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Agro-logistics in the Colombian Caribbean state of affairs, bottlenecks and opportunities

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Agro-logistics in the Colombian Caribbean: state of affairs, bottlenecks and opportunities

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 **RESILIENCE**



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EXECUTIVE SUMMARY (ENG)

The agricultural potential of Colombia is, without a doubt, enormous. However, it is not yet fully exploited. The growing (urban) population of the country is in need of agricultural production of higher quality and quantity. Colombia has a handful of flagship agricultural export products (banana, coffee, palm oil, avocado), but has potential to provide the global markets with many more. However, around one third of the food produced in Colombia is either wasted or lost, with important economic, social and environmental consequences. The internal logistics and infrastructure are in need of improvements, while the external operations are suffering – as any other in the world – by the pandemic-lead global logistics crisis.

This study aimed to analyse and present the current situation of the agro-logistics sector in the five departments of Atlántico, Bolívar, Cesar, La Guajira and Magdalena. These five departments host three of the four main ports for Colombia, playing a crucial role in the import and export operations of the country. In addition, they are home to large production of banana and oil palm. Despite their overall suitable environmental conditions, the majority of the food consumed locally is not produced in the regions, but transported from other departments with more structured agricultural systems.

Furthermore, bottlenecks have been identified along the agricultural supply chains, starting from the production side. Agricultural producers struggle with the increasing prices of agricultural inputs, also given to the recent world geo-political developments. Additionally, small producers do not have the knowledge or possibility to introduce elements of technification, often penalizing their yield quality and quantity against bigger producers. The five regions also lag behind in formalization of the agricultural sector. The bad state of tertiary roads and the high price and low availability of transport options reduces the chances of the farmers to bring their produce directly to markets. They must then rely on intermediaries, and sell their produce for a lower price, eventually preventing them to be able to get better income to invest in improving their production or access to new markets possibilities. Farmers in general lack the opportunity of capturing the best value of their production. In terms of inter-regional transport, fluvial transport of agricultural commodities is not developed, given the economic advantages only come into play when handling high volumes. Besides, fluvial ports lack infrastructure for the maintenance of cold chains, which in turn keep the demand for improvements of fluvial transport for agricultural products extremely limited. In the case of products for export, maritime ports play a crucial role. They however struggle not only with the global logistics crisis, but also with internal coordination challenges. Colombia exports mainly to countries in Europe and North America, although having a privileged position for exports towards Caribbean islands, as the case of the Dutch Antilles, the potential is not fully exploited as shipping to the islands is too expensive, given the lack of imports back to Colombia. An improved coordination of routes and products exchange is therefore needed.

Finally, preliminary opportunities have been identified for (Dutch) private sector actors, that will contribute to resolve food waste and loss issues and to an increased value capturing in the focus regions. Amongst these, mango processing is proposed, as well as production and processing of (organic) cashew and the distribution of solutions for increased efficiency in small production. Opportunities lie in the improvement of tertiary roads, thanks to the new different technologies available, as well as in the recovery of organic waste for the production of energy, heat and fertilizers. The connection between Colombia and the (Dutch) Caribbean islands offer large margins of improvements, but does require a well-thought coordination and integration of products flow and routes.

EXECUTIVE SUMMARY (SPA)

El potencial agrícola de Colombia es, sin duda, enorme. Sin embargo, aún no está plenamente explotado. La creciente población (urbana) del país necesita una producción agrícola de mayor calidad y cantidad. Colombia cuenta con unos productos agrícolas de exportación emblemáticos (banano, café, aceite de palma, aguacate), pero tiene potencial para ofrecer otros productos a los mercados mundiales. Sin embargo, alrededor de un tercio de los alimentos producidos en Colombia se desperdicia o se pierde, con importantes consecuencias económicas, sociales y ambientales. La logística interna y la infraestructura necesitan mejoras, mientras que las operaciones externas están sufriendo -como cualquier otra en el mundo- la crisis logística mundial provocada por la pandemia.

Este estudio tiene como objetivo analizar y presentar la situación actual del sector agrológico en los cinco departamentos de Atlántico, Bolívar, Cesar, La Guajira y Magdalena. Estos cinco departamentos albergan tres de los cuatro principales puertos de Colombia, jugando un papel crucial en las operaciones de importación y exportación del país. Además, albergan una gran producción de banano y palma de aceite. A pesar de sus condiciones ambientales favorables, la mayoría de los alimentos que se consumen localmente no se producen en las regiones, sino que son llevados desde otros departamentos con sistemas agrícolas más estructurados.

Además, se han identificado cuellos de botella a lo largo de las cadenas de suministro agrícola, empezando por el lado de la producción. Los productores agrícolas luchan contra el aumento de los precios de los insumos agrícolas, también debido a los recientes acontecimientos geopolíticos mundiales. Así mismo, los pequeños productores no tienen los conocimientos ni la posibilidad de introducir elementos de tecnificación, lo que a menudo afecta su calidad y cantidad de rendimiento frente a los productores más grandes. Las cinco regiones también se quedan atrás en cuanto a la formalización del sector agrícola. El mal estado de las carreteras terciarias, junto con el alto precio y la baja disponibilidad de opciones de transporte, reducen las posibilidades a los agricultores de llevar sus productos directamente a los mercados, deben recurrir a intermediarios y vender sus productos a un precio inferior, lo que les impide tener mejores ingresos para invertir en la mejora de su producción o en las posibilidades de acceso a nuevos mercados. En general, los agricultores carecen de la oportunidad de captar el mejor valor de su producción. En cuanto al transporte interregional, el transporte fluvial de productos agrícolas no está desarrollado, ya que las ventajas económicas sólo entran en juego cuando se manejan grandes volúmenes. Adicionalmente, los puertos fluviales carecen de infraestructura para el mantenimiento de las cadenas de frío, lo que hace que la demanda de mejora del transporte fluvial de productos agrícolas sea muy limitada. En el caso de los productos para la exportación, los puertos marítimos desempeñan un papel crucial, sin embargo, no sólo luchan contra la crisis logística mundial, sino también contra los retos de coordinación interna. Colombia exporta principalmente a países de Europa y Norteamérica, y aunque tiene una posición privilegiada para las exportaciones hacia las islas del Caribe como en el caso de las Antillas Holandesas, el potencial no se aprovecha del todo, ya que el transporte marítimo a las islas es demasiado costoso, debido a la falta de importaciones por parte de Colombia; por lo tanto, es necesario mejorar la coordinación de las rutas y el intercambio de productos.

Por último, se han identificado oportunidades preliminares para los actores del sector privado (holandés), que contribuirán a resolver los problemas de pérdida y desperdicio de alimentos y a una mayor captación de valor en las regiones objetivo. Entre ellas, se propone el procesamiento de mango, así como la producción y el procesamiento de marañón (orgánico) y la distribución de soluciones para incrementar la eficiencia de pequeños cultivos. Las oportunidades residen en la mejora de las vías terciarias, gracias a las nuevas y diferentes tecnologías disponibles, así como en la recuperación de residuos orgánicos para la producción de energía, calor y fertilizantes. La conexión entre Colombia y las islas (holandesas) del Caribe ofrece grandes márgenes de mejora, pero requiere una coordinación e integración bien pensada del flujo de productos y de las rutas.

1. INTRODUCTION

1.1 Background and rationale of the study

Colombia has enormous agricultural potential, with almost 40 million hectares suitable for agricultural production, corresponding to 34% of the country's total land¹. However, such potential is largely underutilized, roughly one fifth of the suitable area is cultivated². This area is hence required to provide sufficient agricultural products for the ever-growing internal and export markets. In the latter case, Colombia has well-established export flows of banana, coffee, palm oil and avocado. Yet the country has the potential of growing and exporting a much larger array of agri-food products.

Colombia counts 49.5 million inhabitants and is set to grow to 53 million by 2030, and 55 million by 2050. The urban population currently accounts for 82%, set to reach 88.8% by 2050³. This implies a growing demand for agri-food products and an increasing need for the professionalization of the value chains. In these regards, the Dutch Embassy in Bogotá is carrying out the *Feeding the cities* agenda, with initiatives aimed at strengthening and improving food and production systems, crucial for food and nutrition security in Colombia.

Currently, 34% of food produced in Colombia and destined to human consumption is lost or wasted, of which mainly fruits and vegetables (62%), root vegetable (25%) and cereals (8%)⁴. More than one third (40.5%) of the total losses and waste occurs at farm level, followed by losses in the distribution phase (20.6%), the post-harvest and storage phase (19.8%) and the consumption phase (15.6%).

Specifically, in the case of fruits and vegetables, Colombia registers losses and waste for 58% of the production, compared to a global average of 45%. The gap is not so prominent when taking into account loss and waste of root vegetables: 49% in Colombia and 45% globally. On the contrary, Colombia performs significantly better in the cereals category, where only 8% of the production is lost or wasted, compared to a worldwide average of 30%. Overall, the Caribbean region of Colombia scores second in terms of food loss and waste, only after the departments in the centre-east of the country, hence showing a large potential for improvement.

In general, the problems with logistics in Colombia are multiple, starting with a topography that hinders efficient and fast transport, and offers few alternatives to road transport. In addition, the state of secondary and tertiary roads highly affects the transport time, and hence costs, from rural production areas to distribution centres, ports (for export) and final consumers. Of the 142,000 km of tertiary roads, 94% is reportedly in a bad state, hence strongly affecting the connections between rural areas and municipalities⁵.

The last three years have been characterized with crisis that had a big impact on the world's economy. The Covid-19 pandemic and the war in Ukraine have caused and are still creating huge disturbances in agricultural value chains around the world, including in Colombia. Here too the Covid-19 crisis resulted in an increase of agri-food products prices. This was mainly due to the several lockdowns in the country, increase in demand of food items aggravated by migrations inside and to the country, rise in prices of inputs and increase in prices of imported items, in turn caused by the devaluation of the Colombian peso. However, after the first shocks caused by the pandemic, the agricultural sector of Colombia registered a sound recovery. Compared to 2020, in 2021 the export of a handful of non-traditional agricultural products (e.g. lime Tahiti, avocado, mango fresh and processed) grew

¹ Agronegocios, 2020, available [here](#)

² HH & NInvest, Opportunities in Colombia's Agro-Logistics sector for Dutch Business, 2019, available upon request

³ World Bank, Population estimates and projections, 2022, available [here](#)

⁴ DNP, Política para la prevención y reducción de las pérdidas y desperdicios de alimentos, 2020. Available [here](#)

⁵ La Republica, 2019, available [here](#)

of 19.5%⁶; similarly, flowers exports increased of 22% (and of 17% compared to the pre-pandemic export of 2021)⁷.

The logistics sector however has been heavily affected by the pandemic, that exacerbated the container crisis that started a few months earlier, following the USA's announcement of their intention to impose higher duties on Chinese products. Following this announcement, shipping companies rushed to secure the highest number possible of containers, with a consequent rise in rental prices worldwide. Land transport of commodities in Colombia took more time, and disrupted worldwide supply chains caused a big imbalance in cargo capacities. Combined with ever-increasing fuel prices, these factors resulted in a big increase in transport prices in and from Colombia.

After the world learned to live with Covid-19, the next crisis hit the world food market. Ukraine, 'breadbasket' of Europe, was invaded by Russian forces at the end of February 2022 resulting in blockades and damages of Ukraine's ports infrastructure, hindering trade of agricultural products which, in consequence, exerted additional pressure on international (food) inflation. Economic sanctions put on Russia by several countries, including Colombia, are currently affecting the world's economy. Since the supply of cereal crops from Ukraine and Russia came to a hold, the prices of these commodities spiked. As boycotted Russia is a big player on the agricultural inputs' market, especially fertilizer, the prices of the supplies have increased to almost record highs, penalizing those countries that do not produce such inputs internally.

Combined, the weaknesses presented hinder the potential for Colombia to position as an agricultural powerhouse, able to feed its growing (urban) population and to export high-quality and strongly demanded products to international markets. This study is therefore going to offer a comprehensive analysis and assessment of the current bottlenecks related to agro-logistics in the Caribbean region of Colombia. When presented to the right party, bottlenecks and challenges can be turned into business opportunities.

Dutch expertise could therefore help Colombia to become this agricultural powerhouse. The Netherlands have been at the top of the World Bank's Logistic Performance Index ever since the index was introduced in 2007. For centuries the Netherlands have been a key player in international trade, hosting one of the main ports for the rest of Europe and being one of the biggest traders in agricultural commodities. Cold-chain facilities, efficient transport and good infrastructure help the Dutch sector to prevent, where possible, and reduce post-harvest losses and increase the earning capacity of the agricultural sector. The logistic knowledge and expertise gained in all the years and taught at top (agricultural) knowledge institutes, combined with the innovative entrepreneurship could help Colombia to unlock its full potential.

1.2 Objective and scope of the study

This study aims to provide a comprehensive analysis and assessment of the current bottlenecks of the agro-logistics sector in the Caribbean region of Colombia. This sets the basis for the identification of business opportunities in infrastructure and service provision upgrade and agricultural value chains, both that require and do not require a controlled cold chain temperature. The business opportunities are directed at resolving or alleviating the bottlenecks and issues that affect the agro-logistics sector, linking them to the large pool of knowledge, expertise and solutions found in Dutch organizations and companies.

