

Title: Determinants of agricultural exports in Colombia

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Main findings

- The adoption of technology and the use of productive factors lead to an increase in productivity and incomes of agricultural producers, while increasing the supply of exportable agricultural products (Langyintuo, 2008).
- Small producers have higher production costs and are therefore less competitive than large producers. Cooperative organizations, strategies and vertical integration can reduce costs, create economies of scale, and may allow small producers to have similar unit production costs to those of large producers, which are already supplying major international markets (DNP 2015).
- Colombia faces several challenges in improving the competitiveness of its agricultural producers, especially around the implementation of the National System of Agricultural Innovation (SNIA, for its initials in Spanish). Colombian producers should have technology appropriation and a relationship with the entities that generate knowledge to improve productivity. Since the SNIA understands that innovation begins in the territories, it is a requirement to strengthen the innovation development at a local level. In addition, to change the mindset of local producers it is critical to train on skills related to the farm to fork strategy
- Land formalization and clarification is one of the biggest bottlenecks for international markets exploitation and prevents local and foreign investments. Rural reform and opening the possibility for large scale agricultural production must be part of the regulatory agenda in Colombia.
- The use of irrigation systems may be conducive to double agricultural productivity. However, only 6 % of Colombia's lands with the conditions to be developed with irrigation systems have access to this productive factor. There is room for potential adjustments in production plans across public irrigation districts, thus adjusting agricultural output according to export priorities. However, Private Public Partnerships on irrigation districts is another option to consider.
- The Colombian government and the private sector have a policy in Price Stabilization Funds and the Andean Price Band System for those products that are considered to suffer the most from international market distortions. Nevertheless, the Andean community countries apply to Colombia different instruments that also distort the trade of agricultural goods.

- Farmers can access productive assets through rural and agricultural financial instruments. The National Agricultural Financial System (SNCA, for its initials in Spanish) provides flexible credit lines with low interest rates (subsidies). The most important credit lines linked to productivity are: i) Machinery and sustainable infrastructure, ii) Contract farming, iii) Livestock sustainability, iv) Clusters, v) Biosafety in agriculture, and vi) Crop Insurance to protect growers' investments and crops to mitigate natural and biological risks
- Low public capacity in sanitary, phytosanitary, and food safety risks assessments limit export growth. In Colombia, the stringency of sanitary standards is low, reflecting the lack of a national strategic plan for sanitary access. In that sense agricultural products that have international market opportunities due to the demand and international commercial interest, often do not match the required standards.
- Participation in Global Value Chains (GVCs) requires the development of infrastructure and export-oriented services, in particular, packing houses specialized in the handling of products, the application of quarantine treatments, and the implementation of traceability systems, in accordance with the standards required by the international market. Besides, other major constraints for taking advantage of global market opportunities are logistics, road infrastructure, and low connectivity (broadband – wifi internet, 4G mobile carriers)

Diagnostic

Trade offers the opportunity for economies to grow and contribute to the alleviation of poverty (WTO, 2018). However, food trade faces many challenges, such as countries must guarantee that consumers are supplied with safe food (“safe” in the mean that the standards are considered appropriate), and at the same time, ensure that strict health and safety regulations are not being used as an excuse for protecting domestic producers. A profound change of the global food and agriculture system is needed to nourish populations by increasing agricultural productivity and sustainable food production (UN, 2015). International trade interacts with public health objectives, sanitary and phytosanitary measures, and food safety in different ways. This interaction can enhance access to basic requirements for human health, such as safe food supply.

Though the relative weight of agri-food exports in total exports has declined over the years, the sector continues to make a significant contribution to the country's exports. Between 2000 and 2018, Colombian agricultural exports increased at an average annual rate of 5%, while imports grew at a rate of 9%. In 2018, agri-food exports represented 17% of total exports and 42% of total export value without considering mining and oil exports. The main imported products in 2018 were corn and soybeans, which represented 26% of the total agri-food imports. Agriculture continues to be a critical sector of the economy – accounting for more than 16% of employment and 6% of Gross domestic product - GDP in 2018. According to the agricultural GDP from 2014, 40% of municipalities (439 municipalities out of 1.102) have agriculture as its main economic activity. Colombia is characterized by a dualistic distribution of land ownership where traditional subsistence smallholders co-exist with a large-scale commercial farm (OECD, 2020). Women represent 47.2% of the population in rural areas of the Colombian territory. In 2010, 51.2% of rural households headed by women were in condition of multidimensional poverty, a figure that decreased 10.8 points percentage, standing at 40.4% in 2018 (MADR, 2019).

