2018-2022
NATIONAL BAMBOO STRATEGY
GUIDELINES FOR A GREEN AND INCLUSIVE DEVELOPMENT

Summarised Version

MINISTERIO DE AGRICULTURA Y GANADERÍA

Toda una Vida

EL GOBIERNO DE TODOS

bambú ecuador MESA SECTORIAL

INBAR INTERNATIONAL BAMBOO AND RATTAN ORGANISATION

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Introduction

Ecuador is a country with a rich natural resource in the form of abundant bamboo. Various native and introduced species offer raw materials suitable for transformation into a wide range of useful products. Bamboo can be be utilised in housing and structures, furniture, utilitarian items, mobility, energy, food, knowledge, crafts, art and culture. All of this is accompanied by bamboo cultivation's impressive positive effects on the environment. Bamboo cultivation can enable rural populations to develop smart strategies for dealing with the patterns of climate change that affect their survival. Bamboo clings to the land and protects it from erosion through rhizomes and perennial root systems. Furthermore, it helps to restore reduced water tables, protects water basins, captures and fixes carbon dioxide, and provides a habitat for diverse species of birds, mammals and reptiles.

It is clear, therefore, that Ecuador is strategically positioned for bamboo cultivation. This is a process which is aligned with the global move towards sustainability, which is a fundamental objective of our country. With a growing global interest in sustainable products and materials, one may ask: 'How can Ecuador make the best use of the existing bamboo in its territory, add maximum possible value, contribute to the economic growth of the country, stimulate the structure of equitable value chains, and respect nature while wisely using the ecosystem services provided by bamboo?'

In its most basic form, the answer is simple: by organising ourselves.

'National Bamboo Strategy 2018-2022: Guidelines for a Green and Inclusive Development' is an open participatory document providing a roadmap. It identifies all of the elements, actors, dynamics, processes, competitors, territories, and related knowledge with the emerging bamboo sector in Ecuador, and sets this information out in the clearest way possible. The Strategy recommends a policy diagram in order to effectively and organically articulate key roles. It aims to optimise the production chain with specific markets in sight. Its highest objective is a more prosperous and sustainable Ecuador – all thanks to bamboo.

Felipe Jácome Bamboo Sectoral Table Technical Secretary	Jaime Medina Forest Production Undersecretary, MAG	Pablo Jácome INBAR Regional Coordinator for Latin America and the Caribbean

Foreword

Historically, bamboo has been used in various ways by indigenous peoples, farmers, and mestizos in Ecuador. As is characteristic of the rural world, the teamwork involved in these activities has strengthened the social fabric of these communities. Today, the accumulated bio-knowledge acquired for managing bamboo forms part of the intangible heritage of our country.

Until now there has not been a clear roadmap for the development of this sector, the role of which is as relevant socially and economically as it is environmentally. Therefore 'National Bamboo Strategy 2018-2022: Guidelines for a Green and Inclusive Development' has been constructed in a participative way. Various autonomous governments (GAD), more than 300 farmers, artisans, traders, bamboo processors, local bamboo networks (Bamboo Brotherhood), members of the Bamboo Sectoral Table, and the authorities and personnel of the following 11 State ministries have participated in this process:

Ministry of Agriculture and Livestock (MAG)
Ministry of Environment (MAE)
Ministry of Industries and Productivity (MIPRO)
Ministry of Foreign Trade and Investment (MCEI)
Ministry of Urban Development and Housing (MIDUVI)
Ministry of Tourism (MINTUR)
Ministry of Electricity and Renewable Energy (MEER)[1]
Ministry of Culture and Heritage (MCP)
Secretary of Higher Education, Science, Technology and Innovation (SENECYT)
The National Secretary of Water (SENAGUA)
The National Secretary of Planning and Development (SENPLADES)

Physical Factors affecting Bamboo Cultivation

Bamboo is a renewable resource with 1,642 identified species worldwide. In Ecuador, 46 species of woody bamboo from five genera have been registered: *Arthrostylidium*, with three species; *Aulonemia,* with five; *Chusquea*, with 31; *Guadua,* with four and *Rhipidocladum,* with three. Eleven of these species are endemic. There are also genera such as false bamboo, or pseudo bamboo such as reed and straw.

Since 1923 several bamboo species have been introduced, especially from Asia. Today the following species are found in Ecuadorian territory: *Bambusa tulda* (bamboo from India), *Bambusa ventricosa, Dendrocalamus asper* (giant bamboo), *Dendrocalamus latiflorus, Dendrocalamus longispiculata, Dendrocalamus oldhamii, Melocanna baccifera, Phyllostachys aurea, Phyllostachys nigra and Phyllostachys pubescens* (moso bamboo from China). All of these are exotic species.

In Ecuador, the different species of bamboo are found in natural forests (alone and among other species) and as plantations. They develop spontaneously between crops, in riverbanks, or on mountainsides, mixing with the production and typical vegetation of each

1 Recently eliminated as a Ministry, but its functions are grouped in the new Ministry of Hydrocarbon, Renewable Energy and Mining.

area. Bamboo currently covers a surface of 600,026 hectares[2] which is equal to 2% of the country's total surface, compared with the national wooded area which covers 5.7% and the agricultural area which covers 6%.[3] This area includes areas of possible use and also those allocated for conservation (See Appendix 1).

The country's 24 provinces of the territory have natural bamboo forests and plantations. In 16 provinces these species are especially abundant due to the edaphoclimatic conditions which favour their development in natural conditions. In Ecuador, 66.5% of bamboo is found on the coast, 10% in the mountains, and 23.5% in the Amazon (See Appendices 2, 3 and 4). It is worth noting that, of the total areas with bamboo present, only about 15,000 hectares are currently being used.

Table 1: Land covered in the main areas with bamboo presence (Ecuador 2018)

Province	Hectares	%
El Oro	4370	0.7
Esmeraldas	68,546	11.4
Guayas	43,825	7.3
Los Ríos	80,763	13.5
Manabí	145,529	24.3
Santa Elena	11,872	2.0
Santo Domingo de los Tsáchilas	44,126	7.4
Bolívar	6754	1.1
Cotopaxi	19,047	3.2
Imbabura	7702	1.3
Pichincha	26,581	4.4
Morona Santiago	42,806	7.1
Napo	22,245	3.7
Orellana	24,879	4.1
Pastaza	23,467	3.9
Sucumbíos	27,515	4.6
Total	**600,026**	**100%**

2 In Ecuador, only partial quantifications of the current surface area of bamboo species in natural areas or plantations are available. For this study, statistical, cartographic and survey data were systematized, integrated and put together. The methodology used can be found in the expanded version of this document.

3 According to the 'Map of Vegetal Coverage and Land Use in Ecuador' (MAGAP-MAE 2013-2014), Ecuador has around 10.5 million hectares of forests and 9.5 hectares of agricultural land, out of a total 24,874,396 hectares making up the national territory.

Importance of Bamboo in Ecuador

Economic Importance

Due to its organic composition, morphological structure, and wood-like material, bamboo is one of the most useful species globally for commercial cultivation.

The following characteristics give bamboo an advantage over many other species:

- It reproduces and thrives easily with minimum care and low cost.
- It grows rapidly.
- Bamboo plantations are perennial if they are worked properly, since the stem repeatedly produces from the same rhizome.
- It is a material with a high rate of mechanical resistance, while also being light and easily manipulated.
- The costs of mobilisation and storage are low.
- The facilities, tools, and equipment needed for its primary processing are simple and low-cost.
- The material produced can be transported with light vehicles (including manual ones) on unfinished roads.

Bamboo has 1,500 documented uses, including: raw construction material; housing; nutrition; paper; floors; panels (made of plywood, laminate, floors, and hardwood); decorations; textiles; furniture; various objects (baskets, lamps, musical instruments, fans, utensils, and toys); bridges; charcoal; pharmaceuticals; irrigation systems; and farming tools.

Bamboo is a highly versatile product since all parts of the plant can be utilised, including the rhizomes, culms, buds, cauline leaf, branches, and foliage. No other resource has such versatility, lightness, flexibility, resistance, toughness, climatic adaptability, earthquake resistance, rapid growth, easy management, and visual beauty as bamboo.

Contribution of Bamboo to the GDP

Despite periods of oil booms, the agricultural sector continues to be the driving force of the Ecuadorian economy. This is even more the case when oil prices are low. Therefore, the necessity of repositioning the agricultural sector is supported by official statistics. According to data from the Central Bank of Ecuador, the agricultural sector (in its expanded sense[4]) is the economic activity that contributes most to the global gross domestic product (14%). It is the main source of employment, employing more than two million people.[5] It employs 26% of the total population of the country and 65% of people in rural areas.

In the formation of the agricultural GDP there are three productive sub-sectors: i) farming; ii) silviculture and timber extraction (forestry); and iii) livestock activity (pastures and ranching). Bamboo belongs to the silviculture sub-sector. The contribution of this sub-sector to the economy is of great importance, although the records on this activity are limited.

4 Includes the primary agricultural sector (8.5% GDP), plus manufacturing of agricultural origin (5.5% with the main branches of agro-industry).

5 According to data from ENEMDU, December 2017, INEC.

Taking into account all productivity and services from bamboo activity, this sub-sector represented at least 0.5% of the GDP in 2017. This is a highly significant value, despite the majority fields related to bamboo not being taken into account (i.e., tourism, environment, construction, energy, and forestry). Bamboo has an influence on the production of goods. **In 2017, it accounted for 475 million dollars in services.**[6] The primary use of bamboo generates a multiplier effect in the production of sustainable goods and services (See Appendix 5, Table 2).

Table 2: Contribution from Bamboo Activity to the total GDP in Ecuador, according to production centres and services between 2000 and 2017 (USD)

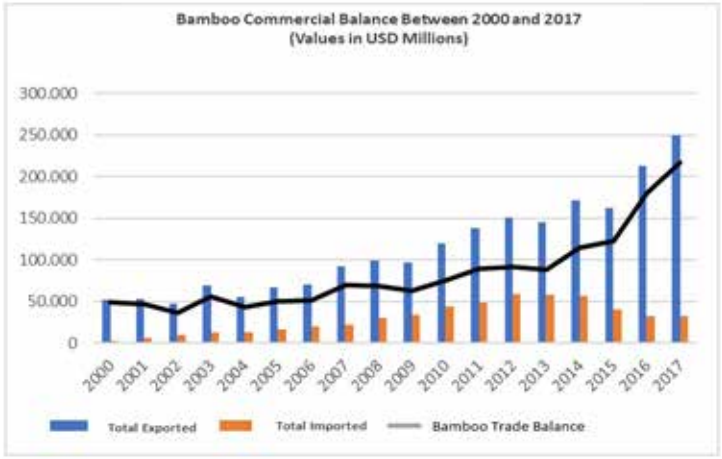
Year	PRODUCTION OF BAMBOO PRODUCTS					Subtotal Bamboo Goods/Prod	PRODUCTION OF BAMBOO SERVICES			Subtotal Bamboo Prod/Serv	Total to GDP	Total % Contribution to GDP
	Silvicult. Bamboo	Autocons Bamboo	Artesanías Bamboo	Agroind. Products	Construction w/ Bamboo		Tourism Services	Energy/ Water Services	Eco Services			
2000	15,296.22	10,707.35	12,840.68	17,976.95	9,061.70	65,882.90	6,089.02	4,629.93	18,318.60	29,037.54	94,920.44	0.52%
2001	15,589.60	10,912.72	14,353.54	20,094.95	14,164.27	75,115.07	11,614.85	9,956.43	24,468.32	46,039.60	121,154.67	0.50%
2002	13,841.86	9,689.30	14,763.71	20,669.20	17,318.78	76,282.86	14,560.37	16,114.95	28,548.95	59,224.26	135,507.13	0.47%
2003	20,312.54	14,218.78	14,921.61	20,890.25	18,963.06	89,306.24	15,681.58	15,947.15	32,432.86	64,061.59	153,367.83	0.47%
2004	16,505.45	11,553.82	16,913.46	23,678.85	24,156.54	92,808.12	16,686.86	14,196.70	36,591.66	67,475.23	160,283.35	0.44%
2005	19,576.17	13,703.32	19,867.18	27,814.05	29,256.66	110,217.37	17,816.14	13,012.65	41,507.09	72,335.87	182,553.24	0.44%
2006	20,823.12	14,576.18	21,964.82	30,750.75	36,389.76	124,504.63	19,279.49	12,902.00	46,802.04	78,983.53	203,488.17	0.43%
2007	27,091.15	18,963.80	12,864.46	18,010.25	40,166.63	117,096.29	20,759.50	14,640.08	51,007.78	86,407.35	203,503.64	0.40%
2008	29,337.26	20,536.08	14,694.68	20,572.55	53,943.24	139,083.81	22,730.06	15,813.30	61,762.64	100,306.00	239,389.81	0.39%
2009	28,506.10	19,954.27	13,743.07	19,240.30	59,277.82	140,721.56	28,377.58	13,540.23	62,519.69	104,437.49	245,159.05	0.39%
2010	35,380.86	24,766.60	14,958.93	20,942.50	65,011.77	161,060.66	31,498.68	18,851.88	69,555.37	119,905.92	280,966.59	0.40%
2011	40,722.70	28,505.89	19,401.07	27,161.50	81,064.94	196,856.10	34,269.34	23,191.38	79,276.66	136,737.38	333,593.48	0.42%
2012	44,242.05	30,969.43	19,815.04	27,741.05	93,786.02	216,553.58	39,163.30	26,158.05	87,924.54	153,245.89	369,799.47	0.42%
2013	42,808.35	29,965.84	19,499.07	27,298.70	100,126.63	219,698.60	45,061.49	26,638.20	95,129.66	166,829.35	386,527.94	0.41%
2014	50,451.84	35,316.29	19,941.11	27,917.55	108,693.62	242,320.41	49,461.24	32,548.08	102,292.26	184,301.58	426,621.99	0.42%
2015	47,882.88	33,518.02	20,069.61	28,097.45	107,187.63	236,755.59	51,355.39	38,933.85	99,290.38	189,579.62	426,335.21	0.43%
2016	62,610.11	43,827.08	19,435.14	27,209.20	94,277.69	247,359.22	49,657.80	45,103.75	98,613.97	193,375.52	440,734.74	0.45%
2017	73,247.76	51,273.43	20,830.88	29,163.23	99,856.54	274,371.84	48,455.40	49,586.25	103,056.62	201,098.27	475,470.10	0.46%

Source: Boletín Anuario N° 38 del Banco Central del Ecuador (2016); Boletín Anuario N° 39 del Banco Central del Ecuador (2017); Cuentas Trimestrales N°102 del Banco Central del Ecuador (2018); World Bank; Ecofys; 'State and Trends of Carbon Pricing 2017', Vivid Economics (2017). Washington, DC: World Bank.; © World Bank. https://openknowledge.worldbank.org/handle/10986/28510

6 Compared to the forestry GDP 1.066 million USD, agricultural GDP 8,808 million USD, and the total GDP amounting to 103,056 million of dollars. (BCE. 2018)

Contribution from Bamboo Activity in Generation of Foreign Exchange Savings

The trade balance of bamboo[7] shows that exportation greatly exceed importation. Exports have grown an average rate of 10% annually in the 21st century, while bamboo imports were at fixed at 20%. The evolution of the trade in bamboo products (furniture and non-wood) over the past 17 years reflects a permanent profit. By 2017, the profit was close to 217 million dollars[8] (Graph 1), 0.2% of the total GDP, and 2% of the total agricultural exports.



Graph 1 Bamboo Commercial Balance Between 2000 and 2017 (Values in USD Millions)

Notes: (1) Rattan, bamboo, wicker furniture (2), non-wood products, including bamboo products. Only bamboo products and derivatives are considered.

Source: Central Bank of Ecuador (2018). Database from the Foreign Trade Division. Quito.

Social Importance

Contribution to Generating Jobs

In general, the farming economy in which bamboo is developed works through a combination of production strategies and income generation. These include agriculture, livestock, using wood and bamboo, and temporary employment through harvesting the product from each area. There is not an exclusive labour market for bamboo; instead, its characteristics correspond to those of a labour market that is primarily for subsistence, connected by a loose network of acquaintances.

Therefore, the statistical information on occupation corresponds to **the labour related to bamboo activities.** In this context, bamboo-related activities have a direct influence on a total of **12% of employment generated in the agricultural sector.**[9] This means **241,630 employees linked to agricultural production units with a bamboo presence.**[10] At least 2.2 members of each productive unit with bamboo presence are engaged in its cultivation (111,498 Agricultural Productive Units).

7 Based on what foreign trade statistics capture, since the primary destination for exports, Peru has a high level of non-registration.

8 By 2017: Total Exported Bamboo Furniture / Non-Wood Products 249,042 million dollars; Total Imported Bamboo Furniture/ Non-Wood Products 32,262 million dollars

9 According to the 2017 INEC employment survey, 2,011,275 people are employed in agriculture nationwide.

10 The quantification of agricultural employment connected to bamboo was carried out based on the official statistics available at 2017 (number of agricultural employees) and with the information structure of bamboo surface.

The dynamic of rural production is one of active participation by the whole family unit. The social importance of bamboo is magnified considering the rural areas in which production takes place. **15% of people employed in rural sectors are connected to agricultural units with the presence of bamboo,[11] which is evidence of the importance of this activity in the rural economy** (see Appendix 6).

Contribution to Social Regeneration of the Productive Unit

Bamboo activity is not just important for its positive economic impact (in production, employment, and generation of foreign exchange savings), but also because it contributes to social regeneration in the productive unit for those living there. **More than 503,000 people rely on bamboo activity for their livelihoods** in the Manabí, Los Ríos, Guayas, Santo Domingo de los Tsáchilas and Esmeraldas provinces (See Appendix 7).

It is important to emphasise that 19% of goods made with bamboo are intended for self-consumption. These goods include living fences, watering holes, animal pen construction, housing construction, and small productive infrastructures (such as supports for banana plants, passionfruit, peppers, and tomatoes, among others). Production for self-consumption was valued at 51,273,000 dollars in 2017. Although this bamboo use does not generate a monetary flow, it means that each sector avoids spending, on average, 38 dollars a month on infrastructure materials (469 dollars a month per sector).

Therefore, the use of bamboo for self-consumption creates several important benefits. These include environmental benefits such as combating soil erosion, water protection, and restoring degraded ecosystems, among others. Producers fully recognise these benefits, and turning bamboo into a means of sustainable livelihood for rural populations makes a considerable contribution **to diversification of agriculture and the survival of families involved in this activity.**

Contribution to Preserving Culture

In Ecuador, bamboo is a vernacular material that holds both history and identity. Culturally it is part of the material (old housing) and immaterial heritage (ancestral knowledge) of the country. There is evidence that the Jama-Coaque used native bamboo species for their construction. Since time immemorial, bamboo cane has been used in the construction of buildings on the Equatorial Coast. Even in Colonial times the precious 'Guayaquil cane' was sent to the capital from the Viceroyalty of Peru. However, the history of bamboo is not well-known by the general population, and its importance is poorly recognised.

Environmental Importance

Environments and microclimates that fulfil multiple roles are found in areas with bamboo cultivation. Bamboo is beneficial because:

- It is the main alternative for replacing the use of wood as an energy source and is used as a fibre source in paper-making.
- Due to its root system and interwoven rhizomes that bind tightly to the soil particles, it can act as a recovery mechanism for degraded land that is not suitable for other crops.
- It is excellent at capturing CO_2 in the atmosphere, which is then stored in its tissue. In Ecuador it is estimated that one hectare of bamboo (specifically *Guadua angustifolia*) can capture between eight and 12 metric tons of CO_2. This is an environmental service that could be commercialised.

11 According to the National INEC Employment and Unemployment Survey for 2017, the total number of agricultural employees in rural areas amounted to 1,590,896 people.

- It is extraordinarily efficient at storing water in the stalks. This preserves moisture in the ground, regulating and conserving water sources.
- Its forests are 'water pumps' that absorb liquid during winter and release it in summer to maintain moisture in the ground.
- It helps regulate water flow and the root distribution strengthens the ground, preventing erosion and mining by rivers.
- Since they are permanent forests, bamboo plantations are a suitable site for wildlife, including lowland paca (*Cuniculus paca*), Central American agouti (*Dasyprocta punctata*) and a wide variety of reptiles, birds, and mammals.
- It generates organic matter because the leaves, branches, and all that remains after harvest are reincorporated into the soil.

In summary, bamboo provides Ecuador with a variety of practical solutions to alleviate climate change. The economic value of environmental services provided by bamboo is an outstanding issue in Ecuador. Although it is a complex subject, here it is given a value: 100 million dollars in 2017 (0.1% of the GDP).

National Public Policy Framework

The 'National Development Plan 2017-2021: Entire lifetime' sets out the vision and strategy of the current government. This is the main framework for the National Bamboo Strategy and it corresponds to and complements the main action points and objectives of the National Plan. Two of the three main action points supported in the plan are directly linked to bamboo.

Main Action Point 1:

- Objective 3: Guarantee the right to nature for current and future generations

Main Action Point 2:

- Objective 5: Drive productivity and competitiveness for economic growth in a inclusive, sustainable way.
- Objective 6: Develop production capacity and promote rural food sovereignty and good rural quality of life.

The bamboo chain is related to the National Development Plan 2017-2021 in at least three of its nine objectives. It aligns directly with objectives 3, 5 and 6 and is related to at least four of its 11 emblematic interventions:

1. Entire lifetime plan: Home for all
2. 'Greening' the Country
3. National Agreement for Employment, Productive Investment, Innovation and Inclusion
4. Agricultural National Community Collectives (known as 'La Minga')

Bamboo activity helps fulfil the governmental policies of **eight ministries, two secretaries and one national institute:** MAG, MAE, MIPRO, MCEI, MIDUVI, MINTUR, MEER, MCP, SENESCYT, SENPLADES and INEN (See Actors and Roles).

Contributions to the Sustainable Development Agenda 2030

In New York, 193 states in the United Nations General Assembly established development objectives under the guidelines 'Transform Our World: The Sustainable Development Agenda 2030', which has been in effect since 1 January 2016. Bamboo activity contributes to these seven objectives as follows:

Objective 1. End poverty in every form. The bamboo chain, from forest management to pre-processing and transformation, has the potential to sustain hundreds of thousands of people in rural areas, according to our estimates based on current efficiency. The activity has a direct influence on the overall 12% employment generated by the agricultural sector. At least 2.2 members of every productive unit with bamboo presence are engaged in its production. Additionally, bamboo production involves the active participation of the rural family unit, which magnifies its importance as a way of life. More than half a million people in Ecuador depended on this activity for their survival in 2017.