The geographic scope of this study is the Colombian Caribbean, composed of Atlántico, Bolívar, Cesar, La Guajira and Magdalena departments. These five departments count, according to the projections of the demographic

⁶ MinAgri, 2021, available [here](#)

⁷ Floraldaily 2022, available [here](#)

census⁸ realized in 2018, a total population of 8.8 million in 2022. Of these, roughly 77% are residing in urban areas. This percentage is set to slightly decrease, until 73% in 2050, when the total population of these five departments will have risen to 10.7 million.

In Colombia, the main agricultural regions are located in the centre of the country, such as Boyacá, Antioquia, Cundinamarca and Santander. However, the Caribbean departments object of this study have large potential for the development of agricultural production. Moreover, their location on the coast puts them in a privileged position when it comes to international trade and exports. A substantial amount of Colombian products exported to Europe is either grown in or is exported via these five departments. Most of these products reach different European countries via the Netherlands, making the Colombian Caribbean a key region for such commerce.

1.3 Methodology

This study has been built upon both primary and secondary data. For the primary data, a total of 36 interviews have been performed by the research team. These included actors from several categories, both from the private and public sector, both Colombian and Dutch, including:

- Private sector: buyers, producers, service providers, importers, exporters
- Infrastructure, incl. the three ports on the Caribbean coast of Colombia and distribution centres
- Knowledge/research institute, incl. Agrosavia and the National Training Service (SENA)
- Public sector
- Sector association, incl. producers and traders' associations
- Others: such as experts in the field of agricultural production and/or logistics, experts involved in agri-focused development project and Ministries from Aruba and Curaçao

The interviews were tailored to the organization and the respondent, but generally touched upon three main themes: current situation of the agro-logistics sector in the five regions (with focus on the interviewees' own sub-sector and expertise), bottlenecks experienced by the interviewee (or by the category of people represented by his/her organization), potential solutions to solve the bottlenecks. The full list of interviewees is available upon request.

Secondary data was collected during the desk study, in which literature was reviewed and public data was gathered. Policy documents of the Colombian government, both central and regional, and analysis of international organizations are amongst the sources used. Public entities' databases and reports, such as the Agricultural Rural Planning Unit (UPRA) and various documents from the National Planning Department (DNP) were consulted for data collection. Furthermore, data has been derived from international public databases like The World Bank Databank and International Trade Centre Trademap.

The study has been developed around its different objectives. First, a situational analysis of the current situation of the Colombian agro-logistics sector is given, identifying the various component of the larger enabling environment. Secondly, the agro-logistics sector is described in its infrastructure and production systems, including the different stages and components of agricultural value chains. Based on these descriptions, bottlenecks are identified. Both quantitative and qualitative information gathered from the primary and secondary sources were used to create the situational and sector analysis. To conclude, preliminary opportunities (leads) in the agro-logistics sector are drawn up, especially from the combination of well-known Dutch strengths and bottlenecks identified. Starting from the opportunities, a set of business cases will be further developed. The Figure 1 below indicates how the three sections and main topics are aligned.

⁸ DANE, Proyecciones de Población a nivel departamental, 2018. Available [here](#)

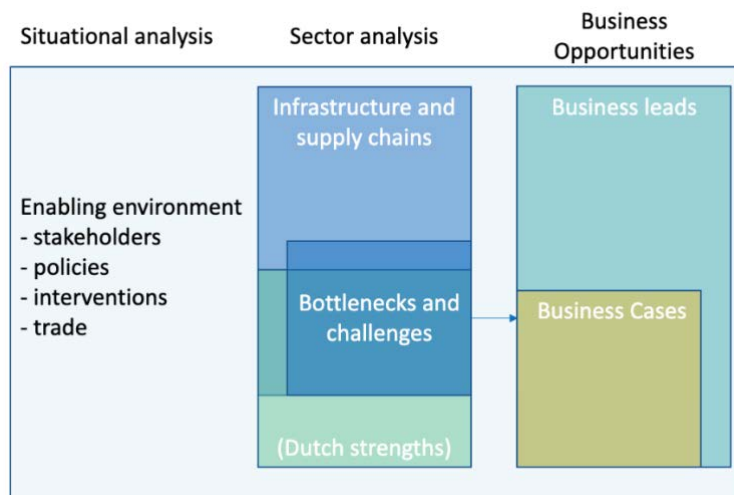


Figure 1: Study methodology

2. SITUATIONAL ANALYSIS

2.1 Geographical and environmental characteristics of the departments^{9,10}

This section aims to provide an overview of the geographical and environmental characteristics of the departments object of the study, as represented in the figure below.



Figure 2: Geographical scope of the study

2.1.1 Atlántico

Atlántico is one of the smallest departments in the country, with a total area of 331,159 hectares (3,312 km²), of which 74.5% is *frontera agrícola*¹¹ (destined to agricultural use). Almost half (45%) of the land is hilly or mountainous, reaching up to 511 m.a.s.l., while the rest is flat land (terraces, alluvial plains and swamps).

In 2020, the National Administrative Department of Statistics (DANE) published the results of the National Agricultural Survey (ENA) performed between 2012 and 2019. In this, they took into account “the rural areas of the country, excluding the areas not utilized for agricultural purposes, that correspond to large forests and water bodies”. The ENA indicates that in Atlántico, 85% of the rural area is used for livestock grazing, 6.3% for agriculture and 1.9% for forestry. The remaining amount is referred to as ‘other uses’¹².

The climate of the department is described as: a tropical climate of the steppe type with herbaceous vegetation (typical of extreme climates and low rainfall) at the mouth of the Magdalena River and surroundings of

⁹ UPRA, Planificación Nacional SIPRA Frontera Agrícola, 2022. Available [here](#)

¹⁰ IDEAM, Atlas climatológico de Colombia, 2022. Available [here](#)

¹¹ *Frontera agrícola*: area where agricultural activities (both cultivars and livestock) are allowed. It is defined as “the limit of rural land that separates the areas where agricultural activities are carried out, the conditioned and protected areas, those of special ecological importance and the other areas in which agricultural activities are excluded by mandate of the law” (UPRA and MinAgri, 2017)

¹² DANE, National agricultural survey Atlántico, 2020. Available [here](#)

Barranquilla, semi-arid on the coast to the north and semi-humid from the centre of the department to the south¹³.

The average annual temperature of the department is 27°C. Atlántico is one of the departments with the least rainfall during the year, with the level of rainfall increasing from north to south, (500 mm – 1000 mm per year). The main rainy season is from September to November; while a minor rainy season is recorded in May. The main dry season occurs between December and April. Throughout the department, humidity increases from south to north, due to the evaporation of water from the swamps and the Guájaro reservoir and the direction and intensity of the winds.

The department borders to the North with the Caribbean Sea, to the east with the Magdalena River and to the South and West with the Bolívar department. The Magdalena River, one of the main rivers of the country, reaches the sea at the city of Barranquilla, the department's capital. Barranquilla therefore enjoys a unique position of access to both the sea and river. The port of Barranquilla is a multipurpose maritime and river terminal that has the availability to serve up to 7 ships at a time and *barcazas* (barges) up to 12 feet.

This gives the department an important comparative advantage that allows it to consolidate its leadership and development in the Caribbean region. In addition, Barranquilla also hosts the international airport Ernesto Cortisoz. By land, Atlántico can be accessed by two main routes from Bogotá and Medellín. The majority of the rural areas of the departments are located at less than 2 hours away from Barranquilla¹⁴, making it the department that scores best in these regards amongst the five departments of the study.

2.1.2 Bolívar

The department of Bolívar counts more than 2.6 million hectares (26,000 km²), of which 48.3% is *frontera agrícola*. Around half of the area of the department is classified as rural area in the DANE agricultural survey, of which 86.3% is dedicated to livestock, 7.2% to agriculture and 4.1% to forestry use¹⁵.

Towards the north of the department, the land is mostly hilly (up to 500 m.a.s.l.), with some marshland areas too; and the Canal del Dique can be found, connecting the Magdalena river to the Cartagena port. In the centre of the department there are marshlands, including the ones formed by the Magdalena, Cauca and San Jorge rivers. In the south is the Serranía de San Lucas, that reaches up to 1,600 m.a.s.l. The Serranía is part of the *Cordillera Central* (central mountain chain) of Colombia, which separates the Magdalena and Cauca rivers. The department also includes insular territories composed by the islands Tierra bomba, del Rosario, Barú, de San Bernardo and Fuerte.

The road infrastructure and communication routes in the department do not cover all the municipalities. In fact, 72.5% of Bolívar's rural areas are more than 3 hours away from the department's capital, as shown in Figure 3 below¹⁶. River passengers transport is one of the most used since the Magdalena, Cauca, San Jorge and other water bodies can be used to connect various municipalities. Fluvial cargo transport is combined with road transport, thanks to well-established multimodal transport for the coal incoming from Cesar to the ports of Cartagena or Barranquilla. Cartagena, the department's capital, is home one of the four main ports of the country, and to the international airport Rafael Núñez. Regional airports, with less coverage and capacity, are found in El Carmen de Bolívar, Magangué, Mompós and San Pablo.

¹³ Atlántico Government, 2022, available [here](#)

¹⁴ UPRA, Presentación Atlántico, 2019. Available [here](#)

¹⁵ DANE, National agricultural survey Bolivar, 2020. Available [here](#)

¹⁶ UPRA, Presentación Bolivar, 2019. Available [here](#)

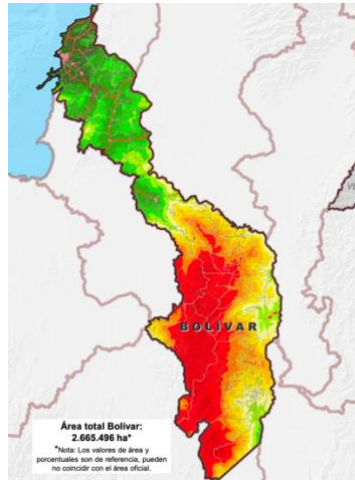


Figure 3: Travel times to Cartagena, going from the darkest green (less than 1 hour) to the bright red (more than 10 hours). Only 27.5% of the department can reach its capital in less than 3 hours

The largest area of the department of Bolívar is characterized by two main climates: hot semi-arid and semi-humid climates. The southwest presents a warm humid climate, especially in the vicinity of the central mountain range; and more temperate climate along the foothills. Throughout the department, the minimum temperature is 20°C and the maximum reaches 30°C. The rainy season is bimodal, with higher rainfall between April and June and between August and November. Along the coast, annual precipitations do not exceed 1,000 mm, while precipitation in the northwest can reach 4,000 mm. Similarly, the coastal area counts with two dry seasons (December-April, June-July), while in the south the dry season goes from December to March.

2.1.3 Cesar

The Cesar department extends over 2,256,550 hectares (22,565 km²), of which 62.5% are *frontera agrícola*. Of the five departments object of this study, Cesar is the only landlocked one. Rural areas amount to 1.9 million hectares, and the ENA indicated that 92.3% is utilized for livestock grazing, 2.8% for forestry and only 1.4% for agriculture¹⁷.

It hosts the Sierra Nevada de Santa Marta along with the department of Magdalena and La Guajira, therefore it can reach peaks of 5,300 m.a.s.l, in addition to having other mountain ranges such as Perijá with a maximum altitude of 3,660 m.a.s.l. The centre of the department, around the Cesar river, is characterized by flat lands that do not reach more than 200 m.a.s.l.

The department has mainly a tropical climate, with an average temperature of 28°C in most of the territory that decreases to 8°C in the mountain peaks. There is also a variety of dry areas, with rainfall respectively up to 1,000 and 3,000 mm.

The national airport (Alfonso López) is located in the department's capital, Valledupar. In addition, the road structure of the department counts more than 7,300 km and it is made up of national, secondary and tertiary roads. Not surprisingly, 58% of the rural areas are less than 3 hours distance from the capital city¹⁸. The latter are managed by a multitude of actors: part of the kilometrage by the National Road Institution (INVIAS), others by the department administration and the rest by municipalities¹⁹. Cesar is also connected with the Magdalena department by the railway system, to date utilized almost exclusively for transportation of coal.

¹⁷ DANE, National agricultural survey Cesar, 2020. Available [here](#)

¹⁸ UPRA, Presentación Cesar, 2019. Available [here](#)

¹⁹ Cesar Government, Plan vial departamental, 2012-2021. Available [here](#)

2.1.4 La Guajira

La Guajira is the northernmost department of Colombia, bordering to the east with Venezuela. Of the five departments scope of this study, La Guajira is the one with the highest percentage of indigenous population (Wayuu group), which makes up 48% of department's total population (985,498).

The total area of the department is 2,061,936 hectares (20,619 km²), of which 33% is *frontera agrícola*. The department is composed of several ecosystems: desert, dry jungle and humid mountains. According to the National Agricultural Survey figures, the largest part of the department (1.7 million he) is considered rural area. Of this, 92.3% is in use for livestock, 2.8% for forestry and 1.4% for agriculture²⁰.

In terms of elevation, the north of the department is at sea level, while in the south peaks of 5,300 m.a.s.l. are reached in the Sierra Nevada de Santa Marta and the Serranía del Perijá. The largest area of the department registers average temperatures above 28°C; while in the foothills of the Sierra Nevada and Serranía del Perijá the average temperature doesn't exceed 22°C. The arid and dry climate of certain areas of the department induce the growth of typical vegetation such as thorny bushes and cacti.