Over the last decade (2009-19), Colombia has had an average real GDP growth of 3.5%, and is a consistent net exporter of agricultural and food products, with a net surplus of USD 1 billion in 2018. Colombia's agri-food exports are almost equally split between those destined for final consumption (52%) and those sold as intermediate inputs (48%) for use in manufacturing sectors in foreign markets. In either case, these are dominated by primary products (OECD, 2020).

1. Productive Factors

The productivity of agricultural activities is low due to limited access to productive factors. Data shows that 83.6% of agricultural production units (known by its Spanish acronym UPAs) has no machinery, only 16.5% of UPAs report specialized infrastructure for production, and about 39% use fertilizers to improve crop growth. Another element that reduces the competitiveness and productivity of the agricultural sector in Colombia is related to the limited use of irrigation systems and low electricity coverage due to a lack of private and public investment. In rural areas, only 11.8% of UPAs has an irrigation system and only 30.2% of these units have access to electricity (CNA, 2014). An analysis of rice farming productivity indicates that producers who have access to credit, an irrigation system, machinery and technical assistance, have yields that are 40% higher than producers who do not have these productive factors. Similarly, the average income of small agricultural producers who can transport their products is 3.1 times higher than the average income of non-agricultural producers (Leibovich, Botello, Estrada & Vásquez, 2013).

Most of Colombian rural producers face various bottlenecks that inhibit their sustainable insertion in international value chains. Colombian producers tend to be small: 70,4% of farms are smaller than 5 hectares, and only 14,7% of them participate in association schemes (DANE; 2014). These statistics reflect the limited capacity of Colombian producers to create economies of scale or vertical integration which could reduce production costs and would facilitate their entry to international markets. Nevertheless, appropriate economies of scale are a necessary but not sufficient condition to insert small producers in international value chains.

According to the National Agricultural Survey (known by its Spanish acronym ENA), only 37,4% of rural households have access to land, among which 59% do not have formal titles (DANE, 2011). That informality can limit growers' access to public services and productive assets. Colombia faces the twin challenges of high concentration of land ownership and the under-exploitation of arable land (OECD, 2020).

Human capital is an essential factor in attracting investment (Cubillos y Navas, 2000). The labor market in rural areas is an informal market, with an elderly workforce and low coverage of social protection. The rural area is characterized by high levels of informal employment that do not have access to social security. In 2019, 85.4% of rural employees did not contribute to pensions. Even though agricultural activities are the highest employer for labor in rural areas, lately, there has been a contraction in the labor supply. Total rural employees in agriculture activities drop from 65.4% in 2010 to 60.6 % in 2019. That could be explained by the average income of agricultural employees only reaches 65.8% of a monthly minimum wage. Besides, the rural population is aging. In 2010 for every 100 children under 15 years old, there were 27.5 elders over 60 years. In 2018 this ratio increased to 37.7 (The Great integrated Household Survey known by its Spanish acronym GEIH).

As labor begins to exit the (agricultural) sector, there is a need for land policies that permit or facilitate the consolidation of farmland so that the most successful farmers can expand their operations. Emerging medium-sized farms can also be expected to substitute capital for labor as wages rise and farm labor leaves the sector. Small, part-time farmers will persist (and be efficient) for a long time, especially if new technologies exhibit constant returns to scale. Public services to support agriculture should not ignore small farms, as they can continue to be a dynamic source of growth. (Fuglie, Keith; Gautam, Madhur; Goyal, Aparajita; Maloney, William F, 2020).

1.1. Public goods and public services

Security is a key factor for attracting national and foreign investment and for the development of agricultural activities in conflict zones. In this area, Colombia has improved significantly. However, this trend should continue into the future, if one takes into account that, in 2018, 53.98% of kidnappings (95 cases) were reported in rural areas and 46.02% (81) in urban areas (Policía Nacional, 2019). For instance, “the emergence of a strong exotic fruits industry in the pacific coastal area of Colombia, where much poverty is concentrated and many ex-combatants live, has been inhibited by the difficulties of negotiating secure and reliable access to the Port of Buenaventura” (Fuglie, Keith; Gautam, Madhur; Goyal, Aparajita; Maloney, William F.. 2020).