Objective 7. Guarantee access to affordable, safe, sustainable and modern energy for all. Management of natural bamboo forests or plantations provides sustainable resources for a long period of time, in the form of raw materials for bioenergy, without causing deforestation. The bamboo chain will support this objective in three ways: i) aiding energy efficiency by using waste; ii) improving the energy return of the production process; and iii) improved CO_2 uptake.

Objective 11. Make cities and human settlements inclusive, safe, resilient, and sustainable. Houses made from bamboo are strong buildings, as well as being flexible, modern, earthquake-resistant, and affordable. In Ecuador, bamboo is being considered for various social housing programmes.

Objective 12. Guarantee sustainable consumption and production methods. The use of bamboo instead of wood is an important and efficient sustainable alternative which protects trees and avoids deforestation.

Objective 13. Adopt urgent measures to fight climate change and its effects. Bamboo offers a variety of practical solutions to fight climate change. One hectare of bamboo stores a large amount of carbon. The amount of carbon stored varies according to species and local conditions, but can range from 94 to 392 tons. Bamboo also offers additional opportunities for income generation for people whose existing way of life has been affected by climate change, making it an important adaptation mechanism.

Objective 15. Protect, re-establish and promote sustainable use of terrestrial ecosystems, manage forests sustainably, fight against desertification, stop and reverse land degradation and put a stop to the loss of biodiversity. Bamboo has a very extensive root system, which is why a single bamboo culm is able to bind tightly to six cubic metres of soil and hold it in place. This unique property of bamboo plants is thus considered to be an effective tool for controlling erosion and improving ground stability.

National Bamboo Strategy 2018–2022

Vision for the Sector by 2022

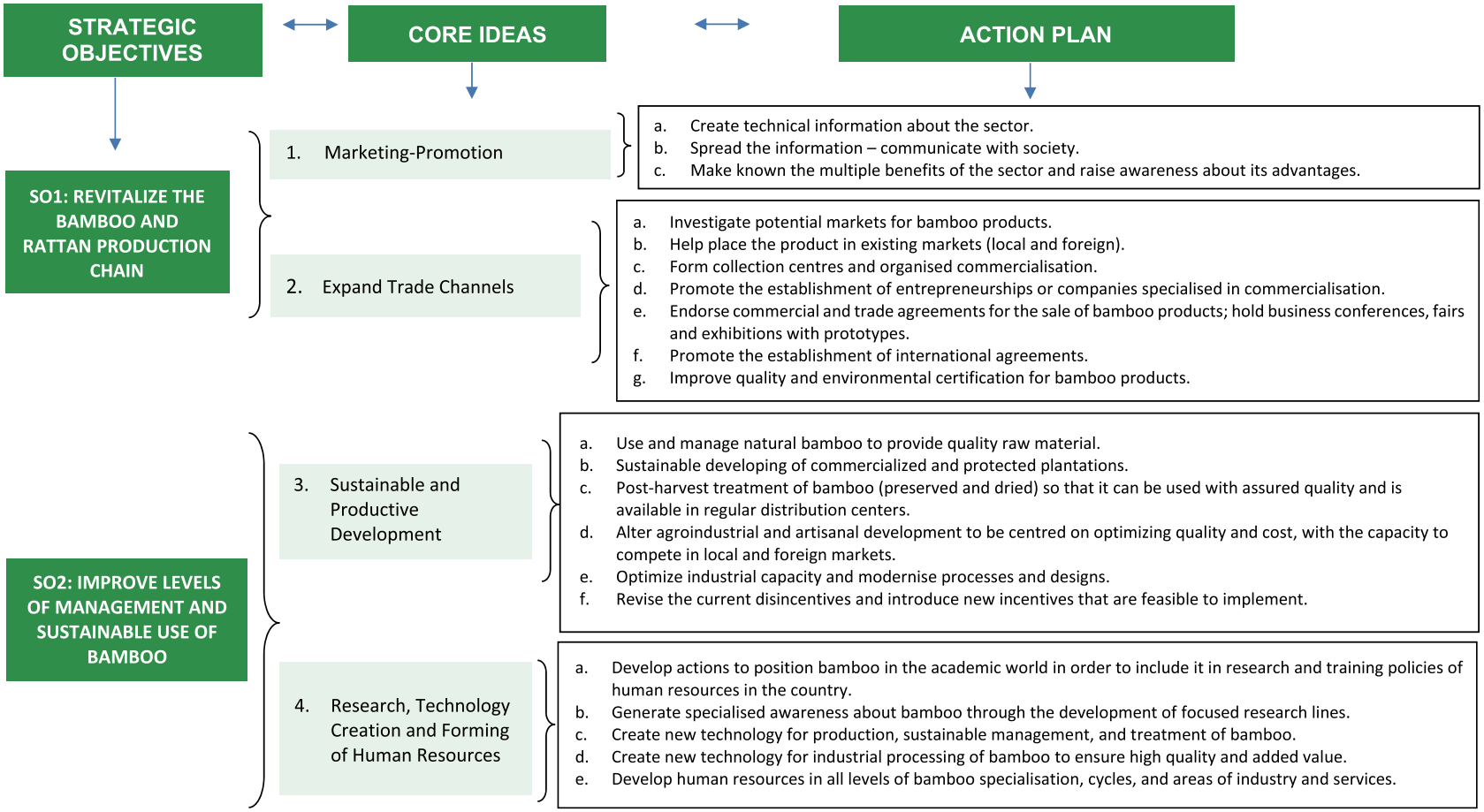
The consulted actors made an effort to create a vision that improves on the fragmentation of the sector that exists today. By 2022 they project that bamboo will be an attractive economic option offering sustainable solutions to improve income for producers and bamboo users. The expectations are that, by 2022:

- The bamboo production chain in Ecuador will have been strengthened.
- Families will apply good practices for management, silvicultural use and post-cut treatment.
- Multi-sectoral bamboo use will have been implemented. It will be recognized for its contribution to production diversification and services through non-traditional means.
- It will have become an upgraded value chain recognized and articulated by public policy.

Strategic Objectives (SOs)

- **SO1:** Revitalise the bamboo production chain from the primary source to its delivery to the final consumer.
- **SO2:** Improve sustainable management of bamboo as an economic and ecological resource that protects the environment and allows opportunity for economic and social development for those involved.
- **SO3:** Contribute to the diversification of agricultural, silvopastoral, and agroindustrial production and exports from the country, as well as taking advantage of the services bamboo provides.
- **SO4:** Improve governance of the bamboo sector between the main participants of the sector in order to secure strategic alliances.

Action Plan: Addressing Core Ideas



SO3: DIVERSIFY PRODUCTION

5. Capitalise on the Multispectral Potential of Bamboo

a. Use bamboo as a diversifying crop in the agricultural family.
b. Use bamboo as a means to help conserve biodiversity and relieve the effects of climate change and restore ecosystems.
c. Use bamboo in agroindustrial diversification.
d. Use bamboo for contemporary and other artisanal production.
e. Use bamboo as a source for diversifying exports (and as a substitution for imports).
f. Use bamboo in the construction sector.
g. Use bamboo as a tourism resource.
h. Use bamboo to preserve culture.
i. Use bamboo as an energy source for rapid and clean growth.
j. Review the regulations that cover the development of activity in the various links of the bamboo chain and areas of influence.

6. Develop Specialised Services for Bamboo

a. Training and technical assistance in all fields in crop management, treatment and bamboo transformation.
b. Financial services (credit and financing).
c. Specialized information about the sector and bamboo.
d. Services for trade and market behaviour (prices).
e. Services to help obtain certifications of quality, origin, green seal, etc.
f. Help services to carry out procedures with the public sector and other actors.

SO4: IMPROVE GOVERNANCE OF THE BAMBOO SECTOR

7. Structure the Institutional Operation of the Sector

a. Identify the actors throughout the chain and their specific activities: production, transformation, transportation, trade, services, etc.
b. Identify the relationship between the actors: product flow, information flow, decision capacity, and bargaining power.
c. Help the institutional operation and organization of the private actors and the public sector linked to bamboo activity.
d. Promote strategic alliances between actors in and out of the chain.
e. Establish actor agreements.

8. Articulation of Policies and Actions of the Sector

a. Publish the articulation of the chain interventions with the priorities of governmental policy and consistent objectives.
b. Further the coordination and articulation of actions with diverse actors: within the private sector, between governmental entities, with other strategic alliances, and in-chain actors.
c. Identify current incentives and financial incentives in public policy and develop assistance mechanisms for opportune use of these by producers, artisans, and SMEs.

Proposed Goals

In concordance with the objectives of the National Bamboo Strategy 2018-2022, the macro-goals for the next five years are:

Strategic Objective 1: Revitalise the bamboo production chain, from the primary source to its delivery to the final consumer.	**Goal 1.** Raise awareness about the importance of bamboo use and its eco-systemic benefits in at least 5% of the Ecuadorian population over five years (farmers, factory workers, schools, high schools, universities, professional colleges, central and decentralized government authorities, public workers, and general consumers). This goal will reach 170,000 people a year through communication and information campaigns.
	Goal 2. Double internal demand for bamboo culms/stalks in their different varieties. The current consumption of more than 23 million culms/stalks (about 15, 000 hectares) will reach about 43 million culms/stalks (30,000 hectares) in 2022.
	Goal 3. Quadruple the external demand for bamboo in its natural state and derived products. The current external demand of 784,800 culms/stalks (about 650 hectares) will reach close to 43 million culms/stalks (30,000 hectares) in 2022. Diversify markets through European countries with important bamboo consumers, USA and Chile (who currently buy marginally), and Peru (who is the most important consumer of Ecuadorian bamboo).
	Goal 4. Reach 30,000 hectares of plantations and natural forests producing raw material with sustainable processes and efficient harvesting methods. This is linked to industrial, artisanal, export, goods and services transformation processes.
	Goal 5. Double the volume of value added products in the market which transformed with modern technology with diversified agricultural and artisanal uses will take advantage of existing installed capacities, and reduce production costs. The demand for cane will go from 4.8 million culms/stalks to 5.8 million culms/stalks.
	Goal 6. Reduce waste from 50% to 25% by 2022; this is equivalent to a 5% reduction per year during the implementation of this strategy. Put in place treatment processes and use waste with new technology.
	Goal 7. Develop a useful and affordable information system that is accessible to producers. This generates, disseminates, and provides services for: training, technical assistance, credit and financing, trade services, and market behaviour (prices), assistance for obtaining certifications of quality, origin and green seal, and support services for carrying out procedures with public sectors and other actors.
Strategic Objective 2: Improve levels of management and sustainable use of bamboo as a resource that protects the environment and allows opportunities for economic and social development for those involved.	**Goal 8.** Contribute to the conservation of biodiversity with a 10% reduction in deforestation through the alternative use of bamboo instead of wood (with about 6,000 hectares per year, the pressure on natural forests is reduced).
	Goal 9. Contributed to relieving the effects of climate change through absorbing carbon dioxide. This is expected to store 34,199 tons of carbon on average a year (5.7 tons of carbon hectares per year). The total contribution would be to store 170,997 tons of carbon in the next 5 years.

Strategic Strategy 3: Contribute to diversification in agricultural, agroforestry and agroindustry production and exports from the country; as well as taking advantage of services bamboo provides.	**Goal 10.** Establish bamboo as a diversification crop in the agricultural family. About 20% of productive units with less than 5 hectares of the main bamboo production areas to be working with bamboo as a complementary source of income. This is equivalent to 22,180 smallholder unions.
	Goal 11. Increase national forestry production by at least 10% annually (about 100 million dollars a year) by taking advantage of bamboo production in its natural state. The national forestry production in 2017 exceeded a billion dollars.
	Goal 12. Manufacturing of bamboo products to show in production counts registering at 165 million dollars every year as a result of bamboo agroindustry development. The national manufacturing products that could be made from bamboo (including products from wood, furniture and paper), by 2017, had already reached almost 1.650 billion dollars. It is estimated that 10% of this market could be substituted with bamboo products
	Goal 13. The construction sector to increase bamboo use by at least 1% of its production, equivalent to around 100 million dollars a year. The sector to use bamboo to help alleviate the lack of housing in at least 5% of the rural housing deficit until 2022 (1% a year, equivalent to 4,000 houses a year).
	Goal 14. The tourism sector to increase the use of bamboo as a tourism resource in at least 2.4% of its production. This is equivalent to around 50 million dollars a year.
	Goal 15. The volume and value of exports of natural bamboo and derived products to increase at least 50 million dollars annually, going from the current level of 250 million USD (2016) to 500 million dollars a year in 2022 through diversification of products and destinations.
	Goal 16. Replacing bamboo imports by at least 30 million dollars annually, going from the current level of 32 million USD a year to 50 million dollars in 2022 (10).
	Goal 17. Bamboo is part of preserving the culture of the country. By 2022 a cultural history will have been published and a permanent exhibition centre about bamboo will have been set up.
	Goal 18. Bamboo to be used as an efficient energy source, with waste used.
	Goal 19. Rural poverty (in rural sectors whose agro-ecological vocation favours bamboo development) to have reduced 10 percent (2 percent per year).
Strategic Objective 4: Improve governance of the bamboo sector between the main participants of the sector to secure strategic alliances. .	**Goal 20.** The chain actors to have been identified according to their specific activities and the relationship between them defined (primary production, secondary transformation, transportation, trade, and services).
	Goal 21. The institutional operation for the sector to have been consolidated and actors linked to a joint strategy organised.
	Goal 22. At least 10 strategic alliances to be set up between the chain actors and those outside.

Urgent Strategic Tasks

Although all of the actions detailed in the previous point are important, to reach the production jump that the bamboo sector requires, it is essential to achieve the following:

- **Create the operational framework** necessary for the sector to implement the Strategy.
- Articulate policies and actions so that all the cparties involved allocate strategic priority to bamboo activity.
- Identify and develop actions to obtain financial sources for implementation of the strategy.
- Strengthen **local and international strategic alliances.**

Requirements for Implementing the Strategy

Strengthening the Institutional Operation of the Sub-Sector

To form the institutional operation for the sector, it is necessary to identify the actors, establish their responsibilities and capacities, and define agreements. There have already been 10 actor groups put in place:

- **Responsibilities and Capacity of the Bamboo Sectoral Table.** This is the main organisational agency of the subsector that must evolve in its role and configuration towards forming a group with greater competencies in terms of management and technical assistance for the subsector.
- **Responsibilities and Capacity of Producers in the Primary Phase of the Bamboo Chain.** That is focused on achieving links to (and participation in the Strategy activities by) the forestry/farming producers of all sizes. To work on this phase, the grouping and development of organisational capacities is very important.
- **Responsibilities and Capacity of Producers in the Secondary Phase of the Bamboo Chain.** This is focused on achieving links to (and participation in the Strategy activities by) to industrial and artisanal producers. Stimulating the organisation and development of technical capacities and negotiation are very important in this phase. Wood industries should be emphasized within this group of actors.
- **Responsibilities and Capacities of the Artisanal Producers Sector.** Specialised treatment is required within the sector of producers who carry out transformation of the raw materials. In view of the characteristics and the potential market for bamboo handicrafts that is already existent in the country, it is necessary to organise these producers within the chain.
- **Responsibilities and Capacity of Commercialisers/Intermediaries.** Both those who trade within the local market and those at the international level constitute a challenge within the framework for implementation of the Strategy.
- **Responsibilities and Capacity of Producers in the Third Phase of the Bamboo Chain and Provision of Services.** This involves raising awareness of the fact that bamboo activity is not just related to production of goods but is, instead, about overall production of services. It is necessary to achieve links with (and participation in the Strategy activities by) service providers such as tourism, energy, ecosystems, environmental, and cultural fields.
- **Responsibilities and Capacity of the Involved Ministries.** At both central level and decentralised units (provincial management), it is important to articulate and harmonise coordinated work strategies that strengthen the current governmental interventions with a vision to promote sustainable production that explicitly considers bamboo in all of its potential and benefits.
- **Responsibilities and Capacity of Decentralised Autonomous Governments (DAGs).** These deserve special attention, as they act as coordinating agencies of the Strategy in each territory to ensure the articulation of the proposal. They must ensure their interventions are registered in the strategic framework defined for the bamboo subsector. Currently 4 of the 16 prefectures that have bamboo presence are working on the matter.
- **Responsibilities and Capacity of Strategic Alliances.** This includes the academic sector (public and private), the cooperation of governments (local and international), and the producer associations – which are currently minimal in this sector.
- **Responsibilities and Capacities of the Consumers.** This group of actors is key and must be handled with great care because, as consumers, the dynamism of the sector depends on their demand in order to create the market. Their assessment and choice of bamboo products as eligible consumer goods and services is the basis for the development of the sector.

Actor Map and Roles

In general, producers dedicated exclusively to bamboo production in the country have not been identified, as this activity is done to diversify the existing farming production system. With this clarification in mind, the following key actors have been identified:

- **Foresters – Extractors of Natural Forests.** Small, medium and large producers benefit from the extraction of bamboo from natural forests (and, on a minor scale, from plantation). In the majority of cases, the material is extracted without technical criteria[12] and without management plans. This leads to the destruction and clear cutting of the poles and threatens bamboo regeneration. Bamboo is mainly extracted for self-consumption, with some taken for the market through local traders.

  Very few of the actors in this link of the chain are exclusively dedicated to using natural forests or to maintaining bamboo plantations. This activity is considered a part of diversification within the farming/forestry sector. It is an economic strategy to generate resources and additional benefits for producers, families, and businesses.

- **Industrial Producers – Transformation into Processed Goods.** Industrialisation of bamboo in Ecuador is in a phase of research, technological development, and testing of products. The production units are few (around 10), and are located in Guayas, Manabí, Santo Domingo de los Tsahalis, Santa Elena and Pichincha (Puerto Quito and Quito). This is sufficient for the current demand, but the country does not take into account technological centres for the industrial development of bamboo. The business owners make their innovations in an isolated form, using the technology of countries that dominate the market (such as China, India, and others) as a reference. It is fundamental to organise these actors.

- **Artisanal Producers.** There are various groups of artisans dedicated to making crafts out of bamboo. They are key actors in the chain because they already use the waste from the cane. Bamboo is used in making furniture, decorations, tools, musical instruments, jewellery, and more. This group of actors requires organisation to improve results and impact. Currently this activity revitalises the economy for thousands of families who are involved.

- **Traders/Intermediaries for the Local Market and Exports.** The volume of products and type of actors that carry out the transactions distinguish some traders from others:

  - **Small Commercial Producers.** The product offered is extracted from the bamboo on the producer's property, which is generally in Manabí, Los Ríos, Guayas, and some areas in the highlands. They provide material for construction and sell the product on their farm, and they have specific abilities in relation to the market.

  - **Large Commercial Producers.** They have private capital and large areas of cultivation. They work directly with those who are buyers of bamboo for purposes such as construction, banana growing, transformation industries, and exports.

  - **Wholesale Intermediaries.** They have large warehouses for goods and materials for construction. Within their lines, they distribute or sell every size of bamboo without considering its maturity grade, diameter, or quality. In some cases, the providers are retail intermediaries and producers who cover the cost of transporting the bamboo from natural forests. They are generally located in the main cities of provinces with bamboo presence on the Ecuadorian coast.

  - **Retail Intermediaries.** They acquire bamboo in the countryside; they generally buy from plots of natural forests and extract it through clear cutting without considering the state of maturity or diameter of the cane. They are located in communities, rural sectors, parishes, and small cantons.

12 That is, they cut the canes without considering the age or state of maturity.

- **Agricultural Intermediaries.** People with vehicles who buy or collect cut bamboo in areas where they live, or have a farm and sell the product in warehouses in the cities. They are located in the bamboo producing provinces on the Coast. In most cases, the business generates extra income for transporting bamboo to the cities where it is sold.
- **Transportation Intermediaries.** They buy one or two truckloads of bamboo per week and take them to different cities in the highlands where they sell the cargo in warehouses or collection centres for construction materials. They try to carry the greatest possible quantity of product to improve the freight charge. There are drivers from both the coast and the highlands, and their main aim is to collect the freight charge and generate income with their transportation unit.

- **Service Providers: Tourism, Ecosystems, Environmental and Cultural Industries.** Another important sector of the chain, usually not mapped, is that of the providers of services derived from bamboo activity. These are: tourism business owners; those responsible for preserving culture; and those who monitor the sustainability of the ecosystem and environmental services. They include both public and private actors. Incorporating them within the chain of productive use of bamboo is essential for appropriate assessment of the resource.
- **Involved Ministries.** It has already been noted that bamboo activity helps fulfil the objectives of various ministries of the state. Correspondingly, the application of the National Bamboo Strategy requires that the related public institutions recognise it as a fundamental resource and include it in their action plans. According to its competencies, it will mainly focus on:
  - The MAG, as a governing body for agricultural/forestry policies, will include bamboo in the Gran Minga Agropecuaria (Great Agricultural Community Collective) which will incorporate it explicitly in forestry and agroforestry policies and programmes. It will review the current regulatory framework for bamboo use, because producers have difficulties applying these regulations.
  - The MAE, as a responsible member of environmental management, will recognise the role of bamboo in conserving biodiversity, its role in adaptation to the effects of climate change, and its role in restoring ecosystems. The bamboo producers will be beneficiaries of the current economic incentives. They will be included explicitly in the REDD+ Action Plan, and the current regulatory framework relating to the use and mobilising of bamboo will be reviewed.
  - The MIPRO, in its role of promoting the industrial and artisanal transformation of bamboo, will perform specific actions relating to SMEs and handicrafts. Likewise, it will facilitate the regulations and procedures for this productive sector.
  - The MCEI, in its role in the research and placement of new products in the international market, will support by working towards exporting more, and by reviewing trade policies that help substitute imports, as well as through the revision of regulations and procedures for exporting these articles.
  - The MIDUVI, in its role relating to construction with bamboo, will approve sustainable building system prototypes with bamboo, and will review and formulate regulations in this regard.
  - The MINTUR will take advantage of tourism alternatives that can be developed with this resource; establishing, for example, the 'Bamboo Route'.
  - The MEER will use bamboo as a renewable energy source, contributing to reducing the use of fossil fuel in millions of Ecuadorian homes.
  - SENESCYT, MCP and INEN also have important roles within the National Bamboo Strategy in the fields of education, scientific research, cultural promotion, standardisation of quality, and bamboo product design.
  - SENPLADES will incorporate activities from the Strategy into institutional plans (sectoral and national) and prioritise the available resources in every involved institution. To this end, every entity must incorporate bamboo as a strategic resource within its annual operating plan.