La Guajira is the driest department of Colombia: in the north the precipitations amount to roughly 300 mm per year, causing seasonal drought for the longest part of the year. Towards the south, some sectors register 1,000 mm per year. In most of Riohacha and towards the border with Cesar, in the extreme south, precipitations can reach 1,500 mm per year. The predominant rainfall regime in the department is bimodal, with the main rainy season happening in September, October and November, and a lighter season being recorded May and June. UPRA data also show that only 9.6% of the department has the potential to be irrigated, as shown in Figure 4 below²¹.

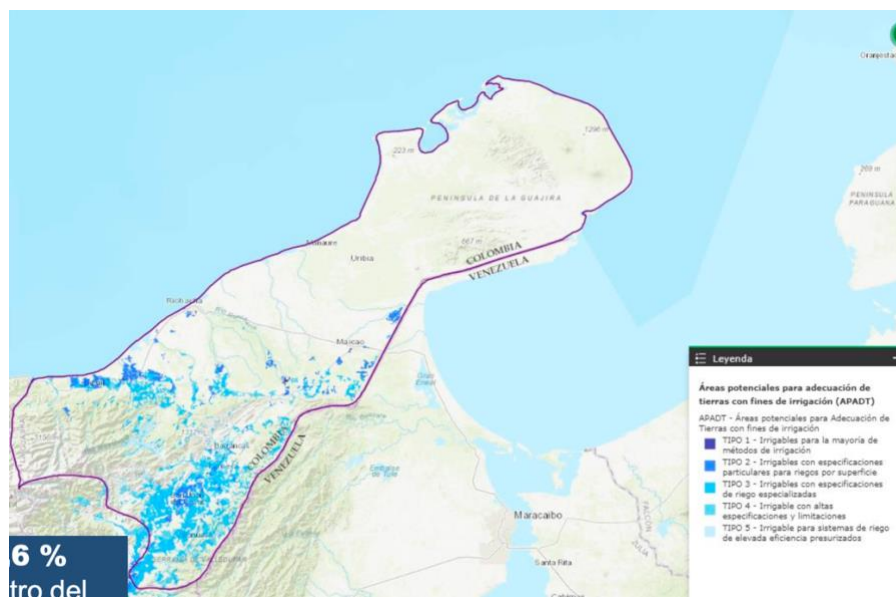


Figure 4: irrigation potential in La Guajira

The hot desert climate dominates in the north of this department, while the largest part of the department can be defined as hot arid climate²². In the south towards the border with Venezuela, the climate is semi-arid, with lower temperatures.

²⁰ DANE, National agricultural survey, 2020. Available [here](#)

²¹ UPRA, Presentación La Guajira, 2019. Available [here](#)

²² IDEAM, Clasificación de los climas, available [here](#)

La Guajira can be (relatively) easily accessed by road during most times of the year, due to the flatness of the land and the low humidity. However, the situation changes during the rainy months when roads are muddy and flooded. This may explain why 46% of the rural areas of the department are situated more than 3 hours distance from Riohacha²³.

2.1.5 Magdalena

The Magdalena department extends over more than 2.3 million hectares (23,144 km²), of which 64.4% is *frontera agrícola*. The department is characterized by two mountainous areas: the eastern mountain range (*Cordillera Occidental*), that develops from south to north of the Magdalena department, and the Sierra Nevada de Santa Marta, an isolated mountain in the north-east of the department. On the western side, the Magdalena river divides the Magdalena and Atlántico departments.

The Magdalena department is characterized by fertile soils and a privileged location for exports, with the port of Santa Marta, the department's capital, having specialized in export of agricultural products. Rural areas are utilized for 80.7% for livestock, 11.5% for agriculture and 5% for forestry²⁴.

Temperature varies according to altitude, with the coastal zone presenting arid conditions given the high temperatures (annual average higher than 28°C) and strong and constant winds (9 to 11 m/s). In the centre of the department, temperatures range between 24°C and 28°C, while in the higher parts of the Sierra Nevada they decrease, register a multi-annual average of 4°C. Regarding precipitation, it is vulnerable to El Niño and La Niña phenomena, as the other regions in the country.

The department is characterized by two main rainy seasons, from April to May and from September to November. However, the Sierra Nevada only registers one main rainy season with its peak in June. In the centre and south of the department, the dry season goes from December to March. The annual rainfalls vary between different areas; 1,000 mm/year along the coast, 1,000 – 1,500 mm/year in the majority of the department surface, and higher than 2,000 mm/year at the foothills of the Sierra Nevada.

The Magdalena department has two ports; the main one in Santa Marta, and one in Palermo, along of the Magdalena river, close to the bridge that connects the Magdalena and Atlántico departments. The Santa Marta port is also connected to Chiriguana (Cesar) and La Dorada (Caldas) via railway, allowing for goods transported via train to be loaded and unloaded directly at the docks. This connection offers therefore unique opportunities for intermodal transport. Currently, the railway is (almost) only used to transport coal, but trials are in place for the transport of agricultural and agro-industry products too, as several institutions share the interest in strengthening this connection.

The Simón Bolívar airport connects Santa Marta to several national destinations. The department is home to four permanent (multi-company) and three special permanent (single-company) *zonas francas* (free economic zones) in Santa Marta, Ciénaga and Sitionuevo²⁵. The Magdalena department is connected to La Guajira and Bolívar departments via the 'Troncal del Caribe', and to several departments, and eventually to Bogotá, via the 'Troncal del Magdalena'. Still, more than half of the rural areas (58%) are more than 3 hours away from Santa Marta²⁶.

²³ UPRA, Presentación La Guajira, 2019. Available [here](#)

²⁴ DANE, National agricultural survey 2020. Available [here](#)

²⁵ Legis, 2021, available [here](#)

²⁶ UPRA, Presentación Magdalena, 2019. Available [here](#)

2.2 Stakeholders mapping

According to the final destination market, national versus export, two stakeholder maps are presented in the images below. They include the normative environment, hence those public institutions that provide (and require) permits and certifications, and the enabling environment, composed of public and/or private actors that facilitate the production or commercialization process.

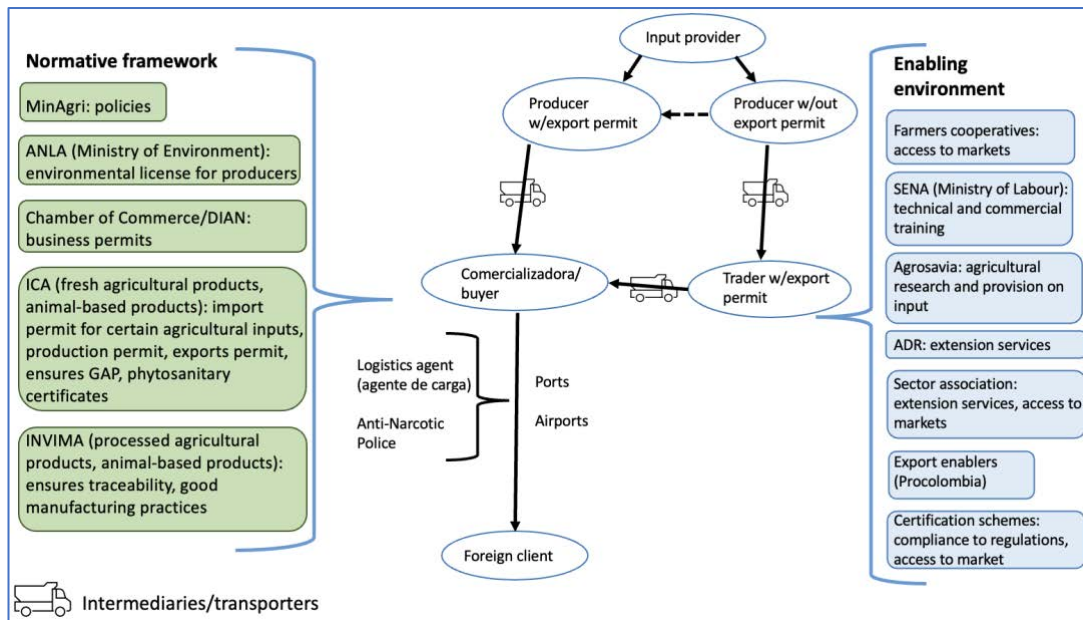


Figure 5: Stakeholder mapping in the agricultural sector for international markets

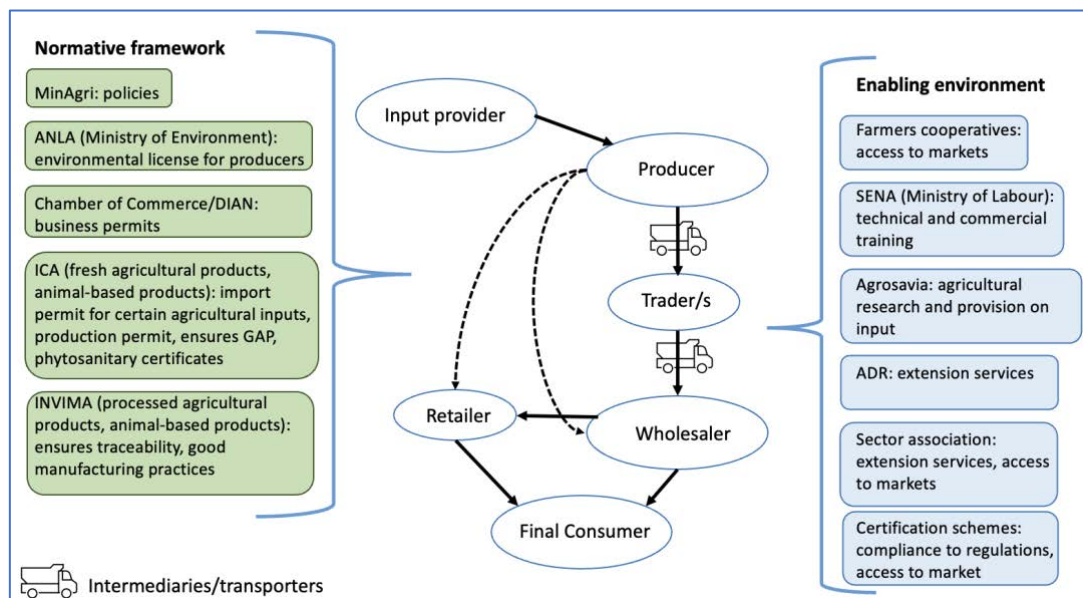


Figure 6: Stakeholder mapping in the agricultural sector for national markets

2.3 Enabling environment

2.3.1 Normative framework and interventions from the public sector

The Ministry of Agriculture presented, in the National Agro-logistics Plan of 2020 (introduced below), an analysis of the current regulations related to the agricultural sector and the logistics process in Colombia. The overview is reported in the table below, indicating the reference number of each norm and how they relate to the agricultural and/or logistic sectors.

Table 1: Some Laws related agro-logistics sector. Source: Translated and edited from National Agro-logistics Policy

Law 1955 of 2019	By which the National Development Plan 2018-2022 "Pact for Colombia, Pact for equity" is issued
Law 1876 of 2017	Through which the National System of Agricultural Innovation is created and other provisions are issued
Law 1508 of 2012	By which the legal regime of Public-Private Associations is established, organic budget regulations and other provisions are dictated
Law 811 of 2003	By means of which Law 101 of 1993 is modified, chain organizations are created in the agricultural, fishing, forestry, aquaculture sectors, agrarian transformation companies and other provisions are dictated.
Decree 482 of 2020	By which the Centre for Logistics and Transportation is created within the framework of the state of economic, social and ecological emergency throughout the national territory (Decree 417 of 2020).
Decree 2044 of 1998	That regulates the public land transport of cargo through legally constituted companies and allows a special treatment for the transport of certain products of the agricultural sector
Resolution 0006 of 2020	By which the National Plan for the Promotion of the Commercialization of the Production of the Peasant, Family and Community Economy (ECFC) is adopted.
Resolution 2546 of 2018	Establishes the regulatory framework for tests of Combined Cargo Vehicles (VCC) or extradimensional in the national territory
Resolution 464 of 2017 del MADR	By which the strategic guidelines of public policy for peasant, family and community farming are adopted
CONPES 3982 of 2020	National Logistics Policy
CONPES 3932 of 2018	Guidelines for the integration of the Framework Plan for the Implementation of the Final Peace Agreement with the instruments of planning, programming and monitoring of public policies of the national and territorial order
CONPES 3857 de 2016	Policy guidelines for the management of the tertiary road network

National Logistic Policy 2020-2024

The National Development Plan indicates the need to improve logistics processes in the country. In the National Logistic Policy (CONPES 3982 *Política Nacional Logística*), three objectives are established that will boost Colombia competitiveness:

1. Promoting intermodality through the development of competitive transport modes and efficient modal exchange connections in order to reduce the logistics costs of national transport;
2. Promoting trade facilitation by optimizing the operation and infrastructure of commercial exchange nodes and import procedures and export in order to reduce logistics times in foreign trade operations;
3. Designing mechanisms for institutional articulation, access to information, promotion of the use of Information technology and communications (TIC) and strengthening of human capital in logistics processes.

Each of them is being developed through 'action lines' that involve the leadership of the Ministry of Transport, the Ministry of Commerce, Industry and Tourism, the National Planning Department (DNP), and the National Tax and Customs Directorate (DIAN), that is part of the Ministry of Finance and Public Credit.

The National policy was developed based on the global perspective of the logistics concept, such as the Logistics Performance Index (LPI)²⁷, in which Colombia ranked 58th (among 160 countries) in 2018. The policy also established that biannual National Logistics Surveys will be performed.