Irrigation systems are essential for the agricultural productivity of strategic crops for international trade in Colombia since they maintain water supplies and strategically handle the specific water requirements for crops, thus avoiding unstable availability and inefficient application. Its impact on productivity has been notably reported in agricultural research. A study by FAO in 2002 pointed out that irrigation systems may double productivity per hectare in cereal crops, and this effect may be even higher for crops with technological packages but no access to any water management system.

Although the impact of irrigation systems on agricultural productivity is well-known, its implementation in Colombia is low relative to its potential. According to data available on AQUASTAT (2018) by FAO, 66% of Mexican lands with the proper conditions to implement this kind of water management scheme is irrigated, number that is of 44% in Chile, and 15% in Argentina. In Colombia, only 6% of the potential lands that could have irrigation actually has the service. Therefore, the country may benefit from promoting better irrigation and water management policies, especially when the area with potential for irrigation accounts for 18 million hectares out of the 39 million that comprise the agricultural frontier.

There is not a consolidated support system that allows agricultural producers to increase their competitiveness. Policies that promote technical support have focused on agricultural technical assistance (ATA, for its initials in Spanish) which emphasizes on increasing crop and livestock farm productivity (Econometria, 2020). In this regard, training for agricultural producers only addresses technical aspects of cultivation and does not include other relevant knowledge which competitiveness such as marketing, associativity, agricultural technologies, information and communication technology, among others. Besides, ATA's coverage is limited, and only 16.5% of UPAs received technical assistance in 2014 (DANE, 2015). The average per capita income of UPAs who received technical assistance was 2.2 times greater than the average per capita income of those who do not (Leibovich, Botello, Estrada & Vásquez, 2013).

Weak implementation of public policies related to science and technology innovation activities for the agricultural sector (ACTI, for its initials in Spanish). According to the Rural Mission (“Misión para la transformación del Campo” in Spanish) the main obstacles to improve agricultural ACTI are: i) lack of financial and human resources, ii) absence of a clear and articulated policy, iii) weakness of intellectual property protection and iv) gaps in planning, monitoring, and evaluation processes (DNP, 2015). These findings show weaknesses in the agricultural innovation system related to governance and coordination of the activities between actors. As a result of that, Colombian producers are weakly integrated with entities who promote ACTI such as producer associations, and research centers. According to the Third National Agricultural Census (DANE, 2015) only 1.1% of UPAs belonged to a union, 3.6% to a producer association and 0.2% to a research center.

“Public agricultural research institutions have historically depended on general government revenues or aid programs for funding. Lack of diverse funding sources can leave them vulnerable to low and unstable funding. One potential source of supplementary funding for research is through producer levies. (...) Revenues from levies may be channeled through producer organizations and used to fund a range of cooperative activities, including research, extension, and market promotion. Governments may give statutory authority to producer associations to impose mandatory levies on all their members when a majority of members are in favor. Levies are mostly used for commodities that are grown commercially and for export, and that are marketed through a limited number of outlets, such as processing mills or ports (which reduces the transaction cost of collecting the levy). Another potential source of research funding is by charging fees for technology products and services. (...) In Colombia, producer associations have enacted mandatory levies on sales of coffee, sugarcane, oil palm, rice, cotton, and cocoa. Some of these associations established their own research stations, and others have contracted research through CORPOICA, nowadays AGROSAVIA (Estrada, Holmann, and Posada 2002). In 2013, nearly 40 percent of the total spending on agricultural R&D in Colombia was funded through producer levies (Stads et al. 2016)” (Fuglie, Keith; Gautam, Madhur; Goyal, Aparajita; Maloney, William F. 2020).

Current financial instruments that promote exports of agricultural products have multiple challenges. Government authorities have identified the following challenges that affect access to productive assets and the internationalization of the agricultural sector: i) Credit lines specialized in productivity and competitiveness of agricultural products for exports are not available. ii) Lack of resources to finance agriculture activities that should be provided by the Ministry of Agriculture and Rural Development, iii) Low demand for crop insurance because of high costs of insurance premiums, iv) Absence of information on crop insurance, iv) Low insurance culture, v) Lack of a monitoring and evaluation mechanism for the Agricultural Financial System to measure the impacts of the financial and agricultural risk policies and programs. (DNP, 2018).

2. Main features of the agricultural market and policy instruments

“In some developed countries, support remains high and linked to production, while some emerging economies have also significantly increased policy interventions that distort production decisions. In both cases, support could have been better targeted at public services that benefit producers, consumers and society overall (...) Two-fifths of the support to the sector is provided through policies that artificially maintain domestic farm prices above international levels, while another 9% are payments linked to output or the unconstrained use of variable inputs. All these policies are distorting production decisions and markets particularly strongly” (OECD, 2020).