Transforming the bamboo sector under current conditions implies parallel actions in multiple areas beyond agricultural/forestry activity. It demands the complementation of other clients and secretaries of State that effectively shape the conditions for the multisectoral development of bamboo in the framework of its competence:

- **Decentralised Autonomous Governments (DAGs).** In conformity with their competencies, the DAG will coordinate and articulate actions in the territories. Currently the prefectures of Pichincha, Santo Domingo de los Tsáchilas, Santa Elena, and Manabí drive the bamboo production chain. Likewise, some municipalities, (such as Chaco, Chillanes, Santa Ana, and Jipijapa) have trained their technical personnel and producers to promote the cultivation and sustainable management of bamboo.

- **Strategic Alliances (public and private academic sector, local and international cooperation, and producer associations).** Each of these actors operates with different points of focus, strategies, and policies to support the different links of the bamboo chain.

    - Currently, nine universities work on this issue: Escuela Superior Politécnica del Litoral (Litoral Technical College); Universidad Católica Santiago de Guayaquil (Santiago de Guayaquil Catholic University); Universidad Estatal Península de Santa Elena (The Peninsula State University of Santa Elena); Universidad Central del Ecuador (Central University of Ecuador), Universidad Laica Eloy Alfaro de Manabí (Eloy Alfaro Lay University of Manabí); Universidad Técnica Estatal de Quevedo (Technical State University of Quevedo); Universidad Tecnológica Equinoccial (Equinoctial Technological University); Universidad de las Fuerzas Armadas (Armed Forces University); and Universidad Regional Amazónica-IKIAM (Amazon Regional University-IKIAM). The academy has a fundamental role in developing specialised research and developing human resources for the sector in distinct areas of knowledge. The research and creation of technologies form a great support to this chain because, in Ecuador, there is low technological and social development in this field.

    - Among the actors involved in international cooperation, it is worth mentioning INBAR, AECID, GIZ, CISP, PNUD. INBAR is distinguished by its permanent presence of more than 20 years. Its aim is to assist with and coordinate programmes related to scientific and technological research and programmes for sustainable development that contribute to solutions for the population and environment. Its role as a promotor and provider of specialised technical assistance in bamboo makes it a key actor in the implementation of the National Bamboo Strategy 2018-2022.

- **Bamboo Sectoral Table.** This is a result of the voluntary work of all the private sectors and supposes a legitimate space of action of the natural competences of the public actors. It aims for a positive outcome of common management and improves opportunities to be the first in line when information is shared. The table is an open space without restrictions which reflects and creates the best possible ways for effective articulation of the actors' viewpoints. It can only exist as long as the actors participate in this process. It does not make arrangements on behalf of any actor; it is the participation of the actors themselves that causes them to take action. It has organizational validation, but no established legal capacity.

- **Consumers.** Currently composed primarily of the construction sector, banana farming, tobacco companies, and other consumers of bamboo furniture and handicrafts. Strictly speaking, the beneficiaries of environmental, tourism, and cultural services, and the users of clean energy (including the state) are also consumers, hence the relevance of this work in society as a whole.

Financial Sources

One central aspect of the Strategy is to promote the allocation of fiscal resources to the ministerial/secretarial ministries involved. That is, under any future fiscal policy, the mentioned public entities will improve their attention towards the producers along the value chain. Various sources of financing are listed below:

- **Kyoto Protocol Clean Development Mechanism.** The current and future bamboo plantations capture carbon (CO_2). There is a market for its sale. Countries such as Colombia and Mexico have this type of experience with bamboo.
- **Private, National and International Large Corporations.** These can support the preservation of the environment by setting up a trust fund to finance sustainable management and use of bamboo. This will help stop the cutting down and extinction of natural forests that provide important services for the ecosystem. As compensation, the businesses will receive financial benefits.
- **Financial Mechanisms and Economic and Honorary Incentives in Environmental Matters.** These are for the benefit of those in the public and private sectors in Ecuador who promote the use of sustainable goods and services related to innovation, technology transfer, and the change of production and consumption patterns. Here are two important types of environmental incentives:
    - **Economic:** tax deductions and credits with environmental considerations, among others.
    - **Honorary:** use of the 'Green Seal' certification label for publicity and marketing, therefore increasing the value of products and services and allowing access to new markets.[13]
- **Local Authority Governments.** These have in Development Plans and Territorial Organization of the Decentralized Autonomous Governments power at the provincial, district, cantonal, and parochial levels to issue ordinances, agreements, and resolutions for the inclusion of sustainability criteria in urban and rural areas in order to promote the development of sustainable communities. They will focus on reducing the ecological footprint, which could favour the search for financing.
- **International Cooperation.** This can finance activities, programmes, and projects related to the achievement of the SDOs including reducing poverty, diversifying income, empowering women, protecting the environment, combating effects of climate change, and using renewable energy. Various funds can be used to implement the National Bamboo Strategy.
- **Economic Contribution to Private Producers Involved in the Chain.** Bamboo activity is practiced almost entirely by private actors (mainly small and medium producers).[14] Production decisions are based entirely on their competence, and revenues are private. The economic contribution to the Strategy, which has a field of action at the national and international level, will result in benefits for private actors.
- **State Incentives.** These will be directed at agricultural and forestry producers and agroindustry businesses in order to expand investment opportunities. In this way, the actors who make up the different links in the bamboo production chain will commit themselves to the implementation of the Strategy.

13 Ministry Agreement 140, Institutional Framework for Environmental Incentives written by the MAE in 2015.

14 The mentioned activities are marginally promoted by provincial governments, as illustrative effects more than as corporate businesses.

The Future of Bamboo in Ecuador

Bamboo is a raw material with which a better future for Ecuador is being built. Various ongoing initiatives are part of the government's support for this resource:

- After the earthquake that affected Ecuador's Coast on 16 April 2016, bamboo was revalued and used as 'vegetable steel' for construction in the affected area.
- This led to bamboo being included as a component in Social Housing Programmes.
- The Ecuadorian Construction Regulation was issued with bamboo. It is included in discussions of the 'Hábitat Rural para el Desarrollo Sostenible' (Rural Habitat for Sustainable Development).
- Research, development and innovation to create products with high added value using this resource are part of the new research agenda.

Currently, in the symbolic MAE programme 'Reverdecer Ecuador' (Greening Ecuador), core ideas of economy and restoration are operating in the brand BIOECUADOR. This deals with developing the bio-economy through bio-enterprises and bio-industries. Within these areas, bamboo offers important contributions. Under the sustainability and management approach, bamboo and other species are integrated in the MAE restoration programme. *Management*, now included in the restoration, is a paradigm change that goes beyond the preservation-focused approach that was previously applied.

For its part, MIDUVI is working on social real estate projects with the aim of providing housing for ancestral communities to achieve the goal of building 125,000 homes annually. At the same time, the private sector demands new construction typologies for sustainable housing. The bamboo sector has a great opportunity within the national urban agenda which studies urban real estate and alternative construction processes. MIDUVI is trying to break the stigma that exists in social housing in order to create community and habitat. Its teams have been able to raise very positive synergies. Equally, there are ample possibilities to work with bamboo in rural housing programmes through the initiative 'Hábitat Rural' (Rural Habitat).

For these reasons, the Ecuadorian government is insisting on carrying forward the National Bamboo Strategy 2018-2022. This will lead to technical use and sustainable management of the resource activating the multisectoral development. With this, it hopes to improve the situation of about half a million Ecuadorians, especially in rural areas, by creating high-impact social, economic and environmental benefits.

The Availability of the Resource

Ecuador has great potential for meeting a growing demand for bamboo, as indicated in the agro-ecological zoning map of bamboo in Ecuador,[15] in which 3,370,868 hectares have the potential for the development of this species in natural conditions (optimal and moderate) (see Appendix 8). Likewise, the data on areas with bamboo presence in Ecuador show around 600,000 hectares (natural areas and plantations) of which around 15,000 (barely 2.5% of available space) is currently being used.

15 Agro-ecological zoning map for the cultivation of bamboo (preliminary), MAG-CGSIN, 2018

Opportunities in the National Market

Under the new scenario of a culture of appropriate bamboo use, awareness of its value and usefulness, and improvement in quality of products, demand at local level will increase. The specific actions that drive the Strategy to increase and diversify markets for new products, adapt products to the consumer's needs, and develop the country brand, together with the product consumption as demonstrated by the state, will also lead to the increase in domestic demand.

Taking advantage of bamboo's multisectoral potential by developing new types of agroindustry and expanding its use in building accessible housing to different social strata (high, middle, and low) will undoubtedly increase local demand for the material. Using it as a tourist/landscape resource and as a source of cheap and renewable energy will also increase the demand.

In addition, as scientists and public policy makers recognise the need for strategies for adaptation and mitigation of climate change, fighting rural poverty through sustainable production systems, and increasing awareness about restoring natural resources, bamboo will gain recognition and the possibilities for consumption will increase at both local and international level.

The total potential domestic demand amounts to more than 103 million canes per year, which could be produced in 74,260 hectares. This volume could be handled by the subsector without difficulty since there is an existing base for the development chain. Currently, just a fifth of this potential demand is covered.

When seeking a balance between domestic supply and potential domestic demand, an unsatisfied demand of 80% (61,229 hectares) is estimated across the different links of the chain. This demand could be covered if the full potential of this activity is promoted (see Appendix 8).

Table 3 Potential and Current Bamboo Demand* in the Internal Market

Potential Internal Bamboo Demand				
Consumption Sector	Potential Demand to 2022		Current Demand 2018	
	N°of Whole Canes	N° of involved Ha.	N° of Whole Canes	N° of involved banana Ha.
Banana	66.000.000	55.000	5.500.000	4.583
Tobacco Companies	20.314.093	4.675	6.545.000	1.506
Housing	2.500.000	2.085	1.260.000	1.051
Culm Storage (Agroindustry and Craftwork)	10.000.000	8.333	4.824.000	4.020
Farm Consumption (self-consumption)	5.000.000	4.167	4.459.920	3.717
Total Internal Demand	103.804.096	74.260	22.588.920	14.877

**Guadua angustifolia species, Dedrocalamus asper, other species.*

Opportunities in the International Market

The main bamboo producer and exporter worldwide is China, according to statistics from UN COMTRADE from the ITC. This country is the indisputable leader because of its great expanse, highly developed technology, and financial resources for product research. It has low workforce costs and has expanded the value chain to fully exploit this resource's potential over a long time. Indonesia, the island country located in the southeast of Asia and Oceania, is the second highest-producing country. In 2017, Ecuador was number 79 out of 167 countries that export bamboo globally, despite the fact that the volume exported to the Peruvian market that does not appear in official statistics. Being a small country with limited resources, the relevance of this product for Ecuador in terms of generating foreign currency is clear, even without positive actions for product development. Considering the potential for production in the country, if the chain is given a major boost then the volume of exports is likely to increase significantly.

The main buyer in the world is the United States, with imports close to an average of 150 million dollars annually in the last 5 years. Its main provider is China. There are also important buyers in various European countries including the Netherlands, France, Italy, Spain, and Portugal. In Latin America the important buyers are Chile, Argentina, Uruguay. and Peru. Ecuador could gain all of these markets under current trade agreements.

The worldwide demand for bamboo is growing. The global tendency to substitute non-renewable products for those that are renewable (such as bamboo) points to a growing global demand for this plant material. Likewise, spreading awareness about the environmental benefits of bamboo will increase its market. The export potential for the country could cover the external demand by at least 3 million stems/year.

Table 4 Potential External Bamboo Demand*

Potential External Bamboo Demand				
External sector	Annual Potential Demand		Current Demand 2018	
	N° of Whole Canes	N° of involved Ha.	N° of Whole Canes	N°of involved Ha
Future Exports	3000,000	2500	784,800	654

**Guadua angustifolia species, Dedrocalamus asper, other species.*

Consequently, an international market for bamboo and its derivatives exists. Ecuador has the productive capability and has sufficient areas suitable for bamboo cultivation that are not being used. What is missing is development of the production chain and finding niches in the international market that demand specialised products with high added value tied to the nature of the product. This requires exploring products with implicit design components and developing prototypes.

Current Challenges

Local consumers and the external market are increasing their demand with the production of goods and services. They demand production processes that resolve various problems simultaneously: higher yields that don't affect the health of consumers, are not costly, are competitive, are friendly to the environment, and address the pressures of climate change. In this context, the main challenges that the National Bamboo Strategy faces are to:

- Change the cultural paradigm about the value of bamboo; raise awareness among consumers about the benefits of its use for families and society, and overcoming any resistance.
- Improve the technical efficiency in the production process (extraction, preservation, drying, transportation, industrial/artisanal transformation, commercialisation), as well as modernising the distinct areas of production (silviculture, post-harvest management, tourism) to obtain quality products with competitive prices.
- Improve development of the chain under the focus of sustainable production and appropriate management of the resource.
- Increase commercialisation channels, find new markets, decrease the intermediation chain, counteract the obstacles and asymmetry of information in bamboo trading, and overcome the difficulties in order to compete with related products.
- Diversify the agricultural-silvicultural production, taking advantage of the multiple uses that bamboo offers; develop new types of agro-industry.
- Launch social housing projects with alternative construction systems such as bamboo.
- Take advantage of potential bamboo tourism with the 'Bamboo Route'.
- Use bamboo and waste products in efficient energy projects, panels, and thermal isolation, among others. This abundant resource, currently largely unused, can considerably diversify production.
- Create specialized knowledge and new technology for the management, treatment, transformation, and consumption of bamboo.
- Develop human resources at every level of specialisation, and on every cycles and industrial area of bamboo. In the absence of specialised services for the development of this activity, it is necessary to develop a service platform.
- Develop the institutional operation of the sector for the new stage.
- Achieve effective empowerment of and cooperation between the actors in the different links of the bamboo production chain in order to improve it.
- Align public policies with private actions and form strategic alliances for the bamboo sector.
- Achieve political and technical backing to assign strategic priority to bamboo activity.
- Obtain financing for the development of the production chain.

In the 21st century the bamboo production chain has registered specific advances, but these have not been able to impose dynamism and continuity on the subsector. On the contrary, there is a tendency for bamboo to remain unused or unnoticed by their owners, hence the relevance of undertaking strategic actions.

The future of the bamboo sector is definitely promising. It requires political decision, business involvement, and public commitment to undertake the actions related to the strategic direction formulated in the National Bamboo Strategy 2018-2022.

Appendices

Appendix 1
Methodological Explanation of Identified Areas with Nationwide Presence of Bamboo

The process considered for determining the areas with bamboo presence at a national level in Continental Ecuador involved four methodological phases: 1) Official bibliographic and cartographic review at different levels; 2) Collection of statistical and geographical data based on the biophysical criteria of the crop that will allow for collection of data variables related to areas with bamboo presence; 3) Processing of statistical and geographic information compiled through the use of a Geographic Information System (GIS); and 4) Determination of the final geographic layer of the areas with bamboo presence and the generation of a map at the national level (figure 1).

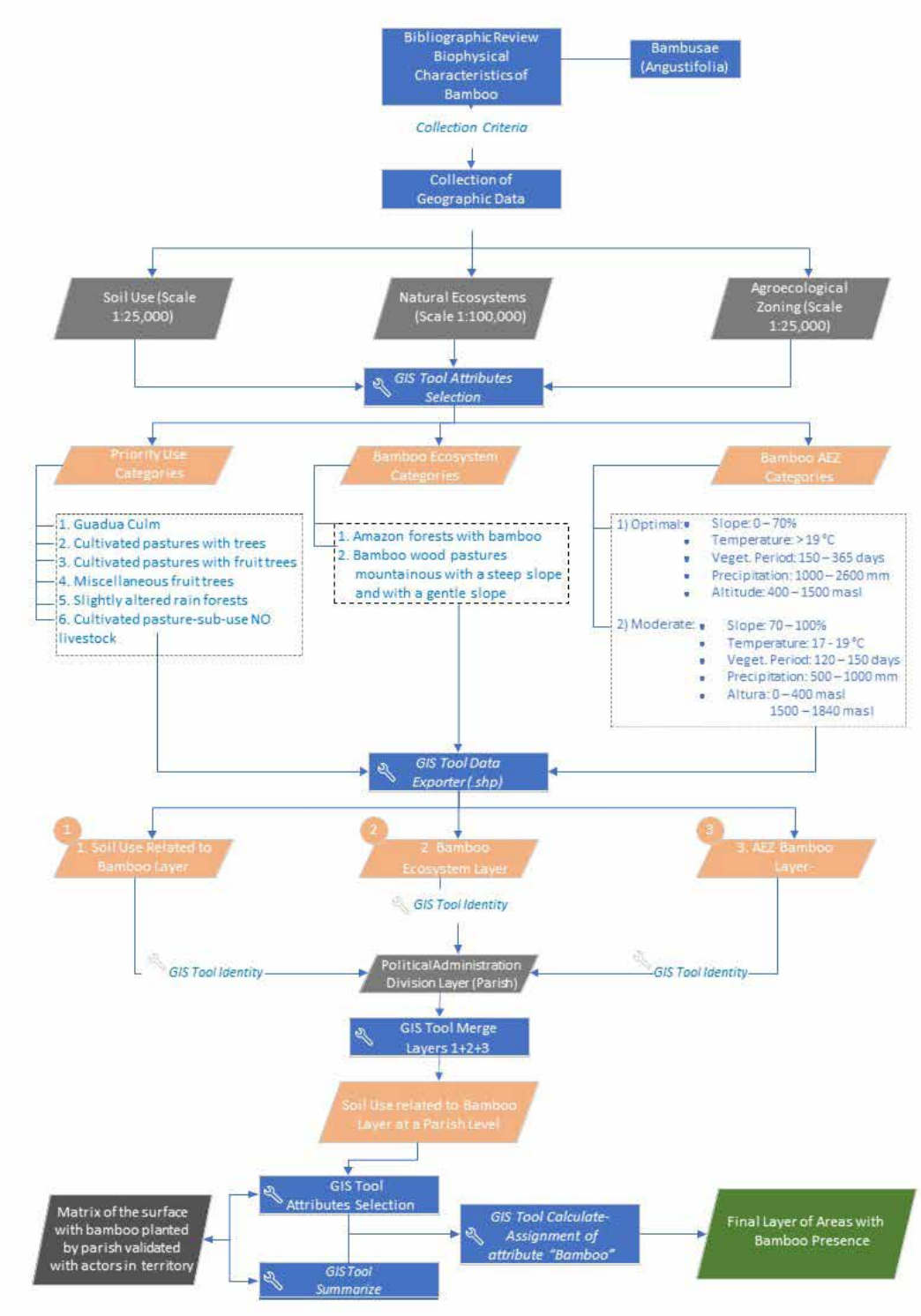


Figure 1. Methodological flow to determine areas with bamboo presence[16]

16 This methodological note was prepared by the geographer Santiago González and by the economist Mariana Naranjo.

1. Official Bibliographic and Cartographic Review at Different Scales

This phase of the process consists of reviewing the bibliography and cartography of two types of information:

a) Review the available statistical information. Due to the lack of current and comparable comprehensive information about the current areas with bamboo, an exhaustive process of surveying and systemising statistical and cartographic information was carried out. In this phase, all existing partial studies about the current areas with bamboo since the beginning of the century were revised.[17] These are generally focused on samplings from the main areas of current bamboo use (Manabí, Los Ríos, Santa Elena, Santo Domingo de los Tsáchilas, and Pichincha).

b) Review of technical-scientific documents that allowed for determination of the biophysical characteristics of bamboo, considering that Ecuador has 46 registered species (11 of which are endemic) of bamboo distributed in five genera: *Arthrostylidium*, *Aulonemia*, *Chusquea*, *Guadua and Rhipidocladum*. Likewise, since 1923, new bamboo species have been introduced, especially from Asia, inculding: *Bambusa tulda Bambusa ventricosa, Dendrocalamus asper Dendrocalamus latiflorus, Dendrocalamus longispiculata, Dendrocalamus oldhamii, Melocanna baccifera, Phyllostachys aurea, Phyllostachys nigra and Phyllostachys pubescens*.

Table 1. Biophysical Characteristics of Bamboo[18]

Subfamily	Perennial grass
Tribe	Bambusae
Genera in Ecuador	*Arthrostylidium, Aulonemia, Chusquea, Guadua and Rhipidocladum*
Soil	pH between 3.5 – 6.5
Size of the Plant	1 to 25 meters tall
Altitudinal Range	0 – 4000 MAMSL
Precipitation	From 1000 mm., to more than 4050 mm per year; with good distribution throughout the year.

2. Collection of Statistical and Geographical Information

a) Collection of Statistical Data: In order to obtain updated information about the current areas with bamboo, data from the territories was gathered. Producers and specialists in the areas currently using bamboo were consulted. This data was partial in some areas according to the knowledge of those who were consulted. The information served as a reference for quantification of areas with bamboo.

Statistical data about foreign trade of bamboo products and derivates provided by the Banco Central del Ecuador (Central Bank of Ecuador) was used. The volume of bamboo cane exported to Peru was estimated (it is not registered in official counts due to the prevalence of illegal trade).

17 The detailed version of these studies is available in the bibliography of the document 'National Bamboo Strategy 2018-2022'.

18 Ministry of the Environment, Unique Environmental Information System – Forest Monitoring System, Development Methodology Report and Results: Preliminary Map of Optimal Zones for the Development of Bamboo Report, May 2018.

In the same way, the statistical data from MAE 2018 about the mobilisation of bamboo cane in Ecuador were evaluated according to province, canton, parish and precinct. The statistical data on areas with bamboo from SIGTIERRAS-MAG (available for 42 cantons of the country) were evaluated.

b) **Collection of Geographical Data:** Once the biophysical characteristics of bamboo were established, collection of geographic information was performed. This shows the different variables needed to identify land use that have a direct relationship with the presence of the plant at a national level. Additionally, in this phase, the technical parameters were defined for the collection of appropriate geographic data, working towards obtaining a map of areas with bamboo presence. In this sense, the main technical parameter used to collect the geographic information used in the process is the scale. This is because appropriate detail is required to identify the areas with bamboo in Ecuador. The scale considered in this study has a parameter of 1:25,000, the primary base of geo-information. However, geo-information has been collected on a relatively large scale that are important as support for the process of generating and analysing the map.