National Agro-logistics Plan

The National Logistic Policy highlighted the need to develop an agro-logistics plan for Colombia. This cross-sectoral policy is set to make it possible to address the challenges and logistical bottlenecks identified in the agricultural sector. The Ministry of Agriculture and Rural Development led and coordinated, with different entities such as DNP and INVIAS, the formulation and delivery of the report. A discussion version of the plan was published in December 2020. While the final version was expected to be published by August 2022, it is not yet available.

The main problem encountered is defined as the "limited capacities for the development of logistics processes in the supply chain of agricultural products". Such processes include:

- Collection, aggregation, handling and storage in the production area
- preparation for transport and delivery in the required packaging and quality conditions,
- transportation
- physical distribution (including packaging, loading and unloading, handling and transit controls) to the agreed delivery or receipt markets or sites.

Consequently to the limited capacity for logistics processing, the agro-logistics sector is characterized by (1) low level of coordination and consolidation of freight transport; (2) high risk in the management of the supply chain of agricultural products; (3) scarce participation of producers in the development of logistics processes of the value chain; (4) high costs and time in the logistics of moving products from production areas to markets; (5) increased gap, marginalization and loss of possibilities for agricultural producers to connect with the dynamics of national and international markets.

The plan revolves around four axes that seek to strengthen the agricultural supply chains in Colombia, namely:

1. Coordination and institutional strengthening of all public entities, with the goal of an improved alignment and integration amongst them. The institutions involved are the Ministry of Agriculture (governing body and guide of the policy), the Rural Development Agency (ADR) and the National Land Agency (ANT) (executors), the UPRA (generator of information methodologies for sectoral planning),

²⁷ World Bank, 2018, LPI, available [here](#)

the Colombian Agricultural Institute (ICA - promoter of national food production - internal market and external) and the National Authority for Aquaculture and Fishing (AUNAP - that will expand its territorial coverage and strengthen its mission in fisheries and aquaculture).

2. Development of human talent: there are shortcomings in the logistics workforce, they must be strengthened for logistics operations, personnel must be trained, there are entities that provide the service such as SENA, but more support is sought from other entities, such as universities;
3. Infrastructure: shortcomings and absences are seen, for instance, in public collection centres to support small producers;
4. Information technology: the promotion of big data and data collection will allow to make better informed decisions at the national level; the use of ICT tools is also targeted.

Canal del Dique

The Canal del Dique system is located in the north of Colombia, in part of the departments of Bolívar and Atlántico, between the municipality of Calamar and the bay of Cartagena. The canal is made up of several swamps, wetlands and floodplains. It is an ecoregion in which livestock, agriculture, fishing, water supply for aqueducts, navigation and environmental services are developed.

In 2010, the increased water levels in the Magdalena river due to La Niña phenomenon caused the breaking of the walls of the Canal del Dique, which therefore resulted in a severe flood. The gravity of the flood was worsened by decades of poor practices, including the capture of water from the river. This event turned emergency is considered one of the main tragedies of the Atlántico department, having affected 120,000 people and 35,000 hectares of land. The large economic losses were added to the social impact caused by the breach of the dam.

After more than 10 years from the flood, the National Government has recently published the final specifications of the bidding process for the “Restoration of Degraded Ecosystems of the Canal del Dique” initiative. Since March 2022, the National Infrastructure Agency (ANI) has been receiving bids from potential implementing parties and was set to complete the award stage in July 2022. The restoration project is worth 3.1 billion COP and is estimated that 61,000 direct and indirect jobs in the Caribbean region will be generated. The total length of the project is 115.5 km, which includes the waterway between the municipality of Calamar and the bay of Cartagena. The execution and the respective maintenance will be done through a concession that will have a term of 15 years²⁸.

The project plan includes interventions that will guarantee the navigability of the Canal and the mitigation of the negative consequences in case of flooding. These objectives will be met through the execution of construction work that includes two systems of locks (Located in Calamar and Puerto Badel) and one system of gates (located in Calamar) to prevent the uncontrolled entry of large amounts of sediment and flow into the system. In addition, the project is set to benefit fluvial transport of (for almost its totality) carbon. Amongst the goals of the project is also the development of multi modal transport option, although this does not seem to be prioritized at the moment, also considering the difficulties in connecting the areas surroundings the Canal, with the Canal itself. One and a half million inhabitants are set to benefit from the project in the departments of eight municipalities of Atlántico, ten municipalities of Bolívar and one municipality of Sucre.

At the beginning of August 2022, the awarding of the project was postponed of a few weeks, leaving the new government in charge of the decision. They pledged to include more communities in the consultation, and the National Infrastructure Agency (ANI - *Agencia Nacional de infraestructura*) was ordered to apply for an environmental license. Furthermore, the Special Jurisdiction for Peace (*JEP - Jurisdicción Especial para la Paz*) recently instructed ANI and the Ministry of Transport to design and include a forensic protocol for missing persons in the canal. Because of these new requirements and commitments from the government, at the end of September 2022, the award of the project has been postponed indefinitely.

²⁸ Portafolio, 2022, available [here](#)

Law 1990 of 2019 for the prevention of food loss and waste

Data on food loss and waste in Colombia was presented in the introduction of this report. This problem is well recognized at national level, where all initiatives in these regards are supported by Law 1990 of 2019. The policy is created to prevent food loss and waste, for which guidelines are established by the Ministry of Agriculture. The policy presents 16 goals, amongst which contributing to the human right to food security of the Colombian people, promoting good agricultural and processing practices, carrying out awareness campaigns for the final consumer and formulating and implementing strategies for the management of surplus and residual foods²⁹.

National entities are set to cooperate with international organizations such as the Food and Agriculture Organization (FAO) and the Inter-American Development Bank (IDB), especially for carrying out advanced technical sessions and to help promoting the strategies and interventions that will be developed according to the policy goals. The collaboration between public entities and international organization will furthermore ensure that the guidelines stipulated in the policy can be followed while also working transversally on themes such as sustainability, productive development, science, technology and research.

Law 1819 of 2016 for the introduction of “construction for taxes” (*Obras por impuestos*)

This law allows natural and juridic persons to invest up to 50% of their income tax in the realization of infrastructure, construction or systems with a social impact. These projects are subject to certain requirements, such as being executed in areas most affected by armed conflict (*ZOMAC - zonas más afectadas por el conflicto armado*), in areas subject to territorial development program (PDET - *programas de desarrollo con enfoque territorial*), or, as introduced in 2022, in areas part of the “orange development plan” (ADN – *áreas de Desarrollo naranja*), with a focus on culture, creativity and urban renovation.

Examples of these projects include the repair and/or construction of road infrastructure; drinking water; energy; sewage systems but also investment in public education, public health and digital connectivity. When the investment is done in partnership with national public entities, project focus include (on top of those mentioned above) rural public goods and productive infrastructure, adaptation to climate change and risk management, payment for environmental services, information technology and communications, transport infrastructure, cultural infrastructure, and sports infrastructure.

2.3.2 Interventions from the private sector and public-private partnerships

Railways (La Dorada-Santa Marta)

At the beginning of 2022, the reactivation of the commercial freight train from the port of Santa Marta to La Dorada (in the Caldas department) started. The cargo train, operated by Elogia Logistical Solutions, is a starting point for multimodal transport activities, combining both import cargo reception and specialized loading and unloading operations, including the transfer of imports to the centre of the country.

With the reactivation of the train, after almost two years of stop due to the Covid-19 pandemic, it is expected to reduce operating costs, generate a competitive advantage for foreign trade, connect the inland with the Caribbean Coast and favour environmental policies to reduce CO₂ emissions.

The train departs on Fridays early in the morning from Santa Marta and arrives on Saturday at 6:00am at La Dorada. Both 20 ft to 40 ft containers are handled; however, refrigerated containers are not handled due to lack of infrastructure to maintain the cold chain in La Dorada. Railway transport is convenient for heavy cargo, maximum 35 tons, with the average load being around 25 tons. Some examples of loose cargo moving by train

²⁹ Law 1990 of 2019, available [here](#)

are wire, rod, and tiles; fertilizers are moved in palletized cargo. Agricultural products are not yet relying on railways transport, though some trials have been carried out³⁰. There is also the idea to transport coffee via such railway, but, in order to make this possible, it will be necessary to install the infrastructure needed to avoid double handling of the products directly in La Dorada.

Cold chain infrastructure inventories

The National Planning Department is carrying out an inventory of the cold chain infrastructures available in the country. Building knowledge on the availability, status and capacity of such infrastructure will allow for an efficient use of resources to be spent in future targeted interventions. The inventory is in process and shall be published in late 2023. Similarly, the Ministry of Transport has initiated an inventory of temperature controlled vehicles. Currently, they are in the methodology design phase, with the data collection and survey set to be carried out in 2023.

MoU between Curaçao and La Guajira

In November 2020, a Memorandum of Understanding (MoU) was signed by the department of La Guajira, the district of Riohacha and the Government of Curaçao. The MoU includes the economic, touristic, logistic and renewable energies sector. They include topics such as the export of certain animal products, export from the zona franca of Curaçao, knowledge sharing on the development of maritime ports, possibility of direct flights from Curaçao-Riohacha (supposedly starting in 2022 with EZair³¹) and the possibility of maritime connection Curaçao-Riohacha. This proves the intention of the island to restore and increase trade with Colombia, especially via its northernmost region.

Construction of maritime port in the Gulf of Urabá

Puerto Antioquia is the upcoming maritime terminal in the Gulf of Urabá, in the department of Antioquia. The location of the port is rather strategic, being located at the point of confluence of the departments of Antioquia, Córdoba and Chocó. The construction of the new port started in April 2022 and it is planned to be completed before 2025.

The port is set to specialize in general and container cargo and will handle vehicles and products such as cereals, banana, plantain, palm oil, cocoa, avocado, and livestock.

The port would be located in Turbo, Antioquia, it would be known as a large terminal and it would bring the main cities of the country closer to the sea. In the case of Bogotá, the connection with the port would represent a reduction of 35% (km) in comparison to the transit Bogotá - Cartagena. Such reduction is considerable too from Manizales, Pereira and Armenia, with around 29%, 27% and 12% less km to be transited compared to Cartagena.

The construction of this port may therefore have implications on the volumes transiting via the ports of Barranquilla, Cartagena and Santa Marta. On the other hand, by allowing a faster connection from the centre of the country, where the main agricultural production areas are concentrated, the construction of the new port may incentivize sea freight (over airfreight) export. Indirectly, this may also incentivize larger and more specialized productions and, in general, agricultural progress in the country. In any case, having a fourth large maritime port on the Caribbean coast will help strengthen the position of the north of Colombia as the main (import and) export point for the country.

³⁰ A representative of the Port of Santa Marta shared about a trial transport of avocados. However, it was not possible to retrieve further details on such trial.

³¹ This information was shared by a representative of the Ministry of Economic Development of Curaçao, however no public information has been found in these regards

Logistic plan for the Caribbean region

Written for the DNP by a consultancy consortium, the logistic plan for the Caribbean region has been developed based on the National Logistics Policy. The document summarizes the policy and presents the interventions and roadmap for the improvements the logistics performance of the region, identifying three production chains with potential (referred to as *apuestas productivas*, or 'productive bets'). These three are (1) the manufacturing of chemical substances and products, (2) the fishing, aquaculture and related service activities, processing and preservation of fish and fish products and (3) the production, processing and preservation of meat and meat derivatives.

Specifically, the document also analyses logistics issues encountered in the regions, which are mostly encountered during road transport. Some of these bottlenecks also emerged from several of the interviews held during the study, showing how these are widespread:

- Low average travel speed along main transport routes due to congestion in the vicinity of populated centres, police control zones on the roads;
- Circulation restrictions during holidays along transportation corridors;
- Security problems on the road related to theft of trucks and merchandise, and also possible contamination of export containers;
- Congestion along cargo corridors in port cities, including the port entrance in Barranquilla;
- Problems in anti-narcotics inspections that cause damage to export merchandise;
- Sedimentation problems in the port of Barranquilla that generate limitations in the size of ships, frequencies and limit the operations of ships that can call at this port, increasing the cost of freight per ton;
- Operational problems within the Public Free Zone of Barranquilla related to the connection between the port and the free zone. Companies located in the *zona franca* in Barranquilla complain problems such as, when having to move good between the port to the *zona franca*, transport companies charge for a haul freight instead of a movement within the port. In addition, they lament delays in port operations, often between 8 and 15 days, that also force them to keep goods at stock for longer (hence more expensive) periods of time.
- Low quality of the secondary and tertiary road network;
- Insufficient logistics real estate market that meets specialized characteristics for storage and cargo handling, which has resulted in the proliferation of small warehouses and distribution centres in port cities;
- Insufficient infrastructure for the aggregation and manipulation of products;
- Insufficient cold chain infrastructure.

Unfortunately, most of the bottlenecks identified require structural and/or public-led interventions. However, some of them can be targeted by private sector interventions, as suggested later in the report.

Distribution centre Cartagena

Cartagena, as other main cities in Colombia, doesn't have a proper distribution centre, but the majority of the agricultural products are traded in an informal market square (plaza de mercado), in the case of Cartagena called Bazarito (also referred to as Basurto). Here, mainly large traders (*mayoristas*) of agricultural products bring and sell their products, often in scarce hygiene conditions and without proper licenses and regulations.

In 2015, a public-private company was established (Mercabastos SAS), with the aim to promote and manage the construction of a centralized distribution centre just outside the city, close to the transport terminal. The project was set to develop a distribution centre of 18 ha with several types of storage and shops (incl. cold chain) available for purchase, on top of a dedicated area for the reception of fresh produce and products. Private

investors made up 90% of the company, while³² given that, for several reasons including many changes in the municipality office, the project was never completed.

