field work

GVC Lab participants tend to fall into 5 broad groups and encompasses all major stakeholders in the country

Participating group	Expected input to lab	Example of participants ¹
Public sector (5-7 members)	<ul style="list-style-type: none"> Ensure overall alignment with on-going strategies Test feasibility and funding commitment Tackle concerns & issues 	<ul style="list-style-type: none"> Coordinating Ministry of Production, Employment and Competitiveness Minister of Agriculture, Cattle raising, Aquaculture and Fishing Ministry of Tourism
Private sector (8-10 members)	<ul style="list-style-type: none"> Identify sector bottlenecks for private involvement Gauge interest and overall private sector approach and focus 	<ul style="list-style-type: none"> Oceanfish S.A. Gondi S.A. Empacadora Bilbo S.A Bilbosa PROIMEC S.A. Local fishers
NGO / Bi-laterals (5-7 members)	<ul style="list-style-type: none"> Measure appetite for tech involvement Align with on-going initiatives and projects Develop sector bridges 	<ul style="list-style-type: none"> World Bank Marine Stewardship Council World Wildlife Fund Sustainable Fisheries Partnership Local NGOs
University & academics (2-3 members)	<ul style="list-style-type: none"> Leverage on-going research & knowledge in strategy development 	<ul style="list-style-type: none"> Universidad Laica Eloy Alfaro de Manabí Universidad Agraria del Ecuador Universidad de Investigación de Tecnología Experimental YACHAY
Associations & Other parties (5-7 members)	<ul style="list-style-type: none"> Engage consultants and other sector participants that add value 	<ul style="list-style-type: none"> National Federation of Fisheries Cooperatives of Ecuador Sector consultants & independent government advisory boards

¹ – A detailed stakeholder map should be developed by each project team manager and shared with the World Bank and MGAP for alignment and coordination

Source: Authors based on field work

Annex 3: Strategic Development Meeting 1

STRATEGY DEVELOPMENT

GVC implementation lab part a (strategy focused) will work on confirming and detailing out prioritised sub-sectors, themes & initiatives

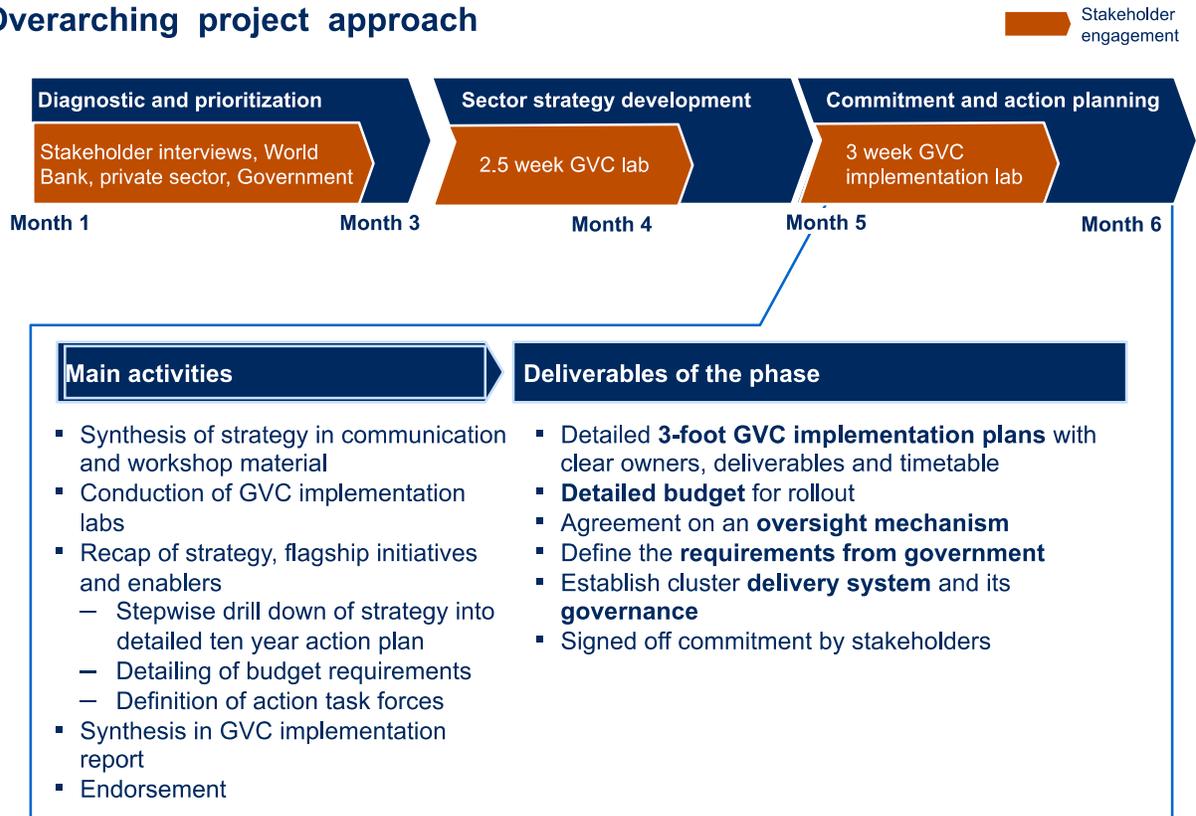
GVC Lab goal – bring together key sector stakeholders and decision makers to co-create, align and develop sector level themes & initiatives to uplift industry while identifying key bottlenecks and enablers required for implementation



Source: Authors based on field work

Annex 4: Generalized Project Roadmap for Pillar 1

Overarching project approach



Annex 5: Structure for final GVC implementation stakeholder meeting

GVC ACTION PLANNING

GVC implementation lab part 2 (implementation focused) will work on developing concrete implementable plans to unleash the execution phase

GVC Lab goal – excite stakeholders for execution by developing very concrete implementation plans / road maps that are owned by identified individuals across a locked in timetable with public and private oversight



Source: Authors based on field work