The geographic information considered for the quantification of the areas with bamboo presence corresponds to 7 maps that are detailed as follows:

Table 2. Geographic Collected Data

Geographic Layer	Scale	Coverage	Generation Period	Source
Coverage and Land Use	1:25,000	National	2010 – 2015	Ecuadorian Spatial Institute, Ministry of Agriculture and Livestock, National Secretary of Planning and Development
Map of Cultivation of Guadua Cane or Bamboo [19]	1:25,000	National	2009 – 2014	Ministry of Agriculture, Livestock, Aquaculture and Fisheries. CGSIN – 2017
Map of the Areas where Guadua Cane Currently	1:25,000	National	2017	Agricultural Productive Systems Information from the Ecuadorian Spatial Institute in participation with MAG-2017.
Agro-ecological Bamboo Zoning	1:25,000	National	2018	Ministry of Agriculture and Livestock 2018
Map of Natural Ecosystems	1:100,000	National	2014	Ministry of Environment
Preliminary Map of Areas Suitable for Bamboo Development	1:25,000	National	May 2018	Ministry of Environment
Administrative Political Limit	1:50,000	National	2010	National Institute of Statistics and Censuses

19 The map generated by MAGAP-CGSIN, by the characteristic of the crop and by virtue of the methodology of information collection, does not properly capture the areas with bamboo presence. It mainly captures from 5 Hecatres and does not consider river banks and property edges. While bamboo is primarily developed in small farms (5 hectares), and even more so in properties smaller than 1 hectare, it develops abundantly in river banks and is present in diverse systems with other species.

The combination of the two types of information (statistical and geo-information) validate the data and the location of the areas with some bamboo cover at province, canton (second level subdivision), and parish levels.

3. Processing of Statistical and Geographical Information

a) Processing of Statistical Information

From the statistical information detailed above, the values corresponding to each area with bamboo presence were quantified. The entire national territory (and riverbanks in areas with surrounding bamboo presence) were considered. Values were derived from the different sources of statistical and geographical information available. They were processed and systematised in detail at parish level.

Information was not available within all of these areas at a parish level. The calculation of areas with bamboo presence for this level of disintegration (internal) was done using an estimation model of statistical data which created data within the areas (parishes). With this procedure, complete information on all the identified areas with bamboo presence, provided by key actors in the territory, was obtained.

The calculated areas were confirmed by crop data from bamboo mapped to a scale of 1:25000 within the layer of Productive Systems of the Ecuadorian Spatial Institution in agreement with the MAG. Additionally, it was confirmed by the area information from INEC (last administrative political division to 2017) and by the agricultural area information from ESPAC. A review of expert opinion was used in addition to the geographical analysis described in the previous point and the detailed processing below.

b) Processing of Geographical Information[20]

This was based on Coverage and Land Use; Agroecological Zoning of Bamboo; and Natural Ecosystems, with the GIS tool ***Attributes selection***. Variables that have the closest link to the biophysical relationship with bamboo were identified. They are detailed in the following table:

Table 3. Selection of Geographic Variables Related to Biophysical Characteristics of Bamboo

Layer	Selected Variables
Coverage and Land Use	1) Guadua bamboo
	2) Cultivated pastures with presence of trees
	3) Cultivated pastures with presence of fruit trees
	4) Miscellaneous fruit trees
	5) Slightly altered rain forest
	6) Cultivated Pasture – sub-use NO livestock
Natural Ecosystem	1) Amazon forests with bamboo
	2) Bamboo wood pastures mountainous with a steep slope and with a gentle slope
Agroecological Zoning of Bamboo	1) Optimal
	2) Moderate

20 http://desktop.arcgis.com/es/arcmap/10.3/main/get-started/arcgis-tutorials.htm

For each of the layers whose variables were mentioned, Data Exportation was performed. This allowed the creation of three new layers in the shapefile format using the tool ***Data Export***. Subsequently, the three new layers that were considered variables related to the biophysical characteristics of bamboo were geometrically intersected with the Political Administration Division Layer at a parish level. Each of the areas related to bamboo has a localisation characteristic at the province, canton, and parish level.

Through the use of the GIS tool **Merge,** the three resulting layers mentioned in the process described previously were merged. This tool allows a combination of multiple layers to produce a single layer that considers all of the data variables from the original layers used in the process. In this way, the preliminary areas with bamboo presence were obtained.

The use of the database in alphanumeric format details the surfaces planted with bamboo at the parish level. This information was verified with key stakeholders in the territory. It was spatialised in the preliminary layer of areas with bamboo presence (result of the previous process). The parameters for the selection of the categories of coverage and use related to bamboo were considered. Besides parameters of geographic location suitable for bamboo development (such as altitude), the goal was to map the surface at a parish level determined in the matrix and validated with actors in the territory. To achieve this objective, the GIS tools **Attribute Selection** and **Summarise** was used.

The aforementioned statistical quantification and its validation through the cartographic process allowed for the determination of areas with bamboo presence. It must be noted that this is extrapolated preliminary data that needs to be validated in the field.

4. Determination of the Final Geographic Layer of Areas with Bamboo Presence and Map Generation at a National Level

Once the areas with bamboo presence at a parish level were defined, the **resulting maps were structured** for the corresponding publication. The areas coincide with the surface of bamboo coming from the aforementioned work of statistical systemisation (from various primary and secondary sources). In this way, two maps were created:

1) *Referential Map of the Main Areas with Bamboo Presence:* in this map, the main areas with bamboo presence, the provincial limits, provincial headwaters, and the main road network at a country level are spatially identified (figure 2).

2) *Map of Bamboo Agroecological Potential vs. Main Areas with Bamboo Presence:* the location of zones with bamboo presence in areas with potential for bamboo production have been identified. The Optimal and Moderate categories established in the Agroecological Zoning of Bamboo created by the Ministry of Agriculture and Livestock have been considered. In addition, baseline information for provincial boundaries, main roads, and main cities has been included (figure 3).

Note that this exercise is a first approximation of the current surface with bamboo presence in Continental Ecuador. The same must be validated through field verification processes with appropriate tools for this type of forest.

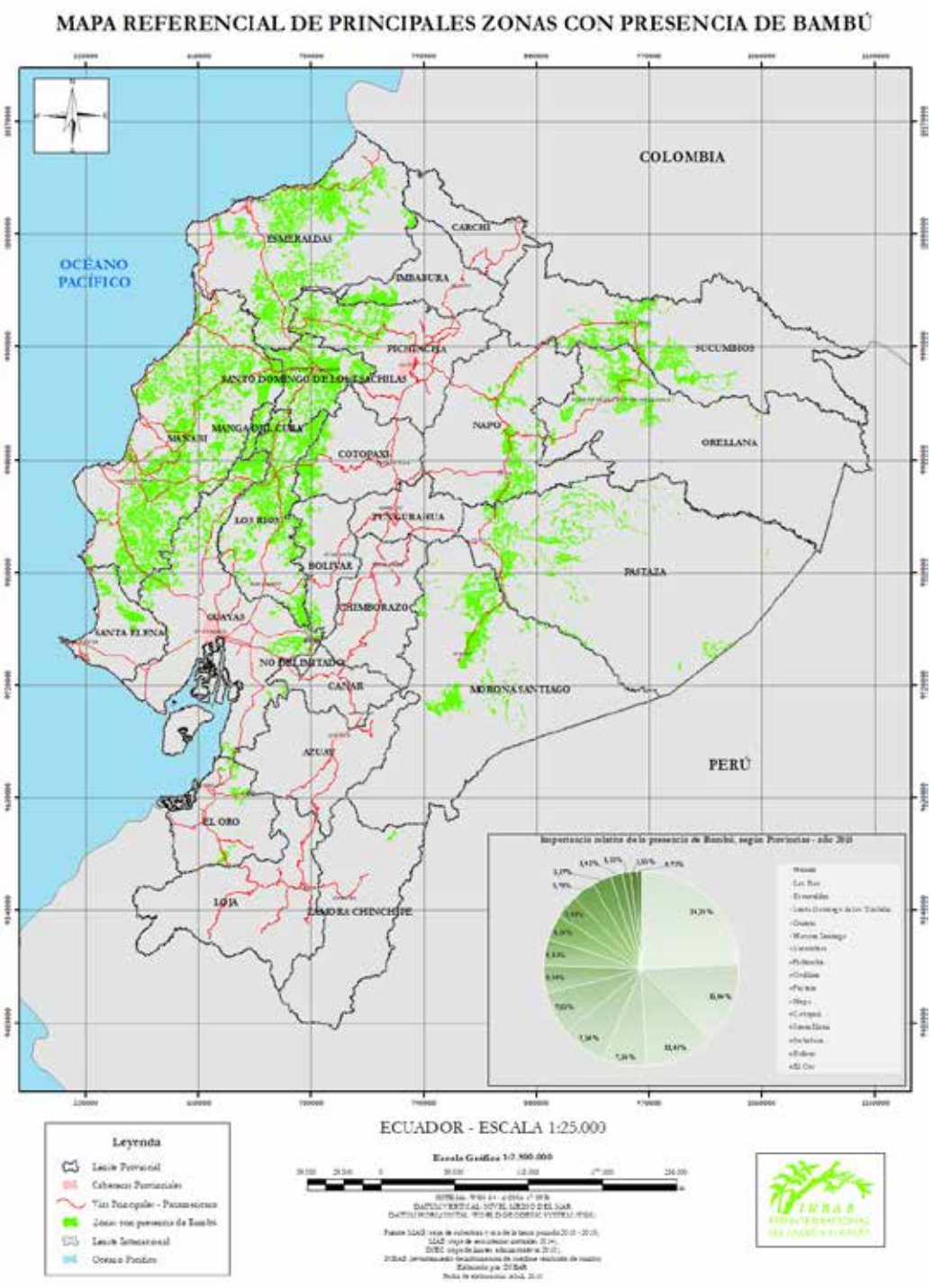


Figure 2. Referential Map of the Main Areas with Bamboo Presence

Reference map of the Main Areas with Bamboo Presence

Relative Importance of Bamboo Presence according to Province (2018)

Ecuador – Scale 1:25,000

Legend, Provincial Limit, Main Cities, Main Roads-Panamericana, Areas with Bamboo Presence, International Border, Pacific Ocean

Map of Bamboo Agroecological Potential vs. Main Areas with Bamboo Presence:

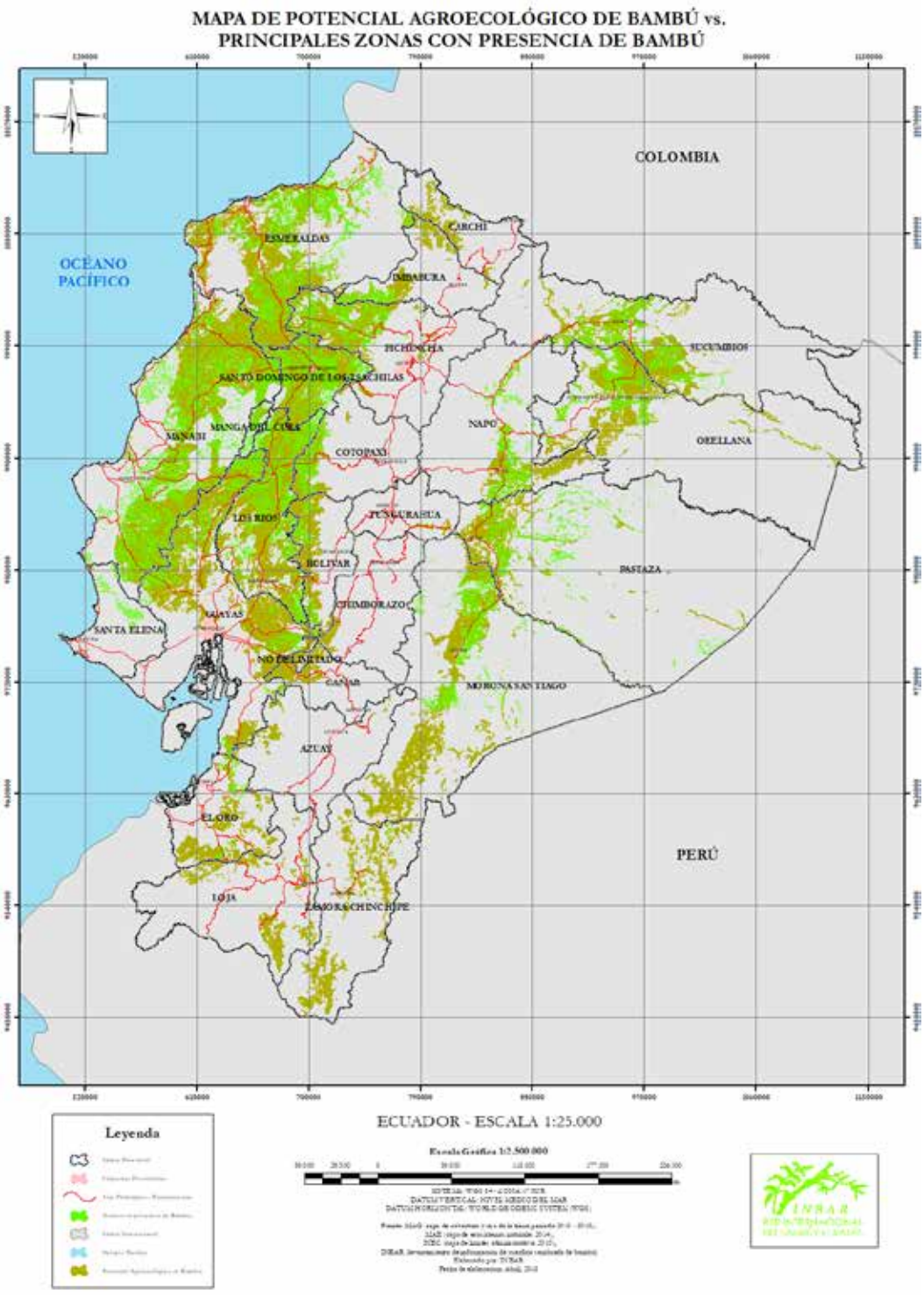


Figure 3. Map of the Agroecological Potential of Bamboo vs. Main Areas with Bamboo Presence

Legend, Provincial Limit, Main Cities, Main Roads- Panamericana, Areas with Bamboo Presence, International Border, Agroecological Potential of Bamboo

Appendix 2
ECUADOR: Main Bamboo Production Areas by Province, Canton, Parish and Precinct (*) Year 2018

(**)	Province/Region	Canton	Parish	Sector/Precinct
1	**El Oro**	Balsas	Balsas	San Roquito
		El Guabo	Rio Bonito	Rio Siete
		Pasaje	Casacay	Casacay, Huizho, Tobar
			Progreso	La Fortuna, Mollepongo, Progreso, Rajaro
		Piñas	Moromoro	Palosolo, Platanillos
	Province Subtotal	**4**	**5**	
2	**Esmeraldas**	Rioverde	Chontaduro	Chontaduro, Papayal
			Chumunde	Nache, Unian de Cumunde
			Lagarto	
			Montalvo	Naranjal
			Río Verde	
			Rocafuerte	
		Quininde	La Unión	La Florida-Empresa Servialimentos S.A.
			Malimpia	5 de Agosto, La Quinta, La Sexta, Las Golondrinas,
				Malimpia, Nueva Esperanza, Ronca Tigrillo,
				San, Cristobal, Valle del Sade
			Rosa Zarate	5 de Agosto, Cupa, Dogola, El 200, El Mirador,
				El Quizpe, El Viudo, La Esmeraldita, La Quinta,
				Recinto Hoja Blanca, Recinto Matamba, San Ramon
				San Antonio de Mache, San Isidro, Santa Elvira,
				Unión Manabita, Velez Tapaje
			Viche	Bellavista, Magua-Timbre, Recinto la Y- Oro Verde,
				Viche
		Esmeraldas	Camarones	La Carmelita
			Crnel. Carlos Concha Torres	El Able
			Tabiazo	Las Cruces, Tibiazo

(**)	Province/Region	Canton	Parish	Sector/Precinct
		San Lorenzo	Calderon	Calderon, Ricaurte, Via Ibarra-San Lorenzo
			Carondelet	Guavina
			Santa Rita	San Francisco, Santa Rita
			Concepcion	Chillavi, Concepcion, Frente a Timbire,
				Maldonado, Rocafuerte, Winbicito
			Alto Tambo	Alto Tambo
			Tululbi	Ricaurte
		Eloy Alfaro	Anchayacu	Anchayacu, Boca de Onzole, Hoja Blanca, Tangare
			La Tola	KM3 Via Borbón
			Maldonado	Maldonado
			San Jose de Cayapas	El Manzo, San Antonio
			Santa Lucía de las Peñas	
			Borbon	Borbon, KM14
			Telembí	
			San Francisco del Onzole	
	Province Subtotal	**5**	**27**	
3	**Guayas**	Balzar	Balzar	Clementina, Monocongo, Recinto Cadeal
		Colimes	Colimes	La Paulina, Guabito, Mesada de Arriba, Saquiel
		Crnl. Marcel Maridueñas	Crnl. Marcelino Maridueñas	
		El Empalme	La Guayas (Pueblo Nuevo)	Los Naranjos, Corotu, Chicompe, Cristobal Colon,
				El Liman la peseta, El Zapote, Estreo Chico, Fruta de
				pan, La Caraca, La Guayas, La Montañuela, La Saiba,
				Las Cucharas, Las Culebras, Macul, Pedro Velez -
				Carlos Julio, Recinto La Bimba, Recinto Las Guayjas
				Salto Chiconombre, San Celestino, San Roque,
				Sitio El Limón.

(**)	Province/Region	Canton	Parish	Sector/Precinct
			El Rosario	El Rosario, La Dama/Los Latones, Recinto El Congo,
				San Cristobal
			Velasco Ibarra	Bella Trinidad Macul, El Rosario Chonero Lote 8
				Recinto el Limon, San Francisco Carlos Julio, Zona 25
				4 Mangas, La Clemencia el congo, Recinto El Rosario,
		El Triunfo	El Triunfo	Colonia Amazonas, El Atasco,
				El Piedrero, Latascoso, Rio Blanco
		General Antonio Elizalde	Gral Antonio Elizalde -Bucay	Barranco Alto, Buenos Aires, El Pedregal, Ester Maria,
				San Lorenzo Sabana, San Pedro
		Guayaquil	Tenguel	Rio Siete
		Naranjal	Jesús María	
			San Carlos	Sitio Calderon, Via Principal
		Pedro Carbo	Pedro Carbo	El Pasaje, Jerusalem, La Cadena, Matilde Esther, Procel,
				Recinto santa Rosa de Villa, Villao
			Valle de la Virgen	Las Muras, Recinto Caña Brava, Recinto Cerezal
		Simon Bolivar	Simon Bolivar	El Arenero, Riochico
	Province Subtotal	**10**	**14**	
4	**Los Ríos**	Buena Fé	San Jacinto de Buena Fe	La Reserva, Hda. San Sebastian; Fumisa
				Las Piedras
			Patricia Pilar	En km 41 , Coope. Río Manzo, Los angeles
				Lola Gangotena
		Babahoyo	Caracol	Cañaveral, Caracol, Hacienda la Jagua
			Febres Cordero (Las Juntas)	Balparaiso, Colombia del Atio, El Achiote, El Prado,
				Sector Matilde, El Tigrillo, Esperanza, Fortuna 2,

(**)	Province/Region	Canton	Parish	Sector/Precinct
				La Admiracion, Colombia Alta, La Envidia, La Plata,
				La Suerte, Margoth, Matilde Esther, Las Juntas,
				Resinto Admiracion, Recinto Estero Blanco,
				Recinto La Teresa, Valparaiso, Riochico, Rosa Elvira,
				Saltadero, San Lorenzo, Santa Lucia, Sector El prado,
				Monserratte, Soledad, Via El Otoño
		Montalvo	Montalvo	El Cisne, Lota Victoria, El Mirador, Genovesa,
				Haciendda La Balsera, Juana Maria, La Esmeralda,
				La Esperanza, La Estrella, La Vitalia, La Y Puerto Arturo,
				Recinto Margarita, Recinto San Pedro, San Jacinto,
				Las Balsas, Las Mercedes, Los Verdacos
		Quevedo	La Esperanza	La Cadena, Sector Nueva Esperanza
			Quevedo	La Estrella, Gallo Giro, Recinto La Ladrillera,
				Tenis Club Via al Emplame, Villa Franca
			San Carlos	Fruta de Pan
			San Camilo	Cañalito, San Camilo Norte, Sector Montoya
			Siete de Octubre	Sector Campo Santo Colina de los Recuerdos,
				Sector del Guayacan
		Valencia	Valencia	6 de agosto, Federico Intriago, Chollo, Calope, Chemere
				Colonia Chpe Hamburgo, Colonia Sucre, Cooperativa
				ni un paso atrás, Costa Azul, Costa Verde, Cuatro Manga,
				El Tarro, El recreo, El Sapote, El Tigre, Estero Nuevo,
				Gonzalez Suarez, Guampe, Hacienda la Paz,
				Hcda Centragen, La Baltazara , La Belisaria, La Cadena,
				La Lucia, La Nueva Union, Las Chavicas,
				Los Transvales, Pambilar,Poza Honda, Recinto Chipe,

(**)	Province/Region	Canton	Parish	Sector/Precinct
				San Simón, Oasis, San Alejandro, Manguila, San Pablo
				Isla de La libertad, El Bimbe, Vergel, Recinto Predrancone
				Recinto Rio Chila, San Melesio, San Pablo, Sector 12 de
				Octubre-Costa, Toachi, Toachicito Rio Negro, Valencia,
				Vega de Maiz, Via Chone KM4, Victoria de Pambilar,
				Zona 23, Zona 7 - la familia km13 via Fumisa Delia, Zona 8
				Hdas: Lastenia, Delia María, La Sucre Wonkingmay,
			El Vergel	A un Km de las Palmitas via EL vergel, Colonia Sucre,
				La Cayambe, La Frontera, La Sucre, Sector
				Tres Cruces, Sitio Pechichal, Zona 10 La Frontera
		Quinsaloma	Quinsaloma	Hcda. Maravilla, Fernando la Delicia, Guamaloma,
		Baba	Baba	Hda. Sotogil, San Antoniio, Recinto El Arenal
			Guare	La Guayaba, La Carmela
		Vinces	Vinces	Hcda. Casa Vinces
		Mocache	Mocache	Peñafiel , Aguas Frías, Pichilingue, Barrio Colorado,
				Cepa de Caña, Divina Miserico, El Guabito, El Naranjo,
				Finca Gustavo, Huancavilca, Isabel Maria, la Cruz, la R
				Recinto Garza Grande, Recinto Loma de Mera, Rosita
				Toquillal, Topezon - Bella Sombra,
				Maculillo, Mocache, numero7, puente de palo,
				Pajarito, Bella Aurora, Bella Sombra, Bijagual,
		Ventanas	Ventanas	La Industria, Recinto el Pailon, San Francisco Zapotal
			Zapotal	Cumandá, El Carmen, El Guabito, Flor de Rios, Bonanza
				Loma de Capilla Guineo, Los Angeles, Tarira, Z. Viejo
		Urdaneta	Ricaurte	
	Province Subtotal	**11**	**20**	