However, the District’s Development plan for Cartagena 2020-2023³³, under the strategy line ‘Economic development and employability’, includes a program for ‘Public markets’ system’. Within this program, the aim is to (1) build one wholesaler distribution centre, (2) relocate Bazurto marketplace and (3) regularize 300 traders of the markets’ system.

2.3.3 Trade agreements in place

Nowadays, Colombia has 17 trade agreements in place, including treaties of free trade and partial scope agreements, reported in the table below. A short description on how they include (or do not) agricultural product is also provided in the table.

Currently, Colombia is finalizing new agreements with Panama (to move from a partial scope agreement to a more comprehensive commercial agreement), the United Kingdom and Singapore. Furthermore, there are ongoing negotiations with the United Arab Emirates, Turkey and Japan. Of these 17 trade agreements, 12 are so called ‘deep trade agreements’, meaning they do not only cover trade but also additional policy areas such as investment, labour and protection of intellectual property rights and environment. Such agreements represent a further step in cross-country collaboration and exchange of goods and knowledge. In South America, only Chile and Perú have more deep trade agreements than Colombia: 25 and 17, respectively. In Central America, Mexico, Costa Rica and Panama count 13, 14 and 15 deep trade agreements³⁴.

Table 2: Trade agreements in place in Colombia

	Agreements in place	Agricultural products
1	<i>Alianza del Pacifico</i> (Chile, Mexico, Perú, Colombia)	Common markets were identified, being USA, Canada, European Union and Uruguay. There are 106 tariff subheadings that are likely to be enhanced between each country part of the treaty and the identified markets. For example, pineapple is included in the agreements: USA-MX; CANADA-MX, CL; EU-CO, MX, PE; and UR-CL, PE.
2	Canada	Colombia has phytosanitary access for all export fruits and vegetables, such as coffee (58% of exports) banana, pineapple, avocado, guava, mango, orange, tangerine, lemon grapefruit, watermelon, papaya, apple, pear, strawberries, blueberries, kiwi, cape gooseberry, passion fruit, pitahaya, potato, tomato, onion, garlic, lettuce, carrot, beet, asparagus, aubergine, celery, spinach.
3	Chile	Agricultural and forestry trade include import products such as apples, pears and grapes; while export products include refined sugar, palm oil and coffee.
4	<i>Comunidad Andina CAN</i> (Bolivia, Ecuador, Perú and Venezuela)	Within the treaty, the Andean Price Band System (SAFP) allows setting a minimum and a maximum price to maintain the cost of importing a certain group of agricultural products.
5	Comunidad del Caribe CARICOM (Trinidad and Tobago, Jamaica, Barbados, Guyana, Antigua and	The agreement includes an agricultural policy, with the objectives of (1) promoting and strengthening agricultural production systems with technical training to be competitive , and (2) respond to and boost demand for such products.

³² El Universal, 2021, available [here](#)

³³ Cartagena District, Plan de Desarrollo de Cartagena 2020/2023. Available [here](#)

³⁴ World Bank, 2018, available [here](#)

	Barbuda, Belize, Dominica, Granada, Monserrate, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines)	
6	Costa Rica	Fruits and vegetables: it was agreed to dismantle tariffs in several time frames: immediate, 5, 10 and 12 years.
7	Cuba	Preferential tariffs for Colombian agricultural exports such as: meat, seeds, cocoa, oilseeds, coffee preparations, fruits, as well as fish, among others.
8	El Salvador, Guatemala, Honduras	The text contemplates the existence of an Agricultural Committee that seeks compliance with the agreed standards for the trade of agricultural goods between the countries.
9	<i>Estados AELC –EFTA</i> (Switzerland, Liechtenstein, Norway, Iceland)	Colombia has phytosanitary access in Switzerland, Norway, Iceland and Liechtenstein for all fruits and vegetables, as well as for coffee and cocoa, fish and fishery products
10	EU	The products with the greatest use in the European Union market have been coffee (increase 15% from 2019), bananas (75% of the total Colombian sales goes to EU), flowers (increased 30% after the agreement started), avocados (increased 63,2% from 2019) and other fruits (goldenberry, mango, passion fruit, lime Tahiti, pineapple). Other important agro-industrial products in exports to the EU are sugar, cocoa, cocoa butter and cocoa-containing food preparations, and fruit and vegetable preparations.
11	Israel	Coffee and some exotic fruits are potential products due to their quality. The marketing of fresh flowers has not stood out after the signing of the agreement. Fruits of interest such as fresh pineapple and mangoes require health approval from Israel.
12	Mercosur (Argentina, Brazil, Paraguay, Uruguay)	The agricultural sector and the promotion of peasant agriculture established as a national policy, has been one of the promoters for the negotiations in the agreement
13	Mexico	The Agricultural Trade Committee is created, which will review the operation every year. A Sugar Analysis Committee is created, with the function to seek an agreement between the two countries regarding sugar trade. The countries commit to grant national treatment to imported products in the application of technical standards or agricultural marketing.
14	Panama	With this agreement Colombia can export fruits such as pineapples, watermelons and goldenberries. Other products to be exported include beans, onions, garlic, cauliflower, carrot, beet, sweet corn and asparagus.
15	South Korea	Colombian export products that will have preferential access, include coffee, flowers, bananas, fruits, vegetables, sugar, beef and offal, pork, poultry, dairy and derivatives, preserves and marmalades, juices, cookies and candies. At the end of the foreseen tariff reduction period, the total elimination of tariffs will be reached.
16	USA	Colombia currently has sanitary admissibility for 99 agricultural products in the US. These products include Hass avocado, lime Tahiti, pineapple, banana, cocoa, onion, beans, aromatic herbs, and recently peppers (capsicum). Likewise, the agreement implies admissibility for 52 processed products, among which are tilapia, dairy products, panela and processed fruits.
17	Venezuela	The treaty defines the preferential treatment applicable to Colombian exports destined for Venezuela and vice versa. Said preferential

		treatment is defined based on the historical trade that existed between both countries, which includes all the subheadings in which trade was presented between 2006 and 2010.
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Colombia was not immune to the commercial effects that the pandemic had on the world. Before Covid-19, national exports had an annual average increase of 4.6% in value. However, when comparing 2019 and 2020 numbers, exports decreased by 21.4%³⁵. However, in 2021 the situation – when considering certain agricultural products, turned around with exports totalling USD 3,784 million between January and May 2021, and presented a growth of 19.2%, compared to the same period in 2020³⁶. This refers to both non-traditional products such as milk, lime Tahiti, beef, mango and Hass avocado, and traditional products, especially flowers and coffee. Amongst the trade agreements, it is worth mentioning a few:

United States: in the agreement between Colombia and USA, a few points stand out, such as the interest in palm-based biodiesel and the monitoring of the regulatory processes for other products such as paprika, mango, passion fruit pitahaya and goldenberries. In addition, the agreement contains a request for cooperation to increase capacities in the US Food Safety Act, and for the control of diseases in cattle and citrus.

European Union: efforts have been concentrated in the sanitary authorities from both sides, on preventing regulatory modifications of the Limits Maximum Residue Limits (MRL) of agrochemicals in export fruits. For this, technical steps have been taken to defend Colombian fruits, among which stand out bananas, pineapples, avocados, mangoes, Tahiti limes, several varieties of passion fruit, tree tomatoes, goldenberries.

In addition, it is worth to notice than in September 2022 the European Parliament adopted a proposal from the European Commission for the ban on imports of products that are linked to deforestation or forest degradation³⁷. Amongst others, the law would apply to cocoa, coffee and palm-oil. The European Parliament will now commence negotiations on the final law with the EU member states.

South Korea: since the agreement came into effect in 2020, Colombia started exporting fresh fruits to South Korea. In 2022, banana exports reached 14.8 million USD; a trend confirmed during several interviews. Banana and plantain, both fresh and processed, exports to the Asian country are rapidly growing. Colombian bananas enter the Korean market with a 0% tariff. This gives Colombia a tariff advantage over competitors such as the Philippines and Ecuador, which must bear a 30% rate.

Israel: in August 2020, the "Road Map - Plan for the Use of the Colombia-Israel FTA in Agroindustry" was formulated, through which a joint strategy for managing the eligibility of fresh and processed products with potential access to the Israeli market. Products to be exported to Israel need to comply with the Kosher Certification. The agreement prioritizes products (and services) with opportunities in agri-food, specifically in beef, flowers, confectionery and fresh fruits.

2.4 Relevant studies

Study *National Logistics Survey* by National Planning Department (biannual, 2008 to 2020)

The DNP has been carrying out, since 2008, the *Encuesta Nacional Logística* (ENL), with latest publications in 2018 and 2020. The study consists of five modules: logistics performance, outsourcing, foreign trade, future

³⁵ MinComercio, Borrador Informe sobre los acuerdos comerciales vigentes de Colombia, 2021. Available [here](#)

³⁶ MinAgri, 2021, available [here](#)

³⁷ European Parliament, 2022, available [here](#)

perspective and regional logistics analysis. The 2020 survey was submitted by 3,383 respondents, 645 more than the survey performed in 2018. The respondents were companies of different size, region and economic sector.

The ENL shows that the average logistic costs incurred by companies have decreased from 13.5% of their sales in 2018, to 12.6% in 2020. This improvement puts Colombia three years ahead on the intended trajectory to reach the average OECD level of 9.5% in 2030. When looking at the different logistics zones however, these amounts change drastically, with the *Caribe oriental* (Cesar and La Guajira) recording logistics costs of 5.3% - less than half of the 2018 data (11.9%) and the *Caribe central* (Atlántico, Bolívar and Magdalena) recording logistics costs of 17.8% in 2020. At a national level, companies in the agricultural sector have seen the average logistics costs drastically increasing from 12.8% in 2018 to 22.3% in 2020. It is unclear to what extent this increase has been caused solely by the global logistics shortcomings caused by the Covid-19 pandemic.

Of the logistics costs companies occur into, 30.7% is represented by transport costs, followed by inventory (29.3%), storage (13.9%) and administrative costs (17.8%). Compared to 2018, transport takes up a smaller percentage of the total logistics costs, being compensated by an increase in administrative costs. Overall, respondents that engage in export activities indicated logistics costs for 36% of their sales. Export operations amount to 21.4% of the total logistics costs of these companies.

In general, the ENL of 2020 depicts a positive picture with, amongst others, lower logistics costs on national level, increased technology awareness and adoption and increased interest in companies to measure their logistics operations. In line with the National Logistics Policy, the ENL will be performed every two years. The next ENL will therefore take into account the effects of the global pandemic started in 2020, and the consequent global logistics crisis, with the risk to overturn the positive results of the latest survey.

Report *Opportunities in Colombia's Agro-Logistics Sector for Dutch Businesses by Holland House and NL in Business (2019)*³⁸

In 2019, a report on the opportunities in the Colombian agro-logistics sector, at a national level, was carried out. Similarly to this study, the report was directed to the expertise of Dutch companies in the agricultural and logistics sector. The opportunities identified are directed to:

1. Dutch companies with experience in storage systems and technologies. In Colombia, these are not yet advanced, meaning that many fruits and vegetables are not stored and maintained in a temperature-controlled environment despite being necessary. Support with software and information systems to connect and measure supply chains complements such technologies.
2. Improving way of packaging (with new technology or products) of fruits such as avocado, orange, banana and passion fruit in Colombia. This can decrease food damage and waste, also by tackling bad aesthetic appearance that may result from incorrect management (packaging, manipulation, transport, distribution) during the post-harvest processes, and/or from external factors as temperature and sun.
3. Guaranteeing the quality of mangos and increasing shelf life through cold chains solutions. The way to go is to create and implement a plan to transfer the knowledge about technology and equipment available.
4. Connecting rural and urban areas with a distribution centre to reduce logistic cost and transport times, resulting in a reduction of food losses.

While certain opportunities identified in the 2019's study are certainly similar, the business leads that will be presented in the last chapter aim to be specifically targeted to the five departments object of this research. The business cases that will be derived from these opportunities will provide potential investors with in-depth information on the costs, gains and impact of each opportunity.

³⁸ The study is available on request

Report *Taste the future – the potential of food horticulture in Colombia* by N&S Del Tropic (2020)³⁹

The document is the result of a study carried out to analyse the current situation of the horticulture sector in Colombia and to link the challenges and opportunities to Dutch companies and organizations that can contribute to the sector development. The demand for horticulture products experiences a constant growth. Interventions are needed to secure that the growing demand will be met: currently, small producers use little technology for their production system and experience high levels of food losses. In addition, interventions targeted to an efficient use of water are needed to reduce the impact on the environment.

Some of the possible projects to carry out, both in the medium- and long-term, depend on the effectiveness of the dialogues between parties. Suggested strategies include (1) standardizing operations (thus unifying processes), (2) prioritizing the useful life of the products in the collection and delivery, and (3) innovating monitoring technologies.

In order to unlock the potential of the horticulture sector in Colombia, the report also recommends Dutch companies to engage in (1) approaching traditional growers and the next generations, (2) technical assistance in agro-logistics and (3) roundtable dialogues. Technical assistance and roundtables are amongst the activities of Hortifuturo, a project spun from this research. More info on www.hortifuturo.com.