Public policy instruments such as the Andean Price Band and Funds based on tariff protection mechanisms and direct subsidies can distort the national and international markets. Market Price Support (MPS) is the main component of the support provided to producers in Colombia (with an average of 90% for the period between 1992-2013 and 81% for the years 2011 - 2013). Products such as rice, corn, poultry, sugar, milk, and pork have received the highest proportion of the MPS. Despite the reforms introduced in the 90s¹, Colombia has been applying the Andean Price Band System in 13 main agricultural products since 1994 (OCDE, 2015). Due to the different Trade Agreements signed by Colombia, this instrument has lost efficiency. Otherwise, the operation of the Price Stabilization Funds is not symmetrical. They become subsidies in periods of low prices, which lack an element of savings from producers during periods of high prices or exchange rates (DNP, 2015). These price stabilization instruments can distort the domestic market for agricultural products and end up being inefficient (OCDE 2015).

Free trade agreements have contributed to the growth of agricultural exports, but not on diversification, while the trade balance tends to deteriorate. While protecting agriculture, Colombia has negotiated Free Trade Agreements and even committing to the reduction of tariffs. During the period in which the Free Trade Agreements with main trading partners entered in force (The United States and the European Union) exports from the agricultural and agro-industrial sector increased at a rate of 1.4% annual average, increasing sector's share in total exports from 11% in 2012 to 18% in 2019. Due to the greater dynamism of the trading partners, whose imports increased at a rate of 4.3% per year, the country's trade surplus reduced from 1,157 to 592 million dollars in the last five years. In 2019, 53% of exports were concentrated in coffee, banana, and flower. Meanwhile, 66% of these exports were sent to 7 countries (United States, Holland, Germany, Belgium, United Kingdom, Ecuador, and Japan) (DANE, 2019). Colombia has the goal of reaching 48 new sanitary accesses between 2018 and 2022. However, it has not fully taken advantage of the ones it has obtained. Between 2010 and 2017, the country had sanitary access to external markets for 106 agricultural products, of which only 36 were exported in 2017 (DNP, 2019). Due to the various regulations of the destination countries, the complexity of the process of sanitary approvals, and the low capacity for producers and the institutions to meet market demands related to the compliance of quality standards, the sanitary access to external markets still limited. Although, that opens an opportunity for Voluntary Sustainability Standards (Rain forest alliance, fair trade, Organic, UTZ, among others).

3. Sanitary and phytosanitary measures

In terms of agri-food safety, Colombia doesn't have an integral policy for food safety and traceability, considering that: (i) only 21% of the total chain production is regulated in terms of the international standard known as the "farm-to-fork approach"; (ii) a high incidence of foodborne diseases persists; (iii) there is a difficulty to identify and control risks associated to food safety, for risk management, there is a lack of public resources to finance the Colombian Agricultural Institute (known by its Spanish acronym ICA) and the National Drug and Food Surveillance Institute (known by its Spanish acronym INVIMA) to mitigate health and safety challenges; iv) there is a lack of technical, scientific, metrological, and calibration capacity of the authorities, laboratories, as well as a weak

¹ Since 1990, Colombia has adopted a trade liberalization policy to modernize the economy, expand the exportable supply, insert itself in international markets and achieve macroeconomic stability, known as economic opening (Ocampo y Villar, 1992)

articulation between government authorities (ICA, INVIMA, and State and Local Health Secretariats); v) there is no strategic plan related to sanitary access and vi) there are additional costs in the production chain, due to the non-compliance of international standards and the low capacity to achieve them (DNP, 2018). Immerse in that policy for food safety and traceability, one of the most important challenges is the compliance with the maximum residue limits in food - MRL (UE, 2019). Regarding international trade and sanitary access, the country does not count on a comprehensive and strategic plan related to sanitary eligibility and access for the compliance of the trade agreements signed (DNP, 2018). Likewise, “public capacity in agricultural science and technology is also needed to support government regulatory actions permitting the use of new technologies, establishing and enforcing sanitary and phytosanitary standards, and assuring safe food products” (Fuglie, Keith; Gautam, Madhur; Goyal, Aparajita; Maloney, William F. 2020).