(**)	Province/Region	Canton	Parish	Sector/Precinct
5	**Manabí**	Chone	Boyaca	Platanales
			Canuto	Buena Ventura, Canuto, La Chorrera, Las Habras, Mem-
				brillo, San Elias, San José Boca de Tarugo de Rio Grande
				Sitio La Chorrera
			Chibunga	Chibunga, Las Monce, San Juan de Bua
			Chone	Crespa, Cucuy de San Isidro, El Bejuco, El Zapallo,
				Eloy Alfaro, Garrapatilla, La Boca de Coño, las Cañas
				Marcos, Sesme, Rancho Viejo
			Convento	3 Esquinas, Convento, La Consencion, Rio Santo,
				Sitio Las Piedras
			Eloy Alfaro	Eloy Alfaro
			Ricaurte	Barragán, Garrapata
			Santa Rita	Rio Grande, El Mate
			San Antonio	
		Flavio Alfaro	San Francisco de Novillo	El Novillo, Las Hierbas, Las Vacas, Mongolla, Sitio de los
				Higuerones, Tigre Puerto Nuevo, Tripa de pollo
			Zapallo	Sitio Facundo, Zapallito
			Flavio Alfaro	el golpe, Flavio Alfaro, la chontilla, la Crespa, la Morena
				Mascara, Rio Mongoya
		Jipijapa	Puerto de Cayo	
			Jipijapa	Agua dulce, El Barro, Noboa, San Pascual, Palmital
			La America	Colon, La Crucita del mamey, Recinto San Pedro,
				Sitio Potosi, Sitio Pacheco
			El Anegado	Buenos Aires, El Carmen, Los Andes, Los Pocitos,
			La Unión	Vargas Torres
			Pedro Pablo Gómez	La Curia, las nieves, Pedro Gomez, Las Leticias, Placido

(**)	Province/Region	Canton	Parish	Sector/Precinct
		Junín	Junín	2 bocas, Agua Fria, Andarieles, El algodón, el Palmar,
				la Florida, las Brisas, Rio Frio, Sitio la Tablada,
				Sitio Cañalascruces
		Olmedo	Olmedo	barranco Colorado, Bellavista, Boqueron, Briones
				Boqueron, El Empalme, El Guasmo, El Junco, El Limon,
				El Pescado, el Secado, La Margarita, La Mercedes, Puca
		Sucre	San Isidro	Chimborazo, San Isidro, Sitio Piquigua
		Paján	Capozano	El Corozo, El Encuentro, El Puente, Las Casitas, Procel
				Los Dos Rios, Tierra Amarilla
			Cascol	Boca de Guanabano, Flor de la Cruz, La Guayaba de la
				Martinica, La Victoria, Las Crucitas, los Palmares,
				San Vicente, Sitio Tres Marias
			Guale	Guale, La Comunna, Roncador
			Lascano	El Porvenir
			Pajan	el Pijio, Mocoral, Poza de agua
		Pichincha	Barraganete	Barraganete, Mata de Cacao
			San Sebastián	Contillal, El Moral Adentro, Las Asucenas, Las Guaijas,
				Naranjillo, Piedra Fina, Sitio 103, San Sebastian
			Pichincha	2 de Agosto, 2 de Mayo, Bandurria, Chonero,
				Come y Paga, El Progreso- Rancho Sada, Santa Rosa
		Jama	Jama	Palmar
		El Carmen	Wilfrido loor (Maicito)	Boca de Suma, km 70 Via Chone, La Cristalina,Roncadora
				La Sandia, Maicito, Piojo, Virgencita
			4 de Diciembre	Comunal-Limones, Comunal-Tropezon, Luz del Carmen
			San Pedro de Suma	Sector Agua Sucia, Estero Ancho, La Abramadora,
				San Pedro de Suma, Suma, Tigre

(**)	Province/Region	Canton	Parish	Sector/Precinct
			El Carmen	Bramadores, Cajones, Calle Bolivar, Caoba, Chila Guabal,
				Doblones, El por Venir, Entrada a Tropezan, Flor de
				Manabi, km 31 Redondel Paso Lateral, La Aguada,
				Rio de Oro, Pambilar, Tinaja, Via Venado,
				La Alegria, La Laguna, la Raiz, Palizada, Playita, Provenir
		Bolívar	Membrillo	Dos Bocas, San Pascual
			Quiroga	La Pavita, Sarampion ,Quiroga, Tranca y Piedra, Pechichal
			Calceta	Calceta
		Santa Ana	Ayacucho	Ayacucho, La Lagua, Peminche
			Honorato Vásquez	Los Cuyenes
			La Unión	Chirimolla, Corralon, La Chana, La Segua, La Union
			San Pablo	
			Santa Ana	Chamucami, La Cuesta, Miguiche, Sitio Bonce, El Cadial,
			Santa Ana de Vuelta Larga	Monte oscuro, Sitio la Taina
		Pedernales	Atahualpa	Atahualpa, Estero Seco, Iguana, La Puntilla, La Zapata,
				Los Lastres, Nalpe, Pajales, Pueblo Seco, Sitio Castillo
				Sitio Don Pepe, Sitio El Retiro, Sitio El Mariano
			Cojimes	Tigua, Carrizales, Cañaveral,Coaza, Mache
			Diez de Agosto	
			Pedernales	Chemere, Cheve Arriba, Chiquimbre, La Pimienta,
				El Hobo, Estero Hondo, estero Platano, San Agustin
		Portoviejo	Alhajuela	La Mocorita, Mancha Grande, Sitio Cascabel, Chirijos
			Abdón Calderón	Bijahual, Miguelillo,
			Chirijo	Cañarez, El Roncon, El Descanso

(**)	Province/Region	Canton	Parish	Sector/Precinct
			Crucita	Nuevo Amanecer, Sosote
			Pueblo Nuevo	
			Riochico	Rio Chico
			San Placido	Altamira, El Cruce, El Moral, Guarumo, Km 92 Addentro,
				La Badea, La cantera, La Mocorita, La Toaquialla,La Tranca
				La Victoria, Las Lozas, Las Torres, Los Colorados,
				Los Manantiales, Mancha Grande, Palma Junta, San Jose
				San Bartolo, Sitio 103, Sitio 90, Sitio piedra Azul Km100
			Portoviejo	
		Puerto López	Salango	Ayampe
		San Vicente	Canoa	Montabuy
		Rocafuerte	Rocafuerte	Las Flores
		24 de Mayo	Bellavista	Calvo Grande, Jaboncillo, Las Anonas, Resbalon, Riecito
			Noboa	Andresillo, Noboa
			Sixto Duran Ballén	Pueblo Arrecho, Sixto Duran Ballén,El Aguacate
			Sucre	La Tinaja, Sucre
		Manga del Cura	Manga del Cura	Corina de Parral, Damacio Chico, El Descanso, la 25,
				laToquilla, Las Marias- La Catorce, Santa Teresa, Zona13,
				Zona53
	Province Subtotal	**19**	**63**	
6	**Santa Elena**	Santa Elena	Manglaralto	Ayampe, Olon , Río Blanco, La Entrada,
				Las Nuñez, Dos Mangas, Pajiza, Sinchal
			Colonche	Comuna de Salanguillo
	Province Subtotal	**1**	**2**	

(**)	Province/Region	Canton	Parish	Sector/Precinct
7	**Sto Domingo de los Tsáchilas**	Santo Domingo	Alluriquin	Las Mercedes, Puerto Nuevo, 10 de Agosto, 6 de enero ,
				El Progreso,Santa Rosa, Alluriquin, La Perla, Luis Felipe,
				Rio Damas, San Jose de Pilaton, Via las Mercedes
			Bomboli	Ciudadela Central, Coop heriberto Maldonado, El Porton
			El Esfuerzo	El Bolo, El Cisne, Milton Murillo, Fuerzas Unidas, Redeccion
				Las Maravillas, Provincias Unidas, Recinto Polanco,
				Recinto santa Marianita, Via Quinninde Km48,
			Rio Toachi	El Placer, Las Mercedes-Sto Domingo, Praderas del Toachi
			Santa María del Toachi	La Florida
			Santo Domingo	San Gabriel, Nuevo Israel, Praderas del toachi, Santa rosa del mulaute, estero frio, San Ramon, UTE
			San Jacinto de Bua	Recinto Avista Chila, Recinto San Jose de las Juntas
			Valle Hermoso	Cristobal Colón
			Luz de America	Finca NU TENKA PA´KI , El Nila, km 12, km 2, km 33 Via
				Quevedo, Luz de America
			Puerto Limón	Paraiso del pupusa, La unión, La Valencia,Hacienda San
				Miguel, La valencia,La Providencia, Rcto militar Tiguinsa
				Rocafuerte, Santa Cecilia, Via el Rosario
		La Concordia	La Concordia	Flor de Valle, Las Villegas, Recinto 2 de Febrero
				recinto el Bua, Recinto Pupusa, Via Quininde km30
			Monterrey	La Mocache, Monterrey, Los Andes 1
	Province Subtotal	**2**	**12**	

(**)	Province/Region	Canton	Parish	Sector/Precinct
I	**Coast Subtotal:**	**52**	**143**	
8	**Bolivar**	Chillanes	San Jose del Tambo	La Plata
		Echeandia	Echeandia	Barraganete, campo Alegre, Chinibi, La Leonera, Puruhuay
		Guaranda	San Luis de Pambil	El Clavelito, La libertad
	Province Subtotal	**3**	**3**	
9	**Cotopaxi**	La Maná	El Carmen	Estero Hondo, Manguila, Recinto Tres Coronas, San Pablo
			La Mana	Calavi, Chipe Hamburgo, Guapara, La Pista, La Segunda,
				Las Colonias, Loma de la Virgen, Puembo, San Pedro
			Guasaganda	21 de Noviembre, California, Guasaganda, Juan Cobo,
				La 21, San Cristbal, Recinto el Progreso
			Pucayacu	Argentina, El Limon
		Pangua	Moraspungo	El Guabo, EL Guayabo, Jalligua, Palo Seco, Punta Brava
	Province Subtotal	**2**	**5**	
10	**Imbabura**	Cotacachi	Garcia Moreno	Salto del Tigre, Guayllabamaba
				Las golondrinas, 10 de Agosto
	Province Subtotal	**1**	**1**	
11	**Pichincha**	Pedro Vicente Mald.	Pedro Vicente Maldonado	Salcedo Lindo, Salto del Tigre, barrio Lindo, Andoas,
				Carretero-Calacali,Celica, Centinela de Guayabamba
				Conrad adeahuer, Coop. 15 de Mayo, Coop. Jhon F
				Kenedy, Coop. Unidos Venceremos, El cisne, km 104
				Via los Laureles, Mangoloma via el Cisne, Monto Olivo,
				Paraiso Escondido, Rio Sabalo, Pedro Vicente Maldonado,

(**)	Province/Region	Canton	Parish	Sector/Precinct
				Nueva ecuador zona72, San Dimas
		Puerto Quito	Puerto Quito	Coop Puerto Quito, coop. Agricola Independiente,
				Coop. Puerto Quito, Coop Tatala, coop. Noroccidental,
				es Achote, el Silanche, El Viringo, Golondrinas, 3 de enero
				Guayaquil Chiquito, km147, km 35 via los Bancos,Rio Caoni
				La Abundancia, Recinto Piedra de Vapor, Union Cariamanga
		Quito (zonas subu-rural)	Gualea	Barrio Bellavista
			Nanegal	San Miguel de Pagcha
			Nanegalito	San Vicente
			Pacto	El Paraiso, Guayabillas, El Pachual, Santa rosa lote18
		San Miguel de Bancos	San Miguel de Los bancos	via Valle Hermoso,11 de Junio, av los Colonos, Sector Loma
				Coop Amanecer Campesino, coop 23 de Junio,
				Coop Luz de america, La Sucia, Los Andes Milpe,
				Union el Banco Mulaulte,Union Provincial, Via Guadalupe
				Virgen de Guadalupe
			Mindo	Via a Cunucu
	Province Subtotal	**4**	**8**	
II	**S. Sierra: areas subtr.**	**10**	**17**	
12	**Morona Santiago**	Huamboya	Chiguaza	Centro Shuar ShamKaim, Centro Shuar Tayunts, Tuutin
				San juan, zona52 Zhangaime, San Carlos, San Juan Bosco
			Huamboya	Chuwints, Centro Shuar Namakim, Huambuchenza
		Logroño	Shimpis	
			Logroño	Barrio24 de Octubre

(**)	Province/Region	Canton	Parish	Sector/Precinct
		Morona	Sevilla Don Bosco	Buena Esperanza, UNT Wichim, San Luis de Iñinkis
		Palora	Arapicos	
			16 de Agosto	San Roman, Tunaim, Yankuam
			Sangay	La Carmelo, Los Angeles, sangay
		Pablo Sexto	Pablo Sexto	Santa Inés, Octava Cooperativa
		Santiago	San Francisco de Chinimbini	Chininbimi
			Santiago de Mendez	Tuna, Vía Méndez Limón, Norte - Sur Margen derecho
			Tayuza	Carretera Tayuza - Macas
		Sucúa	Huambi	Bellavista, Tesoro, Cuisuimi,
		Taisha	Macuma	Vía Tambachi, Vía Huacani
	Province Subtotal	**8**	**14**	
13	**Napo**	Tena	Puerto Misahualli	Alto Pununo, El Mirador
			Puerto Napo	Shalcana
		Archidona	Contundo	Jondachi, Nueva Esperanza
			Hatun Sumaku	
		Carlos J. Arosemena Tola	Carlos J. Arosemena Tola	Flor del Bosque
		El Chaco	El Chaco	
			Gonzalo Días de Pineda	
			Linares	
			Santa Rosa	
			Sardinas	
		Quijos	Baeza	
			San Francisco de Borja	
			Sumaco	
	Province Subtotal	**5**	**13**	

(**)	Province/Region	Canton	Parish	Sector/Precinct
14	**Orellana**	Francisco de Orellana	La Belleza	Flor de la Palma, Inga Urco
			Puerto Francis de Orellana	Comuna San Francisco de Asis
			San Jose de Guayusa	Comuna Huayusa, Las Minas Huataraco
			San Luis de Armenia	Comuna estrella Yacu, Flor de Manduro, Paco Playa
			Taracola	Pantanal
		La Joya de los Sachas	Rumipamba	Rumipamba, Sacha 4
			Lago San Pedro	
			San Sebastian del Coca	Hataraco, San Sebastian del Coca
		Loreto	San Jose de Payamino	8 de Diciembre, Juan Pio Montufar, union y progreso
			San Vicente de Huaticocha	Huaticocha, San Francisco de Asis
	Province Subtotal	**3**	**10**	
15	**Pastaza**	Pastaza	Canelos	Sector Tigre -Pastaza
			Simón Bolívar	Colonia Pillareña, Mushullacta
			Diez de Agosto	Francisco de Orellana
			El Triunfo	Asociacion 17 de Abril, Colonia santo Domingo, El Triunfo,
				Francisco Pizarro, Km 14 Via arajuno
			Sarayacu	
			Veracruz	22 de Abril, Bobonaza, El Calvario
			Río Corrientes	
			Río Tigre	
		Santa Clara	San José	Cajabamba 2
			Santa Clara	Colonia Simon Bolivar, Santa Clara, San Vicente
		Arajuno	Curaray	Oglán-Arajuno
	Province Subtotal	**3**	**11**	

(**)	Province/Region	Canton	Parish	Sector/Precinct
16	**Sucumbios**	Cascales	El Dorado de Cascales	Comuna Duvuno
		Gonzalo Pizarro	Gonzalo Pizarro	Linda, Sitio Panduyacu
		Lago Agrio	El Eno	La Florida, Las Delicias
			General Farfan	Comuna Rivera del oriente, Coop Patria Nueva, Corazon
				Orenze, Pre.Coop Nueva Vicentina, Trampolin del Triunfo
			Nueva Loja	Brisas del Oriente, km 6, Pre Coop POT Ecuador
			Santa Cecilia	Pre Coop Unidos Venceremos, Pre Coop El Porvenir
		Shushufindi	San Pedro de los Cofanes	Coop Shushufindi
			San Roque	
			Shushufindi	
	Province Subtotal	**4**	**9**	
III	**Amazon Subtotal**	**23**	**57**	
c	**Total Main Areas**	**85**	**217**	
24	**General Country Total**	**224**	**1149**	

**There is also a marginal presence of bamboo in: Azuay, Carchi, Chimborazo, Cañar, Zamora Chinchipe, and others. The surface covered with bamboo is marginal and therefore it is not registered in the present Table.*

Appendix 3
Mobilized Cane in the Main Areas with Bamboo Presence- Year 2017

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
1	**El Oro**	Balsas	Balsas	52	2560
		El Guabo	Rio Bonito	191	14,430
		Pasaje	Casacay	51	2360
			Progreso	43	2180
		Piñas	Moromoro	48	1450
	Province Subtotal	**4**	**5**	**384**	**22,980**
2	**Esmeraldas**	Rioverde	Chontaduro	88	4050
			Chumunde	36	2610
			Lagarto		
			Montalvo	53	2300
			Río Verde		
			Rocafuerte		
		Quininde	La Union	805	63,100
			Malimpia	380	25,077
			Rosa Zarate	1122	66,630
			Viche	21	895
		Esmeraldas	Camarones	15	500
			Crnel. Carlos Concha Torres	13	400
			Tabiazo	126	7750
		San Lorenzo	Calderon	106	3670
			Carondelet	11	400
			Santa Rita	42	11,500
			Concepcion	791	27,420
			Alto Tambo	16	600
			Tululbi	72	2550
		Eloy Alfaro	Anchayacu	138	4880
			La Tola	11	250

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
			Maldonado	154	5500
			San Jose de Cayapas	151	4740
			Santa Lucía de las Peñas		
			Borbon	39	1600
			Telembí		
			San Francisco del Onzole		
	Province Subtotal	**5**	**27**	**4189**	**236,422**
3	**Guayas**	Balzar	Balzar	30	2100
		Colimes	Colimes	245	18,700
		Crnl. Marcel Maridueñas	Crnl. Marcelino Maridueñas		
		El Empalme	La Guayas (Pueblo Nuevo)	723	70,470
			El Rosario	89	8000
			Velasco Ibarra	137	13,850
		El Triunfo	El Triunfo	198	12,790
		General Antonio Elizalde	Gral Antonio Elizalde -Bucay	249	13,720
		Guayaquil	Tenguel	335	38,206
		Naranjal	Jesús María		
			San Carlos	16	900
		Pedro Carbo	Pedro Carbo	115	9920
			Valle de la Virgen	81	7100
		Simon Bolivar	Simon Bolivar	52	1600
	Province Subtotal	**10**	**14**	**2270**	**197,356**
4	**Los Ríos**	Buena Fé	San Jacinto de Buena Fe	923	78,900
			Patricia Pilar	637	46,160
		Babahoyo	Caracol	180	14,750

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
			Febres Cordero (Las Juntas)	13,009	806,605
		Montalvo	Montalvo	458	37,700
		Quevedo	La Esperanza	100	11,150
			Quevedo	90	7200
			San Carlos	403	34,035
			San Camilo	71	8650
			Siete de Octubre	149	21,800
		Valencia	Valencia	2830	284,883
			El Vergel	621	66,120
		Quinsaloma	Quinsaloma	233	22,863
		Baba	Baba	82	5950
			Guare	787	56,500
		Vinces	Vinces	23	1580
		Mocache	Mocache	821	76,176
		Ventanas	Ventanas	92	8840
			Zapotal	128	13,780
		Urdaneta	Ricaurte	619	32,370
	Province Subtotal	**11**	**20**	**22,255**	**1636,012**
5	**Manabí**	Chone	Boyaca	22	960
			Canuto	163	13,491
			Chibunga	120	7010
			Chone	215	19,670
			Convento	283	16,985
			Eloy Alfaro	10	500
			Ricaurte	41	3080
			Santa Rita	130	7010
			San Antonio		
		Flavio Alfaro	San Francisco de Novillo	678	47,280

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
			Zapallo	51	4550
			Flavio Alfaro	470	34,850
		Jipijapa	Puerto de Cayo		
			Jipijapa	330	29,756
			America	164	7978
			El Anegado	108	9220
			La Unión	30	1057
			Pedro Pablo Gómez	162	15,100
		Junín	Junín	261	27,505
		Olmedo	Olmedo	1550	209,629
		Sucre	San Isidro	30	700
		Paján	Capozano	903	50,400
			Cascol	431	31,050
			Guale	125	9430
			Lascano	88	5500
			Pajan	316	29,500
		Pichincha	Barraganete	96	8100
			San Sebastián	444	87,549
			Pichincha	165	16,612
		Jama	Jama	20	1000
		El Carmen	Wilfrido loor (Maicito)	516	28,200
			4 de Diciembre	99	6350
			San Pedro de Suma	595	31,427
			El Carmen	2632	163,185
		Bolívar	Membrillo	93	10,394
			Quiroga	248	21,544
			Calceta	200	17,112
		Santa Ana	Ayacucho	117	13,533

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
			Honorato Vásquez	11	550
			La Unión	722	66,616
			San Pablo		
			Santa Ana	243	51,943
			Santa Ana de Vuelta Larga	114	12,528
		Pedernales	Atahualpa	494	27,680
			Cojimes	137	5605
			Diez de Agosto		
			Pedernales	509	36,210
		Portoviejo	Alhajuela	184	20,574
			Abdón Calderón	65	8986
			Chirijo	71	9861
			Crucita	43	1700
			Pueblo Nuevo		
			Riochico	27	800
			San Placido	2075	283,468
			Portoviejo	22	5316
		Puerto López	Salango	28	200
		San Vicente	Canoa	131	2515
		Rocafuerte	Rocafuerte	1	
		24 de Mayo	Bellavista	626	86,592
			Noboa	335	28,270
			Sixto Duran Ballén	217	13,680
			Sucre	276	26,580
		Manga del Cura	Manga del Cura	218	20,100
	Province Subtotal	**19**	**63**	**18,456**	**1696,991**
6	**Santa Elena**	Santa Elena	Manglaralto	99	5480
			Colonche	7	550
	Province Subtotal	**1**	**2**	**106**	**6030**