Feasibility study *Agro-logistic district Barranquilla* by EY and CEBAR (2022)

The local government of the Atlántico department, together with the Embassy of the United Kingdom in Colombia and a consultancy team, is finalizing a feasibility study for the construction of an agro-logistic district at the premises of Granabastos, the distribution centre in Barranquilla. With this initiative, they aim to increase competitiveness of the agricultural production of the department.

The project prioritized three crops: guava, lime Tahiti and cassava, based on several criteria including impact on producers and export and processing suitability (for local value addition). According to the preliminary design, different activities would be centralized in the district, such as aggregation, grading, processing and packaging.

³⁹ Available at Agroberichten Buitenland [here](#)

3 DIAGNOSIS AND CURRENT SITUATION OF AGRO-LOGISTICS

3.1 Infrastructure overview

The five departments object of the study are connected to the rest of the country and to the international markets thanks to the road systems, the Magdalena river, the railway reaching Santa Marta and three of the four main ports of Colombia. The following paragraphs provide an overview of each of these infrastructure systems.

Road network

Colombia has a road network of 206,102 km, of which 6.9% (16,983 km) are primary roads; 21%, are secondary roads and 69.5% (142,284 km) are tertiary roads⁴⁰. The administration of the national road network is divided according to type - primary, secondary or tertiary - as shown in the figure 7 below⁴¹. Roads administered by the various public entities can be concessioned to private parties that will take over the ordinary operations related to the good functioning and maintenance of roads. Private concessions are also granted for extraordinary operations such as the construction of new roads.

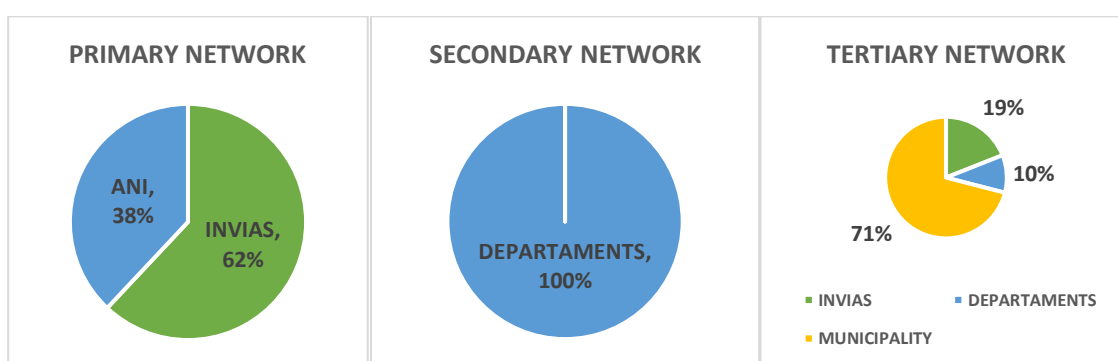


Figure 7: Division of Road Management in each type of road network

INVIAS publishes data on the status of the roads under their responsibility, classifying them into paved and unpaved and indicating the conditions in which they are found, thus maintaining effective control and monitoring that allows you to adopt the necessary preventive measures to provide a better service to road users⁴².

Table 3: State of the road network in the study departments. Source: Edited from INVIAS National road network 2021

	PAVED (Kms)					UNPAVED (Kms)					QUALIFIED TOTAL NETWORK		
	VERY GOOD	GOOD	REGULAR	BAD	VERY BAD	VERY GOOD	GOOD	REGULAR	BAD	VERY BAD	PAV.	UNPAVED	TOTAL
ATLÁNTICO	15,70	7,86	2,49	0,00	0,00	0,00	3,47	0,00	36,38	2,90	26,05	42,75	68,80
BOLÍVAR	15,64	70,34	49,19	22,47	0,00	0,86	3,00	3,00	0,00	0,00	157,65	6,86	164,50
CESAR	92,23	153,84	91,85	109,10	18,78	0,00	2,00	13,10	10,80	0,19	465,81	26,09	491,90
MAGDALENA	37,60	76,82	23,05	8,53	14,47	0,00	0,00	12,21	34,30	41,01	160,47	87,51	247,97
GUAJIRA	70,65	39,03	31,06	8,01	0,00	2,64	7,63	0,00	0,00	0,00	148,74	10,26	159,01

⁴⁰ MinTransporte, Infraestructura para la equidad y competitividad, available [here](#)

⁴¹ MinTransporte, transporte en cifra, 2020. Available [here](#)

⁴² INVIAS, Estado de la red vial, 2022. Available [here](#)

Considering solely the road system overseen by INVIAS, 57% is in 'bad' or 'very bad' conditions in Atlántico. The percentages are lower in other departments: 40% in Magdalena, 28% in Cesar, 14% in Bolívar and 5% in La Guajira 5%. However, the roads that are in 'regular' conditions should not be left behind: if not properly maintained, their state could worsen rapidly to 'bad' or 'very bad'.

Tertiary roads are regulated by CONPES 3857⁴³, which specifies the causes of deterioration of such roads and includes guidelines to maintain and conserve the regional road network in good condition. The CONPES 4039⁴⁴ declares the importance of the connection between the territories, being the tertiary roads an important factor to be taken into account by the institutions. However, the organizations interviewed for this study have (almost unanimously) highlighted that there is still a long way to go to reach a good state of tertiary roads.

At a national level, there are plans to build 8,000 km of roads, within the so called Fourth Generation (4G) projects. Of these, it may be noteworthy mentioning the following, directly impacting the five departments:

- The *Ruta del Sol 3* project has an approximate extension of 465 km and runs through the departments of Cesar, Magdalena and Bolívar through two road corridors: the first runs from Ye de Ciénaga (Magdalena) to San Roque (Cesar), while the second goes from El Carmen (Bolívar) to Valledupar (Cesar). In January 2022, more than one third of the project was completed (42%).
- Cartagena – Barranquilla: completed in December 2021 with a length of 146.6 km and double lanes. It connects the two departmental capitals, as well as a new road on the Circunvalar de la Prosperidad, between Malambo and Barranquilla⁴⁵.
- Puerta de Hierro-Palmar de Varela y Carreto-Cruz del Viso: completed in June 2021. It connects the centre of the country (Medellín, Cali and Bogotá) with the Caribbean region with a total length of 202.5 km.

Railway network

Globally, the logistic sector is trying more and more to focus on intermodality, combining – in an efficient manner - different types of transport. Colombia is also moving towards that direction, though slowly, given, for instance, its weak railway system: of 3,340 km of railway in the country, more than half (1,969 km) are inactive. Currently, Colombia counts with three railway systems: Central, Pacific and Atlantic. The latter crosses the departments of Cesar, La Guajira and Magdalena. Figure 8 below shows the different systems and the inactive and active trajectories.

The importance of reducing transportation costs and environmental impacts motivated the design of a railway master plan published in 2020⁴⁶. The overall aim is to reactivate the railway network for the benefit of, especially, heavy industry and high-volume cargo, in order to connect production locations to seaports on the two coasts. The railway master plan involves entities such as the Ministry of Transport, INVIAS, DNP, ANI and the Transport Infrastructure Regulation Commission (CRIT). The master plan also includes railway projects for passenger transport. For the Caribbean regions, it is foreseen to have both passenger and cargo trains, with the latter being the priority at the moment.

As introduced in earlier sections, an interesting railway connection is the one between La Dorada and Santa Marta, for its enormous potential of connecting the centre of the country to one of the primary import/export ports. The section between La Dorada-Chiriguaná (559 Km) is part of the Central system, while the Chiriguaná-Santa Marta (245 Km) is part of the Atlantic system. The infrastructure of this connection, like the large majority of the railway infrastructure in the country, is managed by ANI, while the operations are carried out by Elogia Logistics Solutions.

⁴³ DNP, Documento CONPES 3857, 2016. Available [here](#)

⁴⁴ DNP, Documento CONPES 4039 version to be approved, 2021. Available [here](#)

⁴⁵ Valora Analitik, 2022, available [here](#)

⁴⁶ DNP and MinTransporte, Plan Maestro Ferroviario, 2020. Available [here](#)



Figure 8: National railway networking. Source: Edited from Railway master plan 2020.

Fluvial transport infrastructure

The river network of Colombia has a total length of 24,725 km, of which 74% (18,225 km) allow for permanent navigation of some kind. Of these, 39% is permanently navigable by large vessels, while 23% allows the transit of large vessels only temporarily. Colombia's river network is divided into four basins: Magdalena, del Atrato, Orinoquía and Amazonía.

Specifically, the Magdalena Basin has 2,770 km of navigable network, which are currently under the care and conservation of the Cormagdalena, the regional Autonomous Corporation of the Río Grande la Magdalena. Cormagdalena is, among others, leading initiatives to recover navigability between Barrancabermeja and Puerto Salgar, for which they are interested in setting up a public private partnership to be supervised and technically supported by the ANI.

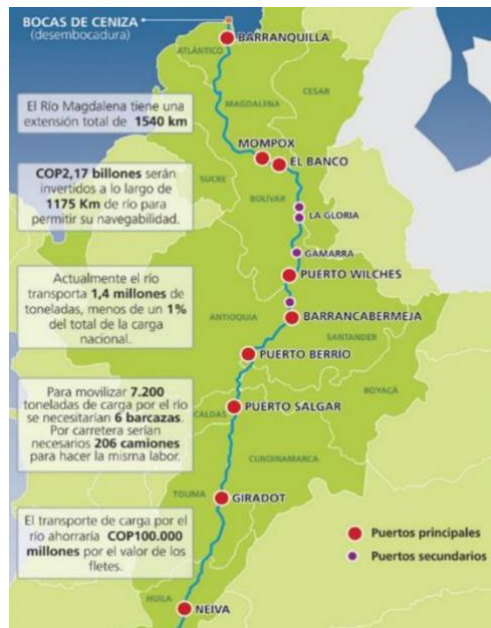


Figure 9: main and secondary ports along the Magdalena river. Source: Legiscomex 2018

The Magdalena is the main river of the country, with a total length of 1,550 km that connect the centre of Colombia to the Caribbean coast, flowing through 9 departments. Of these, 1,092 km are suitable for navigation. Along the river several fluvial ports can be found, divided in ports of national interest, hence allowing access to departments' capitals, and ports of regional interest. Fluvial ports are administered by Cormagdalena, the environmental authority in charge of the basin of the Magdalena river⁴⁷. Of these, some offer potential for intermodal transport, being located along the Central Railway system, namely Puerto Wilches, Barrancabermeja, Puerto Berrío and La Dorada.

Currently, river transport is mainly used for heavy cargo and is limited for cargo of agricultural products, due to transit times and the lack of infrastructure that maintain the cold chain. Travel time between Barranquilla and Barrancabermeja can go from 4 to 5 days, compared to the 1-2 days of land transport. For this reason, the demand for river transport of perishable or short shelf-life products is limited. The river port infrastructure requires investments to optimize services and encourage intermodal transport.

Maritime ports

Colombia counts with four main maritime ports, three of which are located in the departments object of the study: Barranquilla (Atlántico), Cartagena (Bolívar) and Santa Marta (Magdalena). From these ports, Colombia connects to almost all destinations, mainly Central America and the Caribbean, North America and Europe.

Santa Marta

The port of Santa Marta is a multipurpose port, that moves both containerized and bulk cargo, with a strong vocation for agro-industrial products. Amongst these, banana represent 60-70% of the containers exported via Santa Marta. The export of other agricultural products, such as goldenberry, (Hass) avocado and flowers (although still mainly exported via air freight) has overtime helped promoting the development of high-quality cold storage infrastructure. Other products exported in large volumes are palm oil and coffee.

In order to speed up and reduce the amount of inspections needed, export containers incoming in the port go through scanners that send images directly to the authorities; they will then decide whether further inspections are needed. For refrigerated cargo, inspections occur during the crossdocking phase, when the goods are moved

⁴⁷ National University of Colombia, 2020, available [here](#)

from the vehicles to their final container. Differently, the process for the refrigeration of banana containers starts after the inspections directly at the port, as they often arrive to the port directly from the farms in non-refrigerated vehicles.

Barranquilla

The port of Barranquilla is also a multipurpose port, moving both containerized and bulk cargo. In the latter case, both 'clean' (such as products for animal and human consumption) and 'dirty' (e.g. clinker, fertilizers) cargo is handled. In terms of agricultural products, Barranquilla exports traditional products such as coffee and banana. In addition, a 3,200 m² facility is available for frozen (e.g. meat products) and refrigerated (e.g. oranges, blueberries, flowers) cargo. Not all temperature-controlled products pass by this facility, as some already arrives ready for crossdocking operations, during which the anti-narcotic controls are performed.

Since before the pandemic, the port of Barranquilla had been working on making their operations digital, in order to reduce the amount of people working on premises. Currently, to 85% of the container cargo operations is digital. In the coming 1-1.5 years, they plan on extending this to their bulk operations too.

Cartagena

Cartagena is also exporting large volumes of agricultural products and is seeing a significant growth in the volumes of banana, plantain and derived products exported to Asian countries (mainly China and South Korea). When it comes to more traditional products, Cartagena handles large volumes of Hass avocado, exotic fruits (goldenberry, passion fruit), flowers, lime and oranges. Most of these products are exported to the EU and USA. Yam, lime and oranges are also often shipped to the Caribbean region.

On arrival, containers pass through a scanner, in order for ICA and the anti-narcotic police to determine whether inspections are needed. Inspections are semi-randomized, as they are often based on the track record of the exporter. The port of Cartagena offers four facilities where inspections can be carried out while maintaining the cold chain. The smooth running of such processes is further helped by the Container Security Initiative in place in the port of Cartagena. Thanks to this digitalized system, it is possible to access information in real time on, amongst others, the location of any truck and container in the port and the container temperature.