4. Infrastructure and logistics

According to DNP (2016), an estimate of 34% of total food is lost and wasted in the country, which is equivalent to 9.7 million tons. Out of every 3 tons produced, one ton is lost or wasted. 64% of these losses and waste correspond to losses generated in the production, post-harvest, storage, and industrial processing stages while the remaining 36% corresponds to waste produced in the distribution, retail, and household consumption stages. In terms of products, the highest percentage of the total loss and waste of food corresponds to fruits and vegetables (62%), followed by roots and tubers (25%), cereals (8%), meat (3%), oilseeds and legumes (2%), fish (1%) and dairy (0.29%). It is estimated that 20% of the losses and waste of perishable products in Colombia is due to insufficient capacity of the cold chain (Procolombia, 2014). The IDB indicates that in Latin America and the Caribbean there are differences in the density of the cold chain infrastructure in the region. Thus, for example, in the case of Chile (4.2 people per cubic meter of cold chain) and Panama (7.7 people per cubic meter of cold chain), the indicators are similar to those of the United States (2.9 people per cubic meter of cold chain) and Germany (3.7 people per cubic meter of cold chain). These indicators differ significantly from those of Colombia (497 people per cubic meter of cold chain) and Peru (79 people per cubic meter of cold chain), which indicates that there is room for improving capacity.

There is a lack of specialized infrastructure in the handling of agricultural products for exports, particularly packing houses enabled for the application of quarantine treatments and the implementation of traceability systems, under the standards required by the international market. Investing in packing houses with these features requires economies of scale, which allows an adequate cost-benefit ratio, which is not possible for all producers and traders (FAO, 2008).

Rural areas have limited access to transportation infrastructure, digital connectivity, and local public services. For example, two-thirds of the rural population do not have direct access to a road network (OECD, 2016). In 2019, according to the WEF, Colombia registered a score of 65 out of 100 in the Road Connectivity Index in the Global Competitiveness Index (IGC)². This score was below the average for Latin America (73) and the OECD countries (84). Regional roads are those with the greatest extension in the national territory; these represent 69.4% of the national road network, and with secondary roads comprise 91.5%. However, one of the main obstacles in the implementation of road management systems is the lack of organized information to facilitate decision-making, since

² This index calculates a score from 0 to 100 based on average speed and straightness in a road driving itinerary that connects the top 10 cities

there is no current estimate of the state of roads in rural areas. Besides, the road is the main means of freight transport. In Colombia, more than 80% of the cargo is transported by road, 16% by rail, and only 2% by a river. Thus, the road investment represented 71% of public investment in the transport sector for 2018, while public investment in modes such as rail and river represented just 4% and 0.37%, respectively (CPC, 2019). As well, the limited internet access in rural areas is also a bottleneck for productivity and trading agrifood. According to the Quality of life Survey in 2019, only 16,2% of Colombian rural households have access to rural digital connectivity (DNP, 2020).

Policy recommendations

1. Productive Factors

Promote the creation and strengthening of cooperative organizations and vertical integration that will: (1) facilitate access to productive assets, technical assistance, financial resources, commercialization of products and the construction of irrigation and drainage infrastructure; and (2) create economies of scale that effectively reduce unitary production costs. This creation and strengthening of cooperative organizations can be promoted from government agencies but should also be promoted and financed by the private sector. The subscription of contracts between small producer cooperatives and private corporations should also include technical assistance and financing schemes. While it is true that these agreements are costlier for big companies, they also lower the risk of low quality and insufficient yields of production that are necessary for international market penetration and customer loyalty construction.

Improve land rights will contribute to long-term growth in the agricultural sector as well as to promoting rural development. An inclusive land access policy framework, certainty of property rights, and legal security for rural investment are necessary to promote rural and sectoral development. Upgrading the cadastre system and accelerating the registration of land rights are crucial for the sector (OECD, 2020).

To design relevant rural employment policies, it is recommended the strengthening of information systems that allow recognizing the nature of rural employment, rural women participation, the informal population, and the unemployed (DNP, 2018). Likewise, Colombia must design a labor regulation that recognizes all different forms of rural employment (including day laborers, cooperative workers, among others), and the particular characteristics of the rural labor market, which is seasonal (DNP, 2015).

1.1. Public goods and public services

Encouraging an adequate provision of public goods to develop a more competitive rural sector (DNP, 2015). Policy efforts should focus on strategic investments such as off-farm irrigation works; transport infrastructure; improving R&D and innovation; animal and plant health protection and control services; promotion of sustainable use of natural resources; investments in a national and functional extension/training and technical assistance system that fosters technology adoption. Investment in these areas should contribute to further improve productivity and competitiveness in the national and international market and to foster a more inclusive and sustainable agricultural growth (OECD, 2020).