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
7	**Sto Domingo**	Santo Domingo	Alluriquin	1253	69,619
	de los Tsáchilas		Bomboli	156	15,595
			El Esfuerzo	450	22,040
			Rio Toachi	102	7430
			Santa María del Toachi	428	28,815
			Santo Domingo	2346	155,775
			San Jacinto de Bua	1391	80,550
			Valle Hermoso	1022	61,960
			Luz de America	833	56,853
			Puerto Limón	762	38,760
		La Concordia	La Concordia	197	12,160
			Monterrey	232	9660
	Province Subtotal	**2**	**12**	**9174**	**559,217**
I	**Coast Subtotal:**	**52**	**143**	**56,834**	**4355,008**
8	**Bolivar**	Chillanes	San Jose del Tambo	43	2450
		Echeandia	Echeandia	898	74,065
		Guaranda	San Luis de Pambil	132	9170
	Province Subtotal	**3**	**3**	**1073**	**85,685**
9	**Cotopaxi**	La Maná	El Carmen	339	18,085
			La Mana	1151	72,459
			Guasaganda	717	48,736
			Pucayacu	617	34,335
		Pangua	Moraspungo	506	26,505
	Province Subtotal	**2**	**5**	**3331**	**200,120**
10	**Imbabura**	Cotacachi	Garcia Moreno	23	2100
	Province Subtotal	**1**	**1**	**23**	**2100**
11	**Pichincha**	Pedro Vicente Mald.	Pedro Vicente Maldonado	855	60,832
		Puerto Quito	Puerto Quito	427	28,894

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
		Quito (sub-rural zones)	Gualea	31	1552
			Nanegal		
			Nanegalito	2	150
			Pacto	60	4460
		San Miguel de Bancos	San Miguel de Los bancos	945	59,635
			Mindo	10	410
	Province Subtotal	**4**	**8**	**2331**	**155,933**
II	**S. Sierra: aresas subtr.**	**10**	**17**	**6758**	**443,838**
12	**Morona Santiago**	Huamboya	Chiguaza	40	22,300
			Huamboya	4	200
		Logroño	Shimpis		
			Logroño	13	800
		Morona	Sevilla Don Bosco	30	17,360
		Palora	Arapicos		
			16 de Agosto	20	868
			Sangay	33	1330
		Pablo Sexto	Pablo Sexto	17	890
		Santiago	San Francisco de Chinimbini	0	70
			Santiago de Mendez	4	400
			Tayuza		
		Sucúa	Huambi	9	450
		Taisha	Macuma		
	Province Subtotal	**8**	**14**	**170**	**44,668**
13	**Napo**	Tena	Puerto Misahualli	6	284
			Puerto Napo	2	60
		Archidona	Contundo	2	121
			Hatun Sumaku		

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
		Carlos J. Arosemena Tola	Carlos J. Arosemena Tola	5	250
		El Chaco	El Chaco		
			Gonzalo Días de Pineda		
			Linares		
			Santa Rosa		
			Sardinas		
		Quijos	Baeza		
			San Francisco de Borja		
			Sumaco		
	Province Subtotal	**5**	**13**	**15**	**715**
14	**Orellana**	Francisco de Orellana	La Belleza	16	1630
			Puerto Francis de Orellana	40	1165
			San Jose de Guayusa	16	485
			San Luis de Armenia	40	1450
			Taracola	32	1200
		La Joya de los Sachas	Rumipamba	48	2504
			Lago San Pedro		
			San Sebastian del Coca	23	751
		Loreto	San Jose de Payamino	42	1410
			San Vicente de Huaticocha	41	1275
	Province Subtotal	**3**	**10**	**296**	**11,870**
15	**Pastaza**	Pastaza	Canelos		
			Simón Bolívar	14	770
			Diez de Agosto	1	25

	Province/Region	Canton	Parish	Volume in m^3	Number of Canes
			El Triunfo	25	824
			Sarayacu		
			Veracruz	49	555
		Santa Clara	San José	10	300
			Santa Clara	46	465
		Arajuno	Curaray		
	Province Subtotal	**3**	**9**	**145**	**2939**
16	**Sucumbios**	Cascales	El Dorado de Cascales	23	660
		Gonzalo Pizarro	Gonzalo Pizarro	12	620
		Lago Agrio	El Eno	124	8406
			General Farfan	60	3375
			Nueva Loja	144	5435
			Santa Cecilia	16	590
		Shushufindi	San Pedro de los Cofanes	7	250
			San Roque		
			Shushufindi		
	Province Subtotal			**386**	**19,336**
III	**Amazon Subtotal**			**1012**	**79,528**
	Main Area Total			**64,604**	**4878,374**
	Remaining Provinces			**1417**	**86,305**
24	**General Country Total**			**66,021**	**4964,679**

Appendix 4
Number of Smallholder Unions (UPA) in the Main Areas with Bamboo Presence by Province, Canton and Parish- Consolidated Total

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
1	**El Oro**	**16,165**	Balsas	195	Balsas	52	39	66	157	561	3.6
			El Guabo	1700	Rio Bonito	142	105	180	428	1842	4.3
			Pasaje	1278	Casacay	56	42	72	170	605	3.6
					Progreso	139	103	177	419	1197	2.9
			Piñas	1729	Moromoro	80	59	101	240	165	0.7
	Subtotal			**4902**		**470**	**348**	**597**	**1415**	**4370**	**3.1**
2	**Esmeraldas**	**20,611**	Rioverde	1926	Chontaduro	76	54	148	277	2918	10.5
					Chumunde	176	125	344	644	3556	5.5
					Lagarto	74	53	145	272	3003	11.0
					Montalvo	132	93	257	482	3020	6.3
					Rioverde	25	18	49	93	652	7.0
					Rocafuerte	43	31	84	158	1015	6.4
			Quininde	4951	La Unión	116	82	227	426	6003	14.1
					Malimpia	408	289	797	1493	7697	5.2
					Rosa Zarate	475	337	928	1740	9153	5.3
					Viche	31	22	62	115	722	6.3
			Esmeraldas	1725	Camarones	57	41	112	211	824	3.9
					Crnel. Carlos Concha Torres	102	72	198	372	1456	3.9

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
					Tabiazo	48	34	94	177	692	3.9
			San Lorenzo	3898	Calderon	9	6	17	32	428	13.5
					Carondelet	27	19	52	97	1015	10.4
					Santa Rita	28	20	55	104	1057	10.2
					Concepcion	74	52	144	271	2966	11.0
					Alto Tambo	382	271	746	1398	2028	1.5
					Tululbi	123	87	240	450	510	1.1
			Eloy Alfaro	5459	Anchayacu	86	61	168	314	4856	15.4
					La Tola	85	60	166	311	4211	13.6
					Maldonado	20	14	39	73	689	9.4
					San Jose de Cayapas	42	30	82	154	1812	11.7
					Santa Lucía de las Peñas	60	35	74	169	958	5.7
					Borbon	67	48	131	246	2311	9.4
					Telembi	441	313	862	1616	3508	2.2
					San Francisco Onzole	58	41	113	211	1487	7.0
	Subtotal			**17,959**		**3264**	**2306**	**6336**	**11,906**	**68,546**	**5.8**
3	**Guayas**	**66,226**	Colimes	3254	Colimes	1445	458	432	2335	5441	2.3
			Balzar	5091	Balzar	3150	999	942	5091	9489	1.9
			Crnl. Marcel Maridueñas	1089	Crnl. Marcelo Maridueñas	674	214	202	1089	3551	3.3

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
			El Empalme	3072	La Guayas	1074	340	321	1735	8894	5.1
					El Rosario	364	116	109	589	823	1.4
					Velasco Ibarra	463	147	138	748	1046	1.4
			El Triunfo	1695	El Triunfo	1049	333	314	1695	1934	1.1
			General Antonio Elizalde	660	General Antonio Elizalde	408	129	122	660	2267	3.4
			Guayaquil	18,011	Tenguel	367	116	110	593	2654	4.5
			Naranjal	8431	Jesus Maria	246	78	73	397	492	1.2
					San Carlos	238	75	71	384	537	1.4
			Pedro Carbo	4013	Pedro Carbo	1367	434	409	2210	5575	2.5
					Valle de la Virgen	270	85	81	436	609	1.4
			Simon Bolivar	1253	Simon Bolivar	341	108	102	551	514	0.9
	Subtotal			**46,569**		**11,454**	**3632**	**3426**	**18,512**	**43,825**	**2.4**
4	**Los Ríos**	**51,466**	Buena Fé	4149	San Jacinto de Buena Fe	1638	592	728	2959	4556	15
					Patricia Pilar	659	238	293	1191	1500	1.3
			Babahoyo	7766	Caracol	386	140	172	698	586	0.8
					Febres Cordero	1421	514	632	2568	11,503	4.5
			Montalvo	2592	Montalvo	1435	519	638	2592	1451	0.6
			Quevedo	2176	La Esperanza	114	41	51	206	1234	6.0
					Quevedo	414	232	286	932	4529	4.9

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
					San Carlos	335	121	149	604	2023	3.3
					San Camilo	224	16	20	261	265	1.0
					Siete de Octubre	118	25	30	173	580	3.4
			Valencia	6987	Valencia	3207,6	1188,9	1462	5859	18,118	3.1
					El Vergel	660,4	209,8	258	1128	2023	1.8
			Quinsaloma	2024	Quinsaloma	1121	405	498	2024	6401	3.2
			Baba	3694	Baba	682	247	303	1232	862	0.7
					Guare	923	334	411	1668	2802	1.7
			Vinces	4976	Vinces	2191	792	975	3958	2771	0.7
			Mocache	4057	Mocache	2246	812	999	4057	8519	2.1
			Ventanas	3798	Ventanas	666	241	296	1203	3164	2.6
					Zapotal	1437	520	639	2595	4897	1.9
			Urdaneta	2702	Ricaurte	1303	471	580	2354	2977	1.3
	Subtotal			**44,923**		**21,181**	**7659**	**9421**	**38,261**	**80,763**	**2.1**
5	**Manabí**	**82,376**	Chone (3570,6)	13,210	Boyaca	528	162	334	1025	2120	2.1
					Canuto	445	136	281	862	1388	1.6
					Chibunga	1280	392	810	2483	3425	1.4
					Chone	1488,0	485	1000	2973	5803	2.0
					Convento	682	209	431	1322	2755	2.1
					Eloy Alfaro	735	225	465	1425	3203	2.2

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
					Ricaurte	811	249	513	1573	3903	2.5
					Santa Rita	372,0	86	176	634	1575	2.5
					San Antonio	471	144	298	913	1315	1.4
			Flavio Alfaro	5858	Novillo	586	180	370	1136	2872	2.5
					Zapallo	229	70	145	443	1223	2.8
					Flavio Alfaro	2207	676	1396	4279	8855	2.1
			Jipijapa	6383	Puerto Cayo	384	118	243	745	1370	1.8
					America	175	54	111	339	702	2.1
					Anegado	263	81	166	509	935	1.8
					La Unión	105	32	66	203	560	2.8
					Jipijapa	894	274	565	1733	1980	1.1
					Pedro Pablo Gómez	637	195	403	1235	2556	2.1
			Junín	1070	Junín	552	169	349	1070	1969	1.8
			Olmedo	1104	Olmedo	569	175	360	1104	2285	2.1
			Sucre	3020	San Isidro	664	204	420	1288	3553	2.8
			Paján	4733	Capozano	554	170	350	1073	2715	2.5
					Cascol	964	295	609	1868	3866	2.1
					Guale	256	79	162	497	1200	2.4
					Lascano	323	99	204	626	1295	2.1
					Pajan	345	106	218	669	1230	1.8

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
			Pichincha	4677	Barraganete	958	294	606	1857	4698	2.5
					San Sebastián	320	98	202	620	1283	2.1
					Pichincha	1134	348	717	2199	5057	2.3
			Jama	2520	Jama	1300	398	822	2520	2527	1.0
			El Carmen	5486	Wilfrido Ioor (Maicito)	651	200	412	1263	2546	2.0
					San Pedro de Suma	423	130	268	821	1699	2.1
					4 de Diciembre	526,3	81	166,5	773	1198	1.5
					El Carmen	1228,1	457	943,2	2628	11,732	4.5
			Bolívar	2341	Membrillo	272	83	172	527	1453	2.8
					Quiroga	139	43	88	270	620	2.3
					Calceta	797	244	504	1545	3196	2.1
			Santa Ana	4459	Ayacucho	245	75	155	475	1162	2.4
					Honorato Vásquez	350	107	222	680	1406	2.1
					La Unión	522	160	330	1011	2558	2.5
					San Pablo	477	146	302	924	1913	2.1
					Santa Ana de Vuelta Larga	600	184	380	1164	2204	1.9
					Santa Ana	106	32	67	205	983	4.8
			Pedernales	8295	Pedernales	1722	528	1089	3338	3838	1.1
					Cojimies	1654	507	1046	3207	2950	0.9

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
					10 de Agosto	523	160	331	1014	933	0.9
					Atahualpa	379	116	240	736	1015	1.4
			Portoviejo	4179	Alhajuela	55	17	35	106	268	2.5
					Calderón	278	85	176	539	1486	2.8
					Chirijo	172	53	109	333	842	2.5
					Crucita	140	43	88	271	810	3.0
					Pueblo Nuevo	82	25	52	159	329	2.1
					Riochico	185	57	117	360	909	2.5
					San Placido	306	94	194	594	1940	3.3
					Portoviejo	938	287	593	1818	2926	1.6
			Puerto López	1867	Salango	198	61	125	383	793	2.1
			San Vicente	3086	Canoa	867	266	548	1681	4251	2.5
			Rocafuerte	1216	Rocafuerte	627	192	397	1216	1958	1.6
			24 de Mayo	2287	Bellavista	231	71	146	449	1134	2.5
					Noboa	328	101	207	636	1462	2.3
					Sixto Duran Ballén	179	55	113	347	638	1.8
					Sucre	441	135	279	856	1771	2.1
			Manga del Cura	**366**	Manga del Cura	38	50	277	366	4392	12.0
	Subtotal			**76,157**		**35,909**	**11,043**	**22,966**	**69,918**	**145,529**	**2.1**
6	**Santa Elena**	**2681**	Santa Elena	**2613**	Manglaralto	203	46	61	309	3827	12.4

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
					Colonche	548	124	163	835	8045	9.6
	Subtotal			**2613**		**751**	**170**	**224**	**1144**	**11,872**	**10.4**
7	**Sto Domingo**	**15,618**	Santo Domingo	13,276	Alluriquin	1360	415	700	2475	7306	3.0
	de los				El Esfuerzo	575	176	296	1047	3777	3.6
	Tsáchilas				Santa María del Toachi	725	221	373	1319	3972	3.0
					Santo Domingo	1789	580	978	3348	12,486	3.7
					Valle Hermoso	635	194	327	1156	3413	3.0
					Luz de America	637	194	328	1159	2800	2.4
					Puerto Limón	467	142	240	849	1824	2.1
					Bomboli	143	41	69	253	944	3.7
					Rio Toachi	215	61	104	380	2142	5.6
					San Jacinto de Bua	418	127	215	760	3081	4.1
			La Concordia	2343	La Concordia	741	152	256	1149	987	0.9
					Monterrey	1111	228	384	1724	1392	0.8
	Subtotal			**15,618**		**8815**	**2533**	**4271**	**15,618**	**44,126**	**2.8**
I	**S. Costa**	**255,143**		**208,741**		**81,843**	**27,692**	**47,239**	**156,775**	**399,032**	**2.5**
8	**Bolivar**	**20,584**	Chillanes	3457	San Jose del Tambo	637	195	413	1245	2148	1.7
			Echeandia	1202	Echeandia	615	188	398	1202	3225	2.7
			Guaranda	9872	San Luis de Pambil	335	103	217	655	1381	2.1
	Subtotal			**14,531**		**1588**	**486**	**1028**	**3102**	**6754**	**2.2**

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
9	**Cotopaxi**	**64,935**	La Maná	6970	Guasaganda	2107	132	168	2407	3926	1.6
					Pucayacu	1667	114	145	1926	3081	1.6
					El Carmen	158,6	23	30	211	890	4.2
					La Mana	2099	144	183	2425	5028	2.1
			Pangua	7676	Moraspungo	4023	276	350	4649	6122	1.3
	Subtotal			**14,646**		**10,055**	**689**	**875**	**11,619**	**19,047**	**1.6**
10	**Imbabura**	**29,278**	Cotacachi	10,769	Garcia Moreno	3669	284	516	4468	7702	1.7
	Subtotal			**10,769**		**3669**	**284**	**516**	**4468**	**7702**	**1.7**
11	**Pichincha**	36,537	Pedro Vicente Mald.	2391	Pedro Vicente Mald	1691	283	417	2391	5487	2.3
			Puerto Quito	2662	Puerto Quito	1883	315	464	2662	6949	2.6
			Quito (zonas subu-rural)	16,161	Gualea	328	55	81	463	967	2.1
					Nanegal	666	112	164	942	1720	1.8
					Nanegalito	338	57	83	478	623	1,3
					Pacto	941	158	232	1330	2857	2.1
			San Miguel de Bancos	3257	Los bancos	1575	264	388	2227	5558	2.5
					Mindo	728	122	180	1030	2419	2.3
	Subtotal			**24,472**		**8150**	**1364**	**2008**	**11,523**	**26,581**	**2.3**

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
II	**S. Sierra**	**151,334**		**64,417**		**23,462**	**2823**	**4428**	**30,713**	**60,083**	**2.0**
12	**Morona Santiago**	**15,204**	Huamboya	419	Chiguaza	120	23	160	303	5752	19.0
					Huamboya	46	9	61	116	1105	9.5
			Logroño	740	Shimpis	65	13	87	164	3817	23.2
					Logroño	14	3	18	35	683	19.6
			Morona	2943	Sevilla Don Bosco	579	111	768	1457	15,677	10.8
			Palora	919	Arapicos	54	10	72	137	2220	16.2
					16 de Agosto	22	4	30	56	944	16.8
					Sangay	51	10	67	127	1786	14.0
			Sucúa	565	Huambi	41	8	54	102	1292	12.7
			Pablo Sexto	879	Pablo Sexto	349	67	463	879	5295	6.0
			Santiago	888	San Francisco de Chinimbini	34	6	45	84	1317	15.6
					Santiago de Mendez	75	14	100	190	1801	9.5
					Tayuza	24	5	31	59	628	10.6
			Taisha	3899	Macuma	239	46	317	602	489	0.8
	Subtotal			**11,252**		**1712**	**328**	**2272**	**4313**	**42,806**	**9.9**
13	**Napo**	**6312**	Tena	1973	Puerto Misahualli	66	13	97	176	2897	16.5
					Puerto Napo	41	8	60	108	1780	16.4

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
			Archidona	1524	Contundo	362	69	534	966	6140	6.4
					Hatun Sumaku	209	30	170	409	1273	3.1
			Carlos J. Arosemena	253	Carlos J. Arosemena	95	18	140	253	3855	15.2
			El Chaco	1761	Gonzalez Diaz de Pineda	366	70	539	975	698	0.7
					Linares	41	8	60	109	49	0.5
					Santa Rosa	58	11	86	155	154	1.0
					Sardinas	21	4	31	56	669	11.9
					Chaco	13	3	20	36	353	9.9
			Quijos	800	Baeza	33	6	48	88	1405	16.0
					San Francisco de Borja	26	5	38	69	986	14.2
					Sumaco	47	9	69	124	1985	16.0
	Subtotal			**6312**		**1378**	**253**	**1893**	**3523**	**22,245**	**6.3**
14	**Orellana**	**5844**	Francisco de Orellana	1907	La Belleza	91	5	68	164	2045	12.4
					Puerto Francis de Orellana	22	1	16	39	674	17.1
					San Jose de Guayusa	69	4	52	124	1903	15.3
					San Luis de Armenia	48	3	36	86	1064	12.4
					Taracola	61	3	46	110	1890	17.1

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
			La Joya de los Sachas	324	Rumipamba	11	1	8	20	1258	63.8
					Lago San Pedro	11	1	9	21	1265	61.6
					San Sebastian del Coca	42	2	32	77	11,025	143.9
			Loreto	579	San Jose de Payamino	125	7	94	225	2987	13.3
					San Vicente de Huaticocha	29	2	22	52	768	14.8
	Subtotal			**2810**		**509**	**27**	**382**	**918**	**24,879**	**27.1**
15	**Pastaza**	**4932**	Pastaza	3316	Canelos	40	3	33	75	2036	27.1
					Simón Bolívar	90	6	75	170	1935	11.3
					Diez de Agosto	8	1	7	16	589	37.9
					El Triunfo	21	1	17	40	814	20.6
					Río Corrientes	98	6	82	187	352	1.9
					Río Tigre	500	33	416	949	1499	1.6
					Sarayacu	251	16	209	476	3229	6.8
					Veracruz	15	1	12	28	721	25.5
			Santa Clara	52	San José	6	0	5	12	718	62.0
					Santa Clara	21	1	18	41	2620	64.5
			Arajuno	1476	Curaray	722	47	600	1369	8954	6.5
	Subtotal			**4844**		**1773**	**115**	**1473**	**3362**	**23,467**	**7.0**

	Province/ Region	No. of UPAS Prov. Total	Canton	No. of UPAS Canton Total	Parish	No. of UPAS < than 5 Has.	No. of UPAS 5 to 9,9 Has.	No. of UPAS of 10 or more	No. of UPAS TOTAL	Area with Bamboo Presence	Average size of UPA
16	Sucumbios	13,055	Cascales	902	El Dorado de Cascales	220	132	431	784	3453	4.4
			Gonzalo Pizarro	1609	Gonzalo Pizarro	48	29	95	172	1195	6.9
			Lago Agrio	2269	El Eno	91	55	179	326	2076	6.4
					General Farfan	104	63	205	372	3115	8.4
					Nueva Loja	77	46	151	274	2897	10.6
					Santa Cecilia	48	29	94	170	1283	7.6
			Shushufindi	1783	San Pedro de los Cofanes	13	8	26	48	3531	73.7
					San Roque	127	77	250	453	5876	13.0
					Shushufindi	92	55	180	327	4089	12.5
	Subtotal			6563		820	495	1611	2926	27,515	9.4
II	S. Amazonía	45,346		31,782		6193	1218	7631	15,042	140,911	9.4
I+ II+ III	Total Main Areas	451,823		304,940		111,498	31,734	59,298	202,530	600,026	3.0
	Rest Provin.	308,082		454,965		402,122	60,297	94,956	557,375		
	Country Total	759,905		759,905		513,621	92,031	154,254	759,905	600,026	

Appendix 5
Commercial Balance of Paper, Period 2000-2017

Commercial Balance of Paper			
Years	Exports	Imports	Commercial Balance
Certificate	Cap. 48	Cap. 48	
2000	14,381	101,467	(87,086)
2001	16,728	112,282	(95,554)
2002	18,433	132,305	(113,872)
2003	24,377	144,607	(120,230)
2004	28,773	187,188	(158,414)
2005	35,938	193,870	(157,932)
2006	33,003	238,669	(205,666)
2007	40,303	267,620	(227,317)
2008	44,280	352,910	(308,630)
2009	30,302	303,234	(272,932)
2010	42,240	354,613	(312,373)
2011	57,143	401,331	(344,188)
2012	59,354	403,709	(344,355)
2013	50,511	379,924	(329,412)
2014	52,906	393,597	(340,692)
2015	41,922	330,746	(288,824)
2016	39,322	271,285	(231,962)
2017	41,402	327,370	(285,969)

Source: Central Bank of Ecuador, Database from the Foreign Trade Division. Quito. Marz.