La Guajira

La Guajira is also home to multiple maritime ports, amongst which Puerto Bolívar (dedicated to the export of coal), Puerto Brisa and Puerto Nuevo, although significantly smaller than the main three ports of the Colombian Caribbean coast. Puerto Brisa can host two vessels simultaneously, and it is classified as multipurpose port. Currently, they move industrial goods and dry bulk (e.g. wheat and maize). However, the port does not offer cold chain infrastructure, making it de-facto impossible to import and export agricultural products that require temperature control. This is especially disadvantageous considering the close proximity of La Guajira with Caribbean islands such as Aruba, Curaçao and Bonaire. Similarly, Puerto Nuevo allows for three ships per week. In May 2017, after seizing 50kg of cocaine, the DIAN suspended the port's import and export operation⁴⁸. The decision was revoked in late 2018, however there is no clarity on the type of products commercialized through this port.

Free economic zones (*zonas francas*)

ANDI defines free economic zones as 'delimited areas that offer tax, customs, and foreign trade incentives to increase the competitiveness of the companies installed in such zones'⁴⁹. These are divided into:

- Permanent free zone: allows multiple industrial or commercial users, with access to special tax, customs and foreign trade treatment;

⁴⁸ El Heraldo, 2018, available [here](#)

⁴⁹ Más Colombia, 2021, available [here](#)

- Special permanent free zone: allows a single industrial user, who has access to special tax, customs and foreign trade treatment;
- Temporary free zone: a delimited area where national or international fairs, exhibitions, congresses and seminars are held.

The Caribbean area hosts a large amount of *zonas francas*, given the presence of Colombia's main ports and hence the promotion of foreign trade. During the Covid-19 pandemic, the decree 278 of March 2021 was issued to stimulate the generation of employment, investment and exports to promote the safe reactivation of Colombia. The new regulation allows for an easier and faster creation of new free economic zones and the approval times, and broadens the scope and legal certainty for agribusiness, airport and railway concessions, in addition to increasing the extension time to up to 30 years. Table 5 presents an overview of the (special) permanent economic zones in the departments of Atlántico, Bolívar, Cesar, La Guajira and Magdalena, with a short insight on the – substantial – amount of jobs generated.

Table 4: List of free economic zones in 5 departments. Source: Legis information⁵⁰

Department	Permanent Free Economic Zones	Special Permanent Free Economic Zones
ATLÁNTICO <i>12,000 jobs generated.</i>	<ol style="list-style-type: none"> 1. Zona Franca Internacional Valle de Aburrá S.A.S. 2. Zona Franca de Rionegro 3. Zona Franca de Urabá. 	<ol style="list-style-type: none"> 4. K-C Antioquia Global 5. Cementera del Magdalena Medio S.A.S. 6. Tablemac MDF S.A.S., Getcom Colombia 7. Empresa Colombiana de Cementos S.A.S. 8. Ecocemento, 9. Onelink Colombia S.A.S. 10. Hospital San Vicente de Paul.
BOLÍVAR <i>17,000 jobs generated.</i>	<ol style="list-style-type: none"> 1. Zona Franca Candelaria 2. Zona Franca Cartagena 3. Parque Industrial Zona Franca Dexton S.A.S 4. Zona Franca Parque Central S.A.S 5. Zona Franca Santelca Interprise S.A.S. 	<ol style="list-style-type: none"> 6. Argos S.A., Gyplac S.A. 7. Refinería de Cartagena S.A. 8. Reficar 9. Contecar S.A. 10. Extractora Loma Fresca Sur de Bolívar S.A. 11. Sociedad Portuaria Regional de Cartagena 12. Puerto Bahía 13. Centro Hospitalario Serena del Mar S.A. 14. Sociedad Portuaria Mardique S.A. 15. Puerto Mamonal S.A. Sociedad Portuaria 16. Sociedad Portuaria El Cayao S.A. E.S.P. 17. Termocandelaria S.C.A - E.S.P.
CESAR <i>1,600 jobs generated.</i>		<ol style="list-style-type: none"> 1. (Extractora La Gloria S.A.S).
LA GUAJIRA <i>7,500 jobs generated.</i>	<ol style="list-style-type: none"> 1. Brisa S.A. 	<ol style="list-style-type: none"> 2. Puerto Brisa.
MAGDALENA <i>6,600 jobs generated.</i>	<ol style="list-style-type: none"> 1. Zona Franca de Santa Marta 2. Zona Franca Tayrona S.A. 3. Zona Franca Las Américas S.A.S. Usuario Operador de Zona Franca 4. Zona Franca Palermo Usuario Operador de Zona Franca S.A.S. 	<ol style="list-style-type: none"> 5. Biocombustibles Sostenibles del Caribe S.A. 6. Sociedad Portuaria de Santa Marta – SPSM 7. Sociedad Portuaria Puerto Nuevo S.A.

⁵⁰ Legis, 2021, available [here](#)

3.2 Main production crops

As seen, the five departments object of this study have an average of 56.5% of *frontera* agrícola and offer, each, several types of climates. This allows for the cultivation of a wide variety of crops, both horticulture and fruit trees. Each region overtime specialized in the production of some of them, reported in the table below.

The Magdalena department is amongst the main producers of banana of the Cavendish variety. Magdalena, together with Cesar and la Guajira, forms the ‘Magdalena banana cluster’, origin of a large portion of Colombian banana for export is produced (more than 35% of the national export in 2020)⁵¹, while Antioquia also supplies the local market. Similarly, Cesar’s oil palm production is well known, and, together with Magdalena, is amongst the top producers for export of palm oil products. Cassava is the dominant crop in the departments of Atlántico, Bolívar and La Guajira, with the former also being the department with the most variety of fruits in their top 6 productions. In total, more than half of the agricultural production of the five departments is composed of cassava, banana and oil palm, followed by corn and rice.

Table 5: Main production crops per department

Department	Main production crops per Tons produced (UPRA 2020)					
Atlántico	Cassava 64,474	Mango 33,303	Melon 13,001	Guava 10,185	Rice 8,126	Corn 7,868
Bolívar	Cassava 40,4761	Rice 172,683	Yam 166,513	Corn 132,940	Oil palm 128,604	Plantain 83,150
Cesar	Oil palm 285,563	Rice 112,025	Corn 111,342	Cassava 90,202	Banana 33,835	Plantain 33,515
La Guajira	Cassava 32,090	Banana 30,884	Corn 17,391	Pumpkin 14,010	Plantain 13,883	Rice 12,811
Magdalena	Banana 714,621	Cassava 243,392	Oil palm 147,722	Mango 74,207	Corn 53,524	Plantain 32,449

When it comes to less extensive cultivations, the Caribbean departments offer a larger variety of crops, often commercialized locally at farmers’ markets, or cultivated within subsistence agricultural systems (*pancoger*). Such productions are characterized, across the five departments, by low degrees of formality and technification. In the Magdalena department, the subsistence and smallholders systems encounter large export-focused estates (mainly banana and oil palm), as shown in the figure below.

⁵¹ Minagri, Cadena de Banano, 2020. Available [here](#)

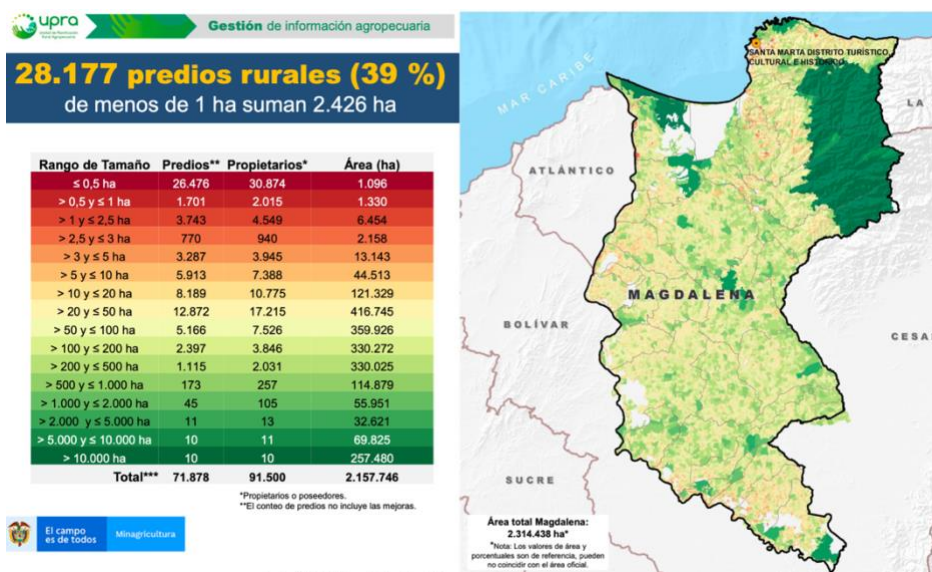


Figure 10: Holdings extension in the Magdalena department

In Atlántico, agriculture is mainly practiced in the south of the department, more fertile than the northern area. There, one can find cultivations such as millet, watermelon and pigeon pea. More recently, farmers started growing sweet potatoes, cashew, rice and pumpkin. Watermelon, melon and plantain are usually cultivated according to the rainy seasons, hence increasing the risks of harvest loss.

In the Bolívar department some of the main production crops - cassava, yam and corn - are usually grown by smallholders. Rice and palm oil are mostly cultivated by medium-sized farmers, with the latter also being found in larger cultivations. Other crops are mostly grown for local consumption, such as aubergines, tomatoes, cashew, avocado, cocoa and mango (especially the *hilacha*, or *común*, variety). Avocado and cocoa are being cultivated particularly in the south of the department, in the area of Montes de María. Part of the mango harvest is processed by Postobon, that also offers assistance and trainings.

Similarly, in the Cesar department cocoa production is gaining relevance, with farmers switching from crops such as rice and cotton, especially in the south of the department. In the north, animal husbandry is widely practiced, and lead to the establishment of corn and sorghum cultivations. Other crops grown in the region are avocado, especially of the Hass variety, and horticulture crops, mainly tomato, onion and chili. These are cultivated in municipalities with colder temperatures, by small producers (1-5 ha). The sector is registering progress in terms of protected horticulture cultivations, though still limited. Mango is grown in Cesar too, especially the *Tommy* and *Keitt* varieties, but also the *hilacha* and *azúcar*. Both SENA and Asohfrucol supported programs for the technification of mango cultivation, in order to comply with export requirements. Cassava is also seeing an increase in export volumes, which however risk threatening the availability of the crop for local consumption.

In La Guajira, a few crops are grown on a large scale and exported (e.g. banana) or sent to other departments (e.g. cassava and plantain). The region is also gaining relevance in the cultivation of pumpkin. The majority of horticulture and fruit crops are grown by small and medium-sized farmers, and sold locally at the weekly markets. These producers rely on the alternation of rainy and dry periods, given that the large majority of them does not have access to irrigation.

3.3 Bottlenecks identified

In the previous section, the main production crops of the five departments were presented, with some of these productions being largely destined to export. For instance, in 2020, 86% of the Colombian banana production was destined to export⁵². In the case of coffee, this percentage reached 92%⁵³. In the same year, Colombia exported 42% of the production of crude palm oil (half of which destined to the European market⁵⁴).

Other crops are grown for local consumption. These volumes are however not sufficient to feed the population of the five departments, that rely on agricultural produce from other departments of the country. Agricultural goods are transported to Granabastos and Mercabastos in Barranquilla and Valledupar, from where they are redistributed to other locations in the region. In the case of Granabastos, up to 90% of the products commercialized come from Santander, Valle del Cauca and the Cundinamarca-Boyacá highlands. In La Guajira, around 60% of the fruit and vegetables sold also comes from Santander. Improving the quality, variety and quantity of local agricultural production will help reduce the departments' dependence on other areas, reduce costs of logistics and transport of such goods and the amounts of food lost and wasted.

A recurrent element encountered during the study is the presence of multiple intermediaries, at least two between producers to consumers. This seems to be the case in all departments, often due to the difficulty of small and medium farmers to sell directly to markets. The difficulty in (and, at times, lack of) transport options from farms to towns puts growers in a disadvantageous position in which they are forced to sell to traders that have the resources and means to secure the transport of goods. Being this the only option available, farmers are often paid low prices for their yields, hence hindering their ability and potential to invest in, for instance, their own vehicle. Though not being the only solution, investing in further professionalization of agricultural production and logistics could ignite a positive cycle of growth and expansion of small and medium farmers, that would in turn improve their livelihood and the sector as a whole.

Drug trafficking is still an issue for the Colombian exports sector. Shipments from producers and traders of high-quality Colombian products are susceptible to these illegal activities, with their products always at risk of contamination. In the unfortunate case that products of unaware exporters are inspected and found contaminated, the reputational damage for producers and traders would strongly impact the possibility to continue their business and pose them under the spotlight for future stricter inspection, that in turn can slow down their operations.

In general, several bottlenecks have been identified along the supply chain, both during the literature review and interviews with several actors. As shown, different public and private actors are working on interventions that would help solve them. However, some of these issues require contribution from several parties over a long-term period. The private sector usually has the ability to intervene in a quick(er) and targeted manner, with concrete impact that can further extend over time. Some of the bottlenecks are however related to the larger enabling environment, hence do require a more structured and broad approach.

In the coming paragraphs, several factors that hinder – along agricultural supply chains – the growth and development of the agro-logistics sector in the Colombian Caribbean, are presented. More or less directly, these shortcomings also contribute to food losses and waste in the sector.

Production phase: limited knowledge (technical and business), low formality and associativity, high input costs

Small and medium-sized producers are the ones experiencing lowest levels of technification, at times complaining low levels of technical assistance. While some (traditional) producers are resistant to change and

⁵² Minagri, Cadena del banano, 2020. Available [here](#)

⁵³ Minagri, Cadena del café, 2020. Available [here](#)

⁵⁴ Minagri, Cadena de la palma, 2020. Available [here](#)

not interested in pursuing innovation, many simply do not have enough resources to improve their operations. Similarly, producers often lack market and business knowledge, hindering the growth of their business and not allowing them to capture the entirety of the value they produce. These dynamics are certainly worsened by the low levels of formality and associativity: despite the presence of farmers' cooperatives and associations, not all producers are eager to partake. Associations are therefore less strong in terms of negotiation and market access, limiting their appeal to potential members, in what seems to be a vicious cycle.

Finally, in line with the global developments of the last years, exacerbated by the Russian-Ukrainian conflict, all regions complain high costs of agricultural input, with La Guajira seemingly experiencing this issue at a stronger magnitude, possibly due to its geographical location. The situation has been aggravated in the last months by the exchange rate of the Colombian Peso against the USD, and poses serious risks for the survival of (especially small) agricultural production of Colombia.

Producer to consumer: too high number of intermediaries, bad state of (tertiary) roads, difficult to reach farms, low availability, high costs of transport, lack of value capturing by producers

Most agricultural supply chains are characterized by the presence of one or more intermediaries. These traders act as a middleman between the farmer and the wholesaler or retailer, or even between the farmer and another trader.

On average in Colombia, 72.5% of rural areas are located at more than 3 hours from main cities. Since most farmers do not have the means of transportation, they must rely on these intermediaries, that facilitate transport from farm gate to markets. Due to the high risks and high (transport) costs the intermediaries are carrying, they add a big margin on their sales prices. This creates a big gap between the farm gate price and the market price and is often being regarded as unfair to the farmers. However, a substantial portion of farmers does not have the means nor interest to carry out such activities themselves.

Fluvial transport of fresh agricultural products: low competitiveness for small volumes, long transit time, unavailability of cold chains at fluvial ports

While fluvial transport is largely utilized for bulk materials such as coal, fertilizers and some grains, to date, it is not convenient for perishable agricultural products. In fact, Colombian fluvial ports along the Magdalena river are not able to secure the continuity of the cold chain, forcing the use of reefers, hence increasing the cost. Intermodal transport of relatively small volumes of produce, which is usually the case for this type of agricultural products, is not convenient also given the increased transit time of fluvial vs road transport. All considered, this is a vicious cycle of low demand for the transport of fresh agricultural products and low investments for making it more attractive for such purpose. Interventions targeting the reduction of navigation times are needed, paired with cold chain infrastructure upgrade and improvement of intermodality options. Fluvial transport in Colombia holds high potential of development, also considering the global trend of increased demand for more sustainable supply chains.

Ports operations: lack of coordination and standardized inspections

Agricultural supply chains risk being disrupted by port operations, either because of their own coordination difficulties or for consequences of the current global logistics challenges. Ports and authorities often have difficulties coordinating the different inspections and bureaucratic operations needed, such as those from the anti-narcotic police, the ICA and the douane agency. At times, DIAN and INVIMA also perform controls on certain products to be exported (or imported, especially in the case of INVIMA). Ports complain not only the different availabilities and working hours of the several authorities in charge of inspection, but also the fact that inspection protocols are often developed on a central level and do not take into account the dynamics of the region and the port itself. In addition, inspections of agricultural goods lack standardization, with some of them being random inspections and some depending on the track record of exporters. The presence of *zonas francas* does help but

does not solve all the problems, as some inspections (e.g. the anti-narcotic) are only performed at the port's premises. Ports also complain the improper handling of products during inspection, requiring therefore increased awareness and knowledge from the authorities that perform such controls.

Generally, ports operations are extremely sensitive to any delay: from the intake of goods, to the arrival of cargo with containers that need to be unloaded and reloaded for a new trip. Delays in the arrival of goods alert the authorities, especially the anti-narcotic police, de facto flagging the shipment for inspection. In the last two years, sea freight has been drastically affected by the pandemic-dictated closure of some of the main ports in the world. The consequent lack of containers available poses new threats as sometimes goods ready to be dispatched are left waiting in the port, increasing the risk for quality – and therefore economic – loss.

Export: high (and increased) costs for small producers (incl. bureaucracy and implications) hence low value retention by producers, increased shipping costs (vs stable sales price)

In order to export their produce, growers need to be certified by the ICA. This implies, on top of the required documents to be handed in, that production and/or transformation infrastructures comply with certain requirements. Often, small producers simply do not have the resources to invest in such upgrades, resulting in them selling to an intermediary and losing part of the higher price paid for export products, which in turn makes it difficult to reinvest in improved infrastructure or techniques.

Export to Caribbean islands via sea freight: expensive because of small volumes, need for consolidation, lack of imports back to Colombia

Despite being geographically close, sea freight export to Caribbean islands from Colombia is far from cheap. Islands import relatively small volumes of agricultural products from and export even lower volumes back to Colombia. For this reason, ships often come back to Colombia empty, de facto doubling the price for the shipping of containers. In the case of agricultural products, volumes shipped each time may be so small as to not fill one full container. This raises the need for consolidation of goods, which is however most of the time impossible in the case of perishable agricultural products, especially given the different conditions required by different produces. In addition, Caribbean islands often experience a lack of regular and reliable shipping options, which contributes to the vicious circle of low demand and insufficient infrastructure and opportunities for cheaper and regular shipping options.

4. PRELIMINARY OPPORTUNITIES IDENTIFIED

The earlier chapters intended to present the current state of the art of the agricultural and logistics sectors in Colombia. As seen, the potential of Colombia in the agricultural sector is enormous. At the same time, several bottlenecks hinder the exploiting of such potential, and shortcomings along the supply chains contribute to high levels of food losses and waste. While certain challenges and structural problems can only be addressed by public actors and large-scale and financially demanding interventions, others can be tackled by private sector interventions and investment.

The preliminary opportunities identified during the study are reported in the tables below. A total of 13 preliminary opportunities, or business leads, have been identified, two of them also including the opportunity for value capturing of the main processing production residues. Each lead is presented with a potential (production) area and market for the product or services proposed. The last column briefly indicates how each lead would benefit the agro-logistics sector of the departments and/or how it would contribute to the reduction of food loss and waste.

Agri-chain: Controlled temperature				
	Lead	Production locations	Markets	Why
1	Aggregation (or production) of mixed (organic) exotic fruits	As close as Cartagena (for airfreight export) as possible	EU, USA (via airfreight because of the small volumes and high value)	<ul style="list-style-type: none"> - Captures value of small productions, offering price premiums to small farmers; possibly promotes less known “exotic” fruits. - Organic certifications can be organized with best performing farmers, leading to extra price premium. - Cooperatives or group of producers that can produce grade A (bring together producers and connect them to a market) - Production option: possibility to set up an agroforestry project, organic permaculture; price premiums
2	Mango processing	Atlántico and Magdalena (mango is 2 nd and 4 th produce per tons produced)	Caribbean islands, USA, EU	<ul style="list-style-type: none"> - Reduced food loss; local capturing of added value; mitigates price fluctuations - Market: warm holidays destination (e.g. Caribbean islands); healthy food trend (e.g. fruit juices vs soft drinks) - Strong local interest for solutions for <i>mango de azúcar</i> (largely available in the departments) - Different varieties of mango grow in Colombia, at different times of the year: the processing factory could potentially run all year long – and possibly with different processing techniques (e.g. frozen/fresh juice; frozen pulp) given the different varieties - The same machines can be used for processing of different fruits (changing e.g. blades and centrifuge “filters”), according to seasonal availability and/or overproduction → mitigation of price fluctuations. There is also the possibility of exporting the product in non-controlled temperature (with proper sterilization and air vacuum)
2a	Possible by-product: mango seed butter		USA, EU	<ul style="list-style-type: none"> - Cosmetic purposes, growing market (see CBI) - Labour intensive process, hence high contribution to local employment

				- To be determined if all mango varieties have good potential for this by-product
3	Export (or production) of fresh jack fruit (<i>yaca o jaca</i>)	As close as Cartagena (for airfreight export) as possible	EU, USA (via airfreight)	<ul style="list-style-type: none"> - Suitable climate - Challenge: it is rather difficult to export fresh jack fruit because of its 'delicate' ripening time

Agri-chain: Not-controlled temperature

	Lead	Production locations	Markets	Why
4	(organic) cashew production and processing	"Caribe seco" (Atlántico, Bolívar, Magdalena, media Guajira y Cesar)	EU, USA	<ul style="list-style-type: none"> - Suitable climate, value dense product (higher if organic), - Market: growing trend of healthy food (incl. cashew-based cheese substitutes) - Labour intensive processing, hence high contribution to local employment - Agrosavia has done a study on the possibility of growing cashew in the region (learn more here and here)
4a	Possible by-product: cashew apple juice		EU, USA	<ul style="list-style-type: none"> - Bycatch, reduced waste - Market potential and processing details needs to be further researched - Likely to need controlled temperature

Agri-solution and infrastructure upgrade

	Lead	Locations	Target market	Why
5	Introduction program of new fusarium resistant banana varieties	Magdalena banana cluster (Magdalena, La Guajira y Cesar)	Banana producers/exporters, sector associations	<ul style="list-style-type: none"> - Fusarium (fungi) is threatening large banana production - Researchers from Australia "designed genetically modified Cavendish bananas with resistance to Fusarium" (a WUR professor also participated) - In order to anticipate the global shift, Colombia may take up a leading position in adopting these new varieties
6	Program for increased banana yield	Magdalena banana cluster (Magdalena, La Guajira y Cesar)	Banana producers/exporters, sector associations	<ul style="list-style-type: none"> - Colombian banana yield (2300 <i>cajas</i>/ha in the Magdalena banana cluster) is lower than other Latin American countries (3500 <i>cajas</i>/ha) but has competitive advantage in terms, e.g. of ports compared to Ecuador – but not Costa Rica – reason unclear
7	Small scale fertilizer production (from manure valorisation and/or composting)	Any location	Smallholder farmers, cooperatives, sector associations	<ul style="list-style-type: none"> - On a small scale (per farm, or per cooperative) it can benefit manure and green waste valorisation - On a medium/large scale, one should could look into specific (high volume) waste streams in the region (e.g. banana and oil palm)

				<ul style="list-style-type: none"> - Potential for reduced fertilizer purchase/import - Small scale: mostly knowledge transfer component - Medium/large scale: possibly WasteTransformers (see #9) or bio-based materials production
8	Tertiary roads improvement	Rural areas, roads in concessions to private	Private sector (with road concessions or private roads), entities in charge of road maintenance	<ul style="list-style-type: none"> - Different tertiary roads are managed by several institutions, so it may be easier to start with private concessions roads (even though they are supposed to be already in good shape), which could work as showcase – or, if the price is competitive enough, proposed them to those institutions that are in charge and need of renovations. A pilot/showcase would probably help the case - Different technologies with limited cost and substantial impact
9	Organic waste transformation	Distribution centres, market squares (plazas de mercado), agricultural producers, agro-processors	Distribution centres, municipalities, private sector	<ul style="list-style-type: none"> - For instance, the technology from the Waste Transformers needs between 350kg and 3000kg of organic waste per day - Valorises food waste and losses by transforming organic waste into electricity & heat, fertilizer, biogas
10	Distribution centre Cartagena	Cartagena	Wholesalers	<ul style="list-style-type: none"> - Per district decree, the current market square in Cartagena (Basurto), needs to be moved out of the city. This has been tried since 2016, unsuccessfully - It will be a private/public partnership, where the district shall provide the land. - The project is open to foreign investors but depends on public actors such as municipalities and district - Revenues will be generated by either selling or renting the lots to wholesalers
11	Aggregation centres for satellite markets	Satellite markets in the region (e.g. Santa Rita – Cartagena)	Traders, producers, wholesalers	<ul style="list-style-type: none"> - Satellite markets usually don't deal directly with producers and their logistics operations are not always well organized - Aggregation centres have been suggested as an opportunity for the satellite markets to be more competitive in terms of price (else, they often have to buy themselves from e.g. Basurto)
12	Integrated transport solutions to/from Dutch Antilles	Colombian Caribbean	Aruba, Curaçao, (Bonaire)	<ul style="list-style-type: none"> - Aruba and Curaçao are interested and more than willing to shift some of their agricultural imports from USA/NL to Colombia (not applicable to meat product for the time being), provided high quality and reliability can be ensured by the producers/traders - They however lament the lack and high prices of sea freight connecting the islands to Colombia; current volumes imported are low; nevertheless it seems to be a “chicken and egg” situation - More research is needed into potential products that the islands can sell back to Colombia to reach lower (maritime) transport cost
13	Saline agriculture	Areas with the most	(large-scale) farmers,	<ul style="list-style-type: none"> - The Salt Doctors offer several services from salinity assessment and feasibility studies to demo plots

		salinity issues	sector associations, (knowledge institutes)	- The technology is mostly suitable for horticulture crops (and not so much for fruit trees)
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