Appendix 6
Population Employed in Bamboo by Province, Canton and Parish, 2017

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
1	**El Oro**	86,932	Balsas	1722	Balsas	1413	678	0.3%
			El Guabo	17,012	Rio Bonito	1863	894	0.4%
			Pasaje	10,724	Casacay	362	174	0.1%
					Progreso	584	280	0.1%
			Piñas	6367	Moromoro	336	161	0.1%
	Subtotal	**41%**		**35,824**		**4558**	**2188**	**0.9**
2	**Esmeraldas**	94,483	Rioverde	5916	Chontaduro	709	341	0.1%
					Chumunde	773	371	0.2%
					Lagarto	1249	600	0.2%
					Montalvo	883	424	0.2%
					Rioverde	1093	525	0.2%
					Rocafuerte	1208	580	0.2%
			Quininde	24,331	La Unión	3955	1898	0.8%
					Malimpia	3528	1693	0.7%
					Rosa Zarate	13,352	6409	2.7%
					Viche	1051	504	0.2%
			Esmeraldas	23,714	Camarones	353	169	0.1%
					Crnel. Carlos Concha Torres	295	141	0.1%
					Tabiazo	333	160	0.1%
			San Lorenzo	7330	Calderon	108	52	0.0%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
					Carondelet	298	143	0.1%
					Santa Rita	283	136	0.1%
					Concepcion	406	195	0.1%
					Alto Tambo	323	155	0.1%
					Tululbi	396	190	0.1%
			Eloy Alfaro	8444	Anchayacu	539	259	0.1%
					La Tola	928	445	0.2%
					Maldonado	395	190	0.1%
					San Jose de Cayapas	321	154	0.1%
					Santa Lucía de las Peñas	480	230	0.1%
					Borbon	1635	785	0.3%
					Telembi	1198	575	0.2%
					San Francisco Onzole	304	146	0.1%
	Subtotal	**74%**		**69,735**		**36,397**	**17,470**	**7.2%**
3	**Guayas**	**485,837**	Colimes	12,875	Colimes	9513	4566	1.9%
			Balzar	19,066	Balzar	19,066	9152	3.8%
			Crnl. Marcel Maridueñas	3284	Crnl. Marcelo Maridueñas	3284	1577	0.7%
			El Empalme	29,230	La Guayas	6902	3313	1.4%
					El Rosario	3614	1735	0.7%
					Velasco Ibarra	18,715	8983	3.7%
			El Triunfo	10,095	El Triunfo	10,095	4846	2.0%
			General Antonio Elizalde	3490	General Antonio Elizalde	3490	1675	0.7%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
			Guayaquil	49,287	Tenguel	250	120	0.0%
			Naranjal	35,551	Jesus Maria	3311	1589	0.7%
					San Carlos	3357	1611	0.7%
			Pedro Carbo	17,798	Pedro Carbo	12,832	6160	2.5%
					Valle de la Virgen	2143	1029	0.4%
			Simon Bolivar	14,267	Simon Bolivar	8166	3920	1.6%
	Subtotal	**40%**		**194,944**	**22%**	**104,738**	**50,274**	**20.8%**
4	**Los Ríos**	**121,286**	Buena Fé	8916	San Jacinto de Buena Fe	7183	3448	1.4%
					Patricia Pilar	1734	832	0.3%
			Babahoyo	19,363	Caracol	644	309	0.1%
					Febres Cordero	2265	1087	0.4%
			Montalvo	3812	Montalvo	3812	1830	0.8%
			Quevedo	16,284	La Esperanza	455	219	0.1%
					Quevedo	1457	5499	2.3%
			8026		San Carlos	941	452	0.2%
					San Camilo	1980	950	0.4%
					Siete de Octubre	1451	696	0.3%
			Valencia	9368	Valencia	8280	3974	1.6%
					El Vergel	1088	522	0.2%
			Quinsaloma	4009	Quinsaloma	4009	1924	0.8%
			Baba	9251	Baba	4393	2109	0.9%
					Guare	2669	1281	0.5%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
			Vinces	12,387	Vinces	9574	4595	1.9%
			Mocache	8669	Mocache	8669	4161	1.7%
			Ventanas	10,310	Ventanas	7072	3395	1.4%
					Zapotal	3238	1554	0.6%
			Urdaneta	6288	Ricaurte	4442	2132	0.9%
	Subtotal	**90%**		**108,658**	**45%**	**85,355**	**40,970**	**17.0%**
5	**Manabí**	**174,847**	Chone (3570,6)	19,464	Boyaca	693	332	0.1%
					Canuto	1593	765	0.3%
					Chibunga	979	470	0.2%
					Chone	10,542	5060	2.1%
					Convento	1012	486	0.2%
					Eloy Alfaro	1205	578	0.2%
					Ricaurte	1219	585	0.2%
					Santa Rita	984	472	0.2%
					San Antonio	1237	594	0.2%
			Flavio Alfaro	5017	Novillo	558	268	0.1%
					Zapallo	740	355	0.1%
					Flavio Alfaro	3719	1785	0.7%
			Jipijapa	7692	Puerto Cayo	368	177	0.1%
					America	331	159	0.1%
					Anegado	743	357	0.1%
					La Unión	210	101	0.0%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
					Jipijapa	5311	2549	1.1%
					Pedro Pablo Gómez	386	185	0.1%
			Junín	3637	Junín	3637	1746	0.7%
			Olmedo	2029	Olmedo	2029	974	0.4%
			Sucre	9335	San Isidro	1794	861	0.4%
			Paján	7839	Capozano	1799	863	0.4%
					Cascol	1521	730	0.3%
					Guale	831	399	0.2%
					Lascano	1095	525	0.2%
					Pajan	2594	1245	0.5%
			Pichincha	690	Barraganete	1674	803	0.3%
					San Sebastián	1164	559	0.2%
					Pichincha	3853	1849	0.8%
			Jama	4922	Jama	4922	2363	1.0%
			El Carmen	13,207	Wilfrido loor (Maicito)	680	327	0.1%
					4 de Diciembre	793	380	0.2%
			9748		San Pedro de Suma	993	477	0.2%
					El Carmen	10,741	5156	2.1%
			Bolívar	6475	Membrillo	565	271	0.1%
					Quiroga	599	287	0.1%
					Calceta	5311	2549	1.1%
			Santa Ana	10,052	Ayacucho	1575	756	0.3%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
					Honorato Vásquez	1249	599	0.2%
					La Unión	1372	658	0.3%
					San Pablo	1127	541	0.2%
					Santa Ana	1675	804	0.3%
					Santa Ana de Vuelta Larga	4280	2054	0.9%
			Pedernales	10,252	Pedernales	6256	3003	1.2%
					Cojimies	2549	1224	0.5%
					10 de Agosto	969	465	0.2%
					Atahualpa	478	229	0.1%
			Portoviejo	17,321	Alhajuela	232	111	0.0%
					Abdón Calderón	876	421	0.2%
					Chirijo	146	70	0.0%
					Crucita	869	417	0.2%
					Pueblo Nuevo	196	94	0.0%
					Riochico	727	349	0.1%
					San Placido	475	228	0.1%
					Portoviejo	13,799	6624	2.7%
			Puerto López	3034	Salango	1621	778	0.3%
			San Vicente	3310	Canoa	1035	497	0.2%
			Rocafuerte	6513	Rocafuerte	6513	3126	1.3%
			24 de Mayo	6142	Bellavista	1048	503	0.2%
					Noboa	1394	669	0.3%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
					Sixto Duran Ballén	842	404	0.2%
					Sucre	2859	1372	0.6%
			Manga del Cura	25,569	Manga del Cura	2301	1104	0.5%
	Subtotal	**96.37%**		**168,499**	**46%**	**134,884**	**64,744**	**26.8%**
6	**Santa Elena**	**52,307**	**Santa Elena**	11,741	Manglaralto	2405	1154	0.5%
					Colonche	**2552**	**1225**	**0.5%**
7	**Sto Domingo**	**55,613**	Santo Domingo	55,613	Alluriquin	1470	705	0.3%
	de los Tsáchilas				Bomboli	722	347	0.1%
					El Esfuerzo	849	407	0.2%
					Rio Toachi	871	418	0.2%
					Santa María del Toachi	849	407	0.2%
					Santo Domingo	45,337	21,762	9.0%
					San Jacinto de Bua	1771	850	0.4%
					Valle Hermoso	1411	677	0.3%
					Luz de America	1644	789	0.3%
					Puerto Limón	1412	678	0.3%
			La Concordia	29,003	La Concordia	1410	677	0.3%
					Monterrey	1820	874	0.4%
	Subtotal	**152.15%**		**84,616**	**64%**	**59,565**	**28,591**	**11.8%**
I	**S. Costa**	**1071,306**		**674,019**		**430,454**	**206,618**	**85.5%**
8	**Bolivar**	**32,065**	Chillanes	2943	San Jose del Tambo	699	335	0.1%
			Echeandia	1888	Echeandia	1888	906	0.4%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
			Guaranda	16,592	San Luis de Pambil	967	464	0.2%
	Subtotal	**66.81%**		**21,423**	**64%**	**3554**	**1706**	**0.7%**
9	**Cotopaxi**	**91,888**	La Maná	8472	El Carmen	535	257	0.1%
					La Mana	5181	2487	1.0%
					Guasaganda	784	376	0.2%
					Pucayacu	412	198	0.1%
			Pangua	5399	Moraspungo	1560	749	0.3%
	Subtotal	**15.10%**		**13,871**	**35%**	**8472**	**4067**	**1.7%**
10	**Imbabura**	**59,733**	Cotacachi	8418	Garcia Moreno	1064	511	0.2%
	Subtotal	**14.09%**		**8418**	**27%**	**1064**	**511**	**0.2%**
11	**Pichincha**	**328,099**	Pedro Vicente Mald.	3479	Pedro Vicente Mald	3479	1670	0.7%
			Puerto Quito	7239	Puerto Quito	7239	3475	1.4%
			Quito (zonas subu-rural)	244,316	Gualea	221	106	0.0%
					Nanegal	288	138	0.1%
					Nanegalito	330	158	0.1%
					Pacto	524	251	0.1%
			San Miguel de Bancos	6759	Los bancos	5281	2535	1.0%
					Mindo	1478	709	0.3%
	Subtotal	**79.79%**		**261,792**	**37%**	**18,839**	**9043**	**3.7%**
II	**S. Sierra**	**511,784**		**305,505**		**31,929**	**15,326**	**6.3%**
12	**Morona Santiago**	**24,737**	Huamboya	1960	Chiguaza	1373	659	0.3%
					Huamboya	588	282	0.1%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
			Logroño	1092	Shimpis	361	173	0.1%
					Logroño	392	188	0.1%
			Morona	6014	Sevilla Don Bosco	1960	941	0.4%
			Palora	855	Arapicos	59	29	0.0%
					16 de Agosto	122	59	0.0%
					Sangay	144	69	0.0%
			Sucúa	2577	Huambi	407	195	0.1%
			Pablo Sexto	294	Pablo Sexto	294	141	0.1%
			Santiago	1608	San Francisco de Chinimbini	187	90	0.0%
					Santiago de Mendez	520	250	0.1%
					Tayuza	261	125	0.1%
			Taisha	4514	Macuma	951	457	0.2%
	Subtotal	**76.46%**		**18,914**		**7619**	**3657**	**1.5%**
13	**Napo**	**18,405**	Tena	10,345	Puerto Misahualli	871	418	0.2%
					Puerto Napo	916	440	0.2%
			Archidona	5151	Contundo	1728	829	0.3%
					Hatun Sumaku	1258	604	0.2%
			Carlos J. Arosemena	708	Carlos J. Arosemena	708	340	0.1%
			El Chaco	1086	Gonzalez Diaz de Pineda	93	45	0.0%
					Linares	68	33	0.0%
					Santa Rosa	170	81	0.0%
					Sardinas	73	35	0.0%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
					Chaco	657	315	0.1%
			Quijos	1115	Baeza	349	167	0.1%
					San Francisco de Borja	394	189	0.1%
					Sumaco	7	3	0.0%
	Subtotal	**100.00%**		**18,405**		**7293**	**3500**	**1.4%**
14	**Orellana**	**19,660**	Francisco de Orellana	7079	La Belleza	553	266	0.1%
					Puerto Francis de Orellana	6047	2903	1.2%
					San Jose de Guayusa	261	125	0.1%
					San Luis de Armenia	269	129	0.1%
					Taracola	350	168	0.1%
			La Joya de los Sachas	1202	Rumipamba	292	140	0.1%
					Lago San Pedro	273	131	0.1%
					San Sebastian del Coca	492	236	0.1%
			Loreto	2151	San Jose de Payamino	565	271	0.1%
					San Vicente de Huaticocha	191	92	0.0%
	Subtotal	**53.06%**		**10,432**	**33%**	**9295**	**4462**	**1.8%**
15	**Pastaza**	**328,099**	Pastaza	10,147	Canelos	356	171	0.1%
					Simón Bolívar	930	446	0.2%
					Diez de Agosto	187	90	0.0%
					El Triunfo	217	104	0.0%
					Sarayacu	418	201	0.1%
					Veracruz	288	138	0.1%

	Province/ Region	Employed T. Provin.	Canton (*)	Employed T. Canton	Parish (*)	Emp. en AG Parish	Employed In Bamboo	Relative Distribu.
			Santa Clara	718	San José	148	71	0.0%
					Santa Clara	570	274	0.1%
			Arajuno	1719	Curaray	711	341	0.1%
	Subtotal	**3.84%**		**12,583**	**31%**	**3824**	**1835**	**0.8%**
16	**Sucumbios**	**20,140**	Cascales	1805	El Dorado de Cascales	1231	591	0.2%
			Gonzalo Pizarro	1096	Gonzalo Pizarro	377	181	0.1%
			Lago Agrio	8598	El Eno	622	299	0.1%
					General Farfan	634	304	0.1%
					Nueva Loja	5410	2597	1.1%
					Santa Cecilia	590	283	0.1%
			Shushufindi	5559	San Pedro de los Cofanes	417	200	0.1%
					San Roque	393	189	0.1%
					Shushufindi	3307	1588	0.7%
	Subtotal	**84.69%**		**17,058**		**12,981**	**6231**	**2.6%**
II	**S. Amazonía**	**411,041**		**77,393**		**41,012**	**19,686**	**8.1%**
I+ II+ III	**Total Principales zonas**	**1994,131**		**1056,916**		**503,396**	**241,630**	**100%**
	Resto provin.	**17,144**		**954,359**		**1507,879**		
	TOTAL PAÍS	**2011,275**		**2011,275**		**2011,275**		

Appendix 7
Population Involved in Bamboo in the Main Production Areas by Province, Canton and Parish

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
1	**El Oro**	698,545	Balsas	8786	Balsas	7210	1413	0.2%
			El Guabo	61,267	Rio Bonito	6710	1863	0.2%
			Pasaje	85,430	Casacay	2883	362	0.1%
					Progreso	4655	584	0.1%
			Piñas	29,638	Moromoro	1564	336	0.0%
	Subtotal	**27%**		**185,121**		**23,021**	**4558**	**0.7%**
2	**Esmeraldas**	626,626	Rioverde	30,840	Chontaduro	3698	709	0.1%
					Chumunde	4031	773	0.1%
					Lagarto	6513	1249	0.2%
					Montalvo	4601	883	0.1%
					Río Verde	5698	1093	0.2%
					Rocafuerte	6299	1208	0.2%
			Quininde	142,462	La Union	23,157	3955	0.7%
					Malimpia	20,656	3528	0.6%
					Rosa Zarate	78,175	13,352	2.3%
					Viche	6151	1051	0.2%
			Esmeraldas	214,975	Camarones	3196	353	0.1%
					Crnel. Carlos Concha Torres	2670	295	0.1%
					Tabiazo	3018	333	0.1%
			San Lorenzo	58,596	Calderon	866	108	0.0%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
					Carondelet	2386	298	0.1%
					Santa Rita	2260	283	0.1%
					Concepcion	3247	406	0.1%
					Alto Tambo	2580	323	0.1%
					Tululbi	3165	396	0.1%
			Eloy Alfaro	44,895	Anchayacu	2866	539	0.1%
					La Tola	4932	928	0.1%
					Maldonado	2102	395	0.1%
					San Jose de Cayapas	1709	321	0.1%
					Santa Lucía de las Peñas	2586	480	0.1%
					Borbon	8695	1635	0.3%
					Telembí	6371	1198	0.2%
					San Francisco del Onzole	1616	304	0.0%
	Subtotal	**78%**		**491,768**		**213,245**	**36,397**	**6.4%**
3	**Guayas**	4267,893	Balzar	59,563	Balzar	59,563	9513	1.8%
			Colimes	25,866	Colimes	19,112	19,066	0.6%
			Crnl. Marcel Marideñas	13,044	Crnl. Marcelino Marideñas	13,044	3284	0.4%
			El Empalme	84,472	La Guayas (Pueblo Nuevo)	19,945	6902	0.6%
					El Rosario	10,444	3614	0.3%
					Velasco Ibarra	54,083	18,715	1.6%
			El Triunfo	56,823	El Triunfo	56,823	10,095	1.7%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
			General Antonio Elizalde	12,732	Gral Antonio Elizalde -Bucay	12,732	3490	0.4%
			Guayaquil	2671,801	Tenguel	13,565	2250	0.4%
			Naranjal	89,936	Jesús María	8376	3311	0.3%
					San Carlos	8492	3357	0.3%
			Pedro Carbo	50,510	Pedro Carbo	36,417	12,832	1.1%
					Valle de la Virgen	6082	2143	0.2%
			Simon Bolivar	31,038	Simon Bolivar	17,764	8166	0.5%
	Subtotal	**73%**		**3095,785**		**336,442**	**104,738**	**10.1%**
4	**Los Ríos**	899,632	Buena Fé	79,784	San Jacinto de Buena Fe	64,271	7183	1.9%
					Patricia Pilar	15,513	1734	0.5%
			Babahoyo	172,502	Caracol	5735	644	0.2%
					Febres Cordero (Las Juntas)	20,175	2265	0.6%
			Montalvo	28,019	Montalvo	28,019	3812	0.8%
			Quevedo	207,064	La Esperanza	5789	1021	0.2%
					Quevedo	180,512	11,457	5.4%
					San Carlos	4463	941	0.1%
					San Camilo	8800	1980	0.3%
					Siete de Octubre	7500	1451	0.2%
			Valencia	52,461	Valencia	40,984	8280	1.2%
					El Vergel	11,477	1088	0.3%
			Quinsaloma	19,754	Quinsaloma	19,754	4009	0.6%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
			Baba	43,105	Baba	20,469	4393	0.6%
					Guare	12,435	2669	0.4%
			Vinces	80,908	Vinces	62,532	9574	1.9%
			Mocache	42,720	Mocache	42,720	8669	1.3%
			Ventanas	74,100	Ventanas	50,829	7072	1.5%
					Zapotal	23,271	3238	0.7%
			Urdaneta	32,251	Ricaurte	22,783	4442	0.7%
	Subtotal	**93%**		**832,668**		**648,030**	**85,355**	**19.5%**
5	**Manabí**	1537,090	Chone	131,649	Boyaca	4685	693	0.1%
					Canuto	10,777	1593	0.3%
					Chibunga	6619	979	0.2%
					Chone	70,290	10,542	2.1%
					Convento	6846	1012	0.2%
					Eloy Alfaro	8151	1205	0.2%
					Ricaurte	8243	1219	0.2%
					Santa Rita	7670	984	0.2%
					San Antonio	8367	1237	0.3%
			Flavio Alfaro	24,360	San Francisco de Novillo	2707	558	0.1%
					Zapallo	3594	740	0.1%
					Flavio Alfaro	18,059	3719	0.5%
			Jipijapa	74,797	Puerto de Cayo	3576	368	0.1%
					Jipijapa	51,640	331	1.6%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
					America	3220	743	0.1%
					El Anegado	7223	785	0.2%
					La Unión	2042	531	0.1%
					Pedro Pablo Gómez	3750	386	0.1%
			Junín	19,077	Junín	19,077	3637	0.6%
			Olmedo	10,244	Olmedo	10,244	2029	0.3%
			Sucre	62,056	San Isidro	11,928	1794	0.4%
			Paján	37,546	Capozano	8616	1799	0.3%
					Cascol	7284	1521	0.2%
					Guale	3981	831	0.1%
					Lascano	5243	1095	0.2%
					Pajan	12,422	2594	0.4%
			Pichincha	30,098	Barraganete	7530	1674	0.2%
					San Sebastián	5236	1164	0.2%
					Pichincha	17,332	3853	0.5%
			Jama	25,804	Jama	25,804	4922	0.8%
			El Carmen	107,572	Wilfrido loor (Maicito)	5542	680	0.2%
					4 de Diciembre	6814	793	0.2%
					San Pedro de Suma	8087	993	0.2%
					El Carmen	87,130	10,741	2.6%
			Bolívar	45,004	Membrillo	3925	565	0.1%
					Quiroga	4162	599	0.1%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
					Calceta	36,917	5311	1.1%
			Santa Ana	48,582	Ayacucho	7611	1575	0.2%
					Honorato Vásquez	6035	1249	0.2%
					La Unión	6629	1372	0.2%
					San Pablo	5446	1127	0.2%
					Santa Ana	6430	1675	0.2%
					Santa Ana de Vuelta Larga	16,431	4280	0.5%
			Pedernales	62,367	Atahualpa	2905	6256	0.1%
					Cojimes	15,508	2549	0.5%
					Diez de Agosto	5896	969	0.2%
					Pedernales	38,057	4782	1.1%
			Portoviejo	316,444	Alhajuela	4242	232	0.1%
					Abdón Calderón	16,006	876	0.5%
					Chirijo	2669	146	0.1%
					Crucita	15,877	869	0.5%
					Pueblo Nuevo	3581	196	0.1%
					Riochico	13,286	727	0.4%
					San Placido	8687	475	0.3%
					Portoviejo	252,096	13,799	7.6%
			Puerto López	24,028	Salango	5327	1621	0.2%
			San Vicente	24,491	Canoa	7658	1035	0.2%
			Rocafuerte	36,924	Rocafuerte	36,924	6513	1.1%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
			24 de Mayo	28,935	Bellavista	4935	1048	0.1%
					Noboa	6568	1394	0.2%
					Sixto Duran Ballén	3964	842	0.1%
					Sucre	13,467	2859	0.4%
			Manga del Cura	25,569	Manga del Cura	25,569	2301	0.8%
	Subtotal	**73.88%**		**1135,547**		**1046,539**	**134,883**	**31.4%**
6	**Santa Elena**	384,102	Santa Elena	384,102	Manglaralto	36,972	2405	1.1%
					Colonche	39,239	2552	1.2%
	Subtotal	**100.00%**		**384,102**		**76,211**	**4957**	**2.3%**
7	**Sto Domingo**	442,788	Santo Domingo	413,785	Alluriquin	11,701	1470	0.4%
	de los Tsáchilas				Bomboli	5750	722	0.2%
					El Esfuerzo	6934	849	0.2%
					Rio Toachi	6756	871	0.2%
					Santa María del Toachi	5756	849	0.2%
					Santo Domingo	327,222	45,337	9.8%
					San Jacinto de Bua	14,099	1771	0.4%
					Valle Hermoso	11,232	1411	0.3%
					Luz de America	13,092	1644	0.4%
					Puerto Limón	11,243	1412	0.3%
			La Concordia	29,003	La Concordia	11,601	1410	0.3%
					Monterrey	17,402	1820	0.5%
	Subtotal	**100.00%**		**442,788**		**442,788**	**59,565**	**13.3%**

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
I	S. Costa	8856,676		6567,779		2786,276	430,454	84%
8	Bolivar	206,771	Chillanes	17,189	San Jose del Tambo	4080	699	0.1%
			Echeandia	13,826	Echeandia	13,826	1888	0.4%
			Guaranda	106,387	San Luis de Pambil	6203	967	0.2%
	Subtotal	66.45%		137,402		24,110	3554	0.7%
9	Cotopaxi	476,428	La Maná	54,104	El Carmen	3820	535	0.1%
					La Mana	42,643	5181	1.3%
					Guasaganda	5008	784	0.2%
					Pucayacu	2632	412	0.1%
			Pangua	24,321	Moraspungo	13,703	1560	0.4%
	Subtotal	16.46%		78,425		67,807	8472	2.0%
10	Imbabura	463,957	Cotacachi	43,792	Garcia Moreno	5535	1064	0.2%
	Subtotal	9.44%		43,792		5535	1064	0.2%
11	Pichincha	3116,111	Pedro Vicente Mald.	16,375	Pedro Vicente Maldonado	16,375	3479	0.5%
			Puerto Quito	24,189	Puerto Quito	24,189	7239	0.7%
			Quito (subu-rural areas)	2690,150	Gualea	2433	221	0.1%
					Nanegal	3167	288	0.1%
					Nanegalito	3635	330	0.1%
					Pacto	5764	524	0.2%
			San Miguel de Bancos	27,128	San Miguel de Los bancos	21,197	5281	0.6%
					Mindo	5931	1478	0.2%
	Subtotal	88.50%		2757,842		82,691	18,839	2.5%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
II	**S. Sierra**	**4263,267**		**3017,461**		**180,143**	**31,929**	**5.4%**
12	**Morona Santiago**	188,028	Huamboya	11,622	Chiguaza	8138	1373	0.2%
					Huamboya	3484	588	0.1%
			Logroño	7311	Shimpis	2418	361	0.1%
					Logroño	2623	392	0.1%
			Morona	55,075	Sevilla Don Bosco	17,950	1960	0.5%
			Palora	7671	Arapicos	533	59	0.0%
					16 de Agosto	1095	122	0.0%
					Sangay	1296	144	0.0%
			Pablo Sexto	2673	Pablo Sexto	2673	407	0.1%
			Santiago	10,859	San Francisco de Chinimbini	1261	294	0.0%
					Santiago de Mendez	3514	187	0.1%
					Tayuza	1764	520	0.1%
			Sucúa	22,916	Huambi	3617	261	0.1%
			Taisha	25,168	Macuma	5303	951	0.2%
	Subtotal	**76.21%**		**143,295**		**55,669**	**7619**	**1.7%**
13	**Napo**	128,252	Tena	75,826	Puerto Misahualli	6386	871	0.2%
					Puerto Napo	6717	916	0.2%
			Archidona	31,547	Contundo	10,583	1728	0.3%
					Hatun Sumaku	8389	1258	0.3%
			Carlos J. Arosemena Tola	4335	Carlos J. Arosemena Tola	4335	708	0.1%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
			El Chaco	9754	El Chaco	5901	718	0.2%
					Gonzalo Días de Pineda	656	68	0.0%
					Linares	256	170	0.0%
					Santa Rosa	1523	189	0.0%
					Sardinas	658	657	0.0%
			Quijos	6790	Baeza	2123	349	0.1%
					San Francisco de Borja	2200	394	0.1%
					Sumaco	243	48	0.0%
	Subtotal	**100.00%**		**128,252**		**49,970**	**7293**	**1.5%**
14	**Orellana**	157,520	Francisco de Orellana	90,044	La Belleza	5112	553	0.2%
					Puerto Francis de Orellana	55,865	6047	1.7%
					San Jose de Guayusa	2413	261	0.1%
					San Luis de Armenia	2489	269	0.1%
					Taracola	3236	350	0.1%
			La Joya de los Sachas	39,457	Rumipamba	2092	292	0.1%
					Lago San Pedro	1953	273	0.1%
					San Sebastian del Coca	3519	492	0.1%
			Loreto	24,117	San Jose de Payamino	3561	565	0.1%
					San Vicente de Huaticocha	1206	191	0.0%
	Subtotal	**97.52%**		**153,618**		**81,446**	**9295**	**2.4%**
15	**Pastaza**	108,365	Pastaza	80,082	Canelos	2806	356	0.1%
					Simón Bolívar	7337	930	0.2%

	Province/ Region	Population T. Provin.	Canton	Population T. Cantón	Parish	Population T. Parroq	Population Inv Bamboo	% P. Bam/ Total Pop.
					Diez de Agosto	1477	187	0.0%
					El Triunfo	1711	217	0.1%
					Sarayacu	3301	418	0.1%
					Veracruz	2270	288	0.1%
			Santa Clara	4069	San José	839	148	0.0%
					Santa Clara	3230	570	0.1%
			Arajuno	7849	Curaray	3247	711	0.1%
	Subtotal	**84.90%**		**92,000**		**26,218**	**3824**	**0.8%**
16	**Sucumbios**	220,483	Cascales	14,914	El Dorado de Cascales	10,173	1231	0.3%
			Gonzalo Pizarro	9811	Gonzalo Pizarro	3371	377	0.1%
			Lago Agrio	114,503	El Eno	8282	622	0.2%
					General Farfan	8448	634	0.3%
					Nueva Loja	72,047	5410	2.2%
					Santa Cecilia	7853	590	0.2%
			Shushufindi	55,449	San Pedro de los Cofanes	4160	417	0.1%
					San Roque	3923	393	0.1%
					Shushufindi	32,993	3307	1.0%
	Subtotal	**88.30%**		**194,677**		**151,251**	**12,981**	**4.5%**
II	**S. Amazonía**	**802,648**		**711,842**		**364,555**	**41,012**	**11%**
I+ II+ III	**General Total**	**13,922.591**		**10,297.082**	**15%**	**3330,974**	**503,395**	**100%**
	Rest Provinc.	**3100,817**						
	COUNTRY TOTAL	**17,023.408**				**3330,974**	**15%**	

Appendix 8
Potential Surface for Bamboo Development in Natural Conditions

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
1	**El Oro**	66,642	Balsas	3327	Balsas	2684	561	21%
			El Guabo	7239	Rio Bonito	5822	1842	32%
			Pasaje	4914	Casacay	1951	605	31%
					Progreso	2913	1197	41%
			Piñas	5564	Moromoro	1474	165	11%
	Subtotal	**66,642**		**21,044**		**14,844**	**4370**	**29%**
2	**Esmeraldas**	333,553	Rioverde	45,403	Chontaduro	6529	2918	45%
					Chumunde	15,189	3556	23%
					Lagarto	6408	3003	47%
					Montalvo	11,370	3020	27%
					Rioverde	2181	652	30%
					Rocafuerte	3726	1015	27%
			Quininde	198,067	La Unión	21,045	6003	29%
					Malimpia	59,727	7697	13%
					Rosa Zarate	69,606	9153	13%
					Viche	4611	722	16%
			Esmeraldas	28,385	Camarones	4465	824	18%
					Crnel. Carlos Concha Torres	7121	1456	20%
					Tabiazo	2909	692	24%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			San Lorenzo	9203	Calderon	810	428	53%
					Carondelet	1215	1015	84%
					Santa Rita	1170	1057	90%
					Concepcion	3085	2966	96%
					Alto Tambo	2301	2028	88%
					Tululbi	602	510	85%
			Eloy Alfaro	21,742	Anchayacu	5021	4856	97%
					La Tola	4637	4211	91%
					Maldonado	975	689	71%
					San Jose de Cayapas	1940	1812	93%
					Santa Lucía de las Peñas	1183	958	81%
					Borbon	2520	2311	92%
					Telembi	3736	3508	94%
					San Francisco Onzole	1620	1487	92%
	Subtotal	**333,553**		**302,800**		**245,703**	**68,546**	**28%**
3	**Guayas**	395,191	Colimes	28,892	Colimes	20,736	5441	26%
			Balzar	64,484	Balzar	64,484	9489	15%
			Crnl. Marcel Maridueñas	20,577	Crnl. Marcelo Maridueñas	20,577	3551	17%
			El Empalme	53,026	La Guayas	29,953	8894	30%
					El Rosario	10,163	823	8%
					Velasco Ibarra	12,910	1046	8%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			El Triunfo	16,885	El Triunfo	16,885	1934	11%
			General Antonio Elizalde	7163	General Antonio Elizalde	7163	2267	32%
			Guayaquil	10,487	Tenguel	7690	2654	35%
			Naranjal	30,846	Jesus Maria	8036	492	6%
					San Carlos	1405	537	38%
			Pedro Carbo	35,475	Pedro Carbo	21,534	5575	26%
					Valle de la Virgen	3851	609	16%
			Simon Bolivar	19,270	Simon Bolivar	8478	514	6%
	Subtotal	**395,191**		**287,106**		**233,865**	**43,825**	**19%**
4	**Los Ríos**	404,222	Buena Fé	35,418	San Jacinto de Buena Fe	25,255	4556	18%
					Patricia Pilar	10,163	1500	15%
			Babahoyo	55,636	Caracol	7231	586	8%
					Febres Cordero	29,394	11,503	39%
			Montalvo	13,529	Montalvo	13,529	1451	11%
			Quevedo	41,317	La Esperanza	3918	1234	31%
					Quevedo	22,036	4529	21%
					San Carlos	11,474	2023	18%
					San Camilo	1555	265	17%
					Siete de Octubre	2333	580	25%
			Valencia	69,628	Valencia	59,184	18,118	31%
					El Vergel	10,444	2023	19%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			Quinsaloma	26,615	Quinsaloma	26,615	6401	24%
			Baba	7570	Baba	2525	862	34%
					Guare	3418	2802	82%
			Vinces	20,565	Vinces	16,358	2771	17%
			Mocache	53,647	Mocache	53,647	8519	16%
			Ventanas	29,360	Ventanas	9301	3164	34%
					Zapotal	20,060	4897	24%
			Urdaneta	13,579	Ricaurte	11,826	2977	25%
	Subtotal	**404,222**		**366,865**		**340,267**	**80,763**	**24%**
5	**Manabí**	601,337	Chone	141,329	Boyaca	10,961	2120	19%
					Canuto	9226	1388	15%
					Chibunga	26,562	3425	13%
					Chone	32,799	5803	18%
					Convento	14,142	2755	19%
					Eloy Alfaro	15,249	3203	21%
					Ricaurte	16,832	3903	23%
					Santa Rita	5788	1575	27%
					San Antonio	9770	1315	13%
			Flavio Alfaro	50,137	Novillo	9720	2872	30%
					Zapallo	3792	1223	32%
					Flavio Alfaro	36,625	8855	24%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			Jipijapa	22,277	Puerto Cayo	3600	1370	38%
					America	2184	702	32%
					Anegado	2278	935	41%
					La Unión	1708	560	33%
					Jipijapa	7049	1980	28%
					Pedro Pablo Gómez	5311	2556	48%
			Junín	7736	Junín	7736	1969	25%
			Olmedo	17,906	Olmedo	17,906	2285	13%
			Sucre	6350	San Isidro	5708	3553	62%
			Paján	64,728	Capozano	14,679	2715	18%
					Cascol	25,552	3866	15%
					Guale	6796	1200	18%
					Lascano	8556	1295	15%
					Pajan	9145	1230	13%
			Pichincha	32,749	Barraganete	13,007	4698	36%
					San Sebastián	4340	1283	30%
					Pichincha	15,402	5057	33%
			Jama	2857	Jama	2857	2527	88%
			El Carmen	76,790	Wilfrido loor (Maicito)	17,682	2546	14%
					San Pedro de Suma	11,491	1699	15%
					4 de Diciembre	7143	1198	17%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
					El Carmen	40,475	11,732	29%
			Bolívar	11,987	Membrillo	2697	1453	54%
					Quiroga	1380	620	45%
					Calceta	7910	3196	40%
			Santa Ana	53,649	Ayacucho	5712	1162	20%
					Honorato Vásquez	8175	1406	17%
					La Unión	12,168	2558	21%
					San Pablo	11,122	1913	17%
					Santa Ana de Vuelta Larga	14,001	2204	16%
					Santa Ana	2471	983	40%
			Pedernales	73,919	Pedernales	29,747	3838	13%
					Cojimies	28,580	2950	10%
					10 de Agosto	9035	933	10%
					Atahualpa	6556	1015	15%
			Portoviejo	10,458	Alhajuela	312	268	86%
					Calderón	1516	1486	98%
					Chirijo	958	842	88%
					Crucita	1078	810	75%
					Pueblo Nuevo	398	329	83%
					Riochico	1023	909	89%
					San Placido	2035	1940	95%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
					Portoviejo	3139	2926	93%
			Puerto López	0	Salango	0	793	
			San Vicente	0	Canoa	0	4251	
			Rocafuerte	0	Rocafuerte	0	1958	
			24 de Mayo	27,536	Bellavista	5399	1134	21%
					Noboa	7656	1462	19%
					Sixto Duran Ballén	4178	638	15%
					Sucre	10,302	1771	17%
			Manga del Cura	0	Manga del Cura	0	4392	
	Subtotal	**601,337**		**600,406**		**599,618**	**145,529**	**24%**
6	**Santa Elena**	-	Santa Elena	0	Manglaralto	0	3827	
					Colonche	0	8045	
	Subtotal	**-**		**-**		**-**	**11,872**	**0%**
7	**Sto Domingo**	290,076	Santo Domingo	259,493	Alluriquin	50,046	7306	15%
	de los				El Esfuerzo	21,168	3777	18%
	Tsáchilas				Santa María del Toachi	26,675	3972	15%
					Santo Domingo	69,940	12,486	18%
					Valle Hermoso	23,363	3413	15%
					Luz de America	23,427	2800	12%
					Puerto Limón	17,168	1824	11%
					Bomboli	4937	944	19%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
					Rio Toachi	7405	2142	29%
					San Jacinto de Bua	15,364	3081	20%
			La Concordia	30,583	La Concordia	12,233	987	8%
					Monterrey	18,350	1392	8%
	Subtotal	**290,076**		**290,076**		**290,076**	**44,126**	**15%**
I	**S. Costa**	**2091,021**		**1868,297**		**1724,373**	**399,032**	**23%**
8	**Bolivar**	**91,707**	Chillanes	11,849	San Jose del Tambo	9268	2148	23%
			Echeandia	12,490	Echeandia	11,218	3225	29%
			Guaranda	30,223	San Luis de Pambil	12,005	1381	12%
	Subtotal	**91,707**		**54,561**		**32,491**	**6754**	**21%**
9	**Cotopaxi**	72,472	La Maná	35,675	Guasaganda	12,732	3926	31%
					Pucayacu	9860	3081	31%
					El Carmen	2012	890	44%
					La Mana	10,413	5028	48%
			Pangua	30,268	Moraspungo	22,332	6122	27%
	Subtotal	**72,472**		**65,943**		**57,349**	**19,047**	**33%**
10	**Imbabura**	57,840	Cotacachi	40,114	Garcia Moreno	32,645	7702	24%
	Subtotal	**57,840**		**40,114**		**32,645**	**7702**	**24%**
11	**Pichincha**	148,372	Pedro Vicente Mald.	33,233	Pedro Vicente Mald	33,233	5487	17%
			Puerto Quito	37,588	Puerto Quito	37,588	6949	18%
			Quito (zonas subu-rural)	38,529	Gualea	5067	967	19%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
					Nanegal	8245	1720	21%
					Nanegalito	4139	623	15%
					Pacto	13,171	2857	22%
			San Miguel de Bancos	34,382	Los bancos	27,511	5558	20%
					Mindo	12,871	2419	19%
	Subtotal	**148,372**		**143,732**		**141,825**	**26,581**	**19%**
II	**S. Sierra**	**370,390**		**304,350**		**264,310**	**60,083**	**23%**
12	**Morona Santiago**	213,616	Huamboya	24,629	Chiguaza	17,791	5752	32%
					Huamboya	6838	1105	16%
			Logroño	6730	Shimpis	4824	3817	79%
					Logroño	1883	683	36%
			Morona	48,429	Sevilla Don Bosco	31,985	15,677	49%
			Palora	26,251	Arapicos	5905	2220	38%
					16 de Agosto	1606	944	59%
					Sangay	3633	1786	49%
			Sucúa	7041	Huambi	3273	1292	39%
			Pablo Sexto	5764	Pablo Sexto	5764	5295	92%
			Santiago	6521	San Francisco de Chinimbini	2890	1317	46%
					Santiago de Mendez	2450	1801	74%
					Tayuza	1128	628	56%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			Taisha	993	Macuma	802	489	61%
	Subtotal	**213,616**		**126,359**		**90,773**	**42,806**	**47%**
13	**Napo**	70,551	Tena	49,128	Puerto Misahualli	14,374	2897	20%
					Puerto Napo	8469	1780	21%
			Archidona	14,302	Contundo	10,562	6140	58%
					Hatun Sumaku	3586	1273	35%
			Carlos J. Arosemena	4812	Carlos J. Arosemena	4812	3855	80%
			El Chaco	2086	Gonzalez Diaz de Pineda	783	698	89%
					Linares	66	49	74%
					Santa Rosa	183	154	84%
					Sardinas	687	669	97%
					Chaco	367	353	96%
			Quijos	223	Baeza	24	1405	
					San Francisco de Borja	19	986	
					Sumaco	35	1985	
	Subtotal	**70,551**		**70,551**		**43,968**	**22,245**	**51%**
14	**Orellana**	144,725	Francisco de Orellana	60,938	La Belleza	7253	2045	28%
					Puerto Francis de Orellana	2259	674	30%
					San Jose de Guayusa	4965	1903	38%
					San Luis de Armenia	3750	1064	28%
					Taracola	5524	1890	34%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
			La Joya de los Sachas	66,891	Rumipamba	4074	1258	31%
					Lago San Pedro	4239	1265	30%
					San Sebastian del Coca	24,285	11,025	45%
			Loreto	14,249	San Jose de Payamino	9533	2987	31%
					San Vicente de Huaticocha	2575	768	30%
	Subtotal	**144,725**		**142,079**		**68,457**	**24,879**	**36%**
15	**Pastaza**	86,917	Pastaza	56,169	Canelos	6275	2036	32%
					Simón Bolívar	6888	1935	28%
					Diez de Agosto	1863	589	32%
					El Triunfo	2278	814	36%
					Río Corrientes	1251	352	28%
					Río Tigre	5330	1499	28%
					Sarayacu	11,481	3229	28%
					Veracruz	2321	721	31%
			Santa Clara	11,652	San José	2586	718	28%
					Santa Clara	9067	2620	29%
			Arajuno	10,644	Curaray	10,358	8954	86%
	Subtotal	**86,917**		**78,466**		**59,697**	**23,467**	**39%**
16	**Sucumbios**	156,568	Cascales	15,804	El Dorado de Cascales	13,729	3453	25%
			Gonzalo Pizarro	10,155	Gonzalo Pizarro	3288	1195	36%
			Lago Agrio	56,134	El Eno	8057	2076	26%

	Province/ Region	Potential Surface Pro Total	Cantón	Potential Surface Canton Total	Parish	Potential Bamboo Surface	Current Surface with Bamboo	% of Current/ Potential Surface
					General Farfan	11,203	3115	28%
					Nueva Loja	9784	2897	30%
					Santa Cecilia	6204	1283	21%
			Shushufindi	71,317	San Pedro de los Cofanes	14,916	3531	24%
					San Roque	21,131	5876	28%
					Shushufindi	16,059	4089	25%
	Subtotal	**156,568**		**153,410**		**104,371**	**27,515**	**26%**
II	**S. Amazonía**	**672,378**		**570,864**		**367,266**	**140,911**	**38%**
I+ II+ III	**Total Main Areas**	**3133,789**		**2743,511**		**2355,950**	**600,026**	**25%**
	Rest provin.	**237,078**		**627,357**		**1014,918**		
	COUNTRY TOTAL	**3370,868**		**3370,868**		**3370,868**	**600,026**	**18%**

Source: Ministry of Agriculture and Livestock (MAG). (2018). Agroecological Crops Zoning in natural conditions for Ecuador at a 1:25,000 scale. Recovered from: http://sinagap.gob.ec/sina. National Information System.

This is a translation of Ecuador's National Bamboo Strategy 2018-2022. The Strategy constitutes a comprehensive national strategy for the bamboo sector in the country, and were developed by The International Bamboo and Rattan Organisation, an intergovernmental organisation comprising 44 member states which promotes the use of bamboo and rattan for sustainable development. The Minister for Agriculture presented this strategy outline at the 2018 Global Bamboo and Rattan Congress in Beijing, China. The Strategy was developed with the support of the Global Assessment for Bamboo and Rattan Programme (GABAR).