Ministry of Finance should work with the various public sector lenders (FDN, ANI, Bancoldex, Bancoagrario, Fiduagrario, etc.) to develop a system of guarantees that allow private sector lenders to reduce their risk, and in turn reduce their rates to borrowers. If Colombia can target and achieve rates for these loans in the range of 6-10% (dependent on sector) it could in turn attract investors and international companies not only to promote production but to increase international market share.

The State needs to guarantee citizen security based on the coordination of its institutions. It is necessary to change practices and attitudes, and adjust norms, procedures and organizational arrangements so that the institutions adapt to the challenges of rurality (Fundación Ideas para la Paz, 2015).

To increase access to international markets, there must be a correspondence between new areas for irrigation projects and the prioritized products for export by the Government. The selection of the areas for these projects must be by analyzing their comparative and competitive advantages so that the selected lands have the proper conditions for growing prioritized crops. It is critical that public investments aimed at supporting new irrigation projects and current irrigation districts must be consistent with prioritized products for export and be part of the annual plans that irrigation districts elaborate every year when selecting what crops will receive wider access to the water supply.

The implementation of the public service of agricultural extension will improve the competitiveness of agricultural producers. The Ministry of Agriculture and Rural Development and the Rural Development Agency (ADR, for its initials in Spanish,) with the support of the National Planning Department, must finalize the necessary regulation to launch the public extension service, with special attention to the regulation of the National Fund for Agricultural Extension (FNEA, for its initials in Spanish) to expand the coverage of users served. As the National System of Agricultural Innovation (SNIA, for its initials in Spanish) has a territorial approach, local entities must develop initiatives to guarantee the agricultural extension service in the different regions of Colombia.

Colombia needs to improve coordination among SNIA actors to ensure that research, technological development, technology transfer, knowledge management and training, and extension actions, effectively support the innovation processes required to improve the productivity, competitiveness, and sustainability of the agricultural sector. In the Regional Competitiveness Commissions, the Ministry of Agriculture and Rural Development, the Ministry of Science, Technology and Innovation, the National Planning Department and AGROSAVIA, must implement the round tables of science, technology and agricultural innovation, whose main objective is to promote the development of Agricultural Territorial Innovation Systems.

The Ministry of Agriculture and Rural Development must design and implement evaluation mechanisms to analyze the impacts of financial and agricultural risk instruments. The evaluation of these instruments will help improving public policy decisions, make a more efficient use of financial resources, and open specialized credit lines for these purposes. Besides, the SNCA requires an improved Agricultural Risk Management System (SIGRA for its initials in Spanish), which will allow for better public policy decisions and will help insurers and farmers make better choices. Also, FASECOLDA and Finagro should design rural financial education programs to promote the development and use of risk instruments. These instruments will improve the supply of agricultural products for export.

2. Main features of the agricultural market and policy instruments

“Governments can take a number of policy actions to make their agriculture sector more productive, sustainable and resilient: A) **Phase out distortive policies**, including price support and budgetary support closely linked with agricultural production and input use. B) **Reallocate funds toward key public services to the sector for improving productivity**, sustainability and resilience, or to well-targeted support for the provision of public good outcomes such as biodiversity. C) **Focus on more ambitious environmental outcomes through less distortive, more efficient and more targeted policies.**” (OECD 2020, “Government policies providing more than USD 500 billion to farmers every year distort markets, stifle innovation and harm the environment”).

Colombia must assess policy instruments such as the Andean Price Band and the Stabilization Funds to evaluate its efficiency to reduce price variability and avoid direct subsidies and market distortions.

The Public Spending and Investment Commission recommended a periodic evaluation of the justification and extension of the parafiscal funds. They suggested that subsidies must be justified from an economic point of view, must be cost-effective and must define their temporality so they would not generate distortion on the behavior of market agents (Fedesarrollo, 2017). That could be a relevant source for the provision of public goods and services such as technical assistance, irrigation system, infrastructure, connectivity, among others.

The Rural Mission (Misión de Transformación para el Campo in Spanish) recommended the promotion of new agricultural products that can increase the export basket as well as the diversification of destinations for our exports. PROEXPORT (Now PROCOLOMBIA) must play an active role in promoting these products and work together with ICA and INVIMA to overcome sanitary, phytosanitary food safety barriers that may be preventing their export (DNP, 2015).

3. Sanitary and phytosanitary measures

Colombia, as a member of the World Trade Organization - WTO, needs to enforce its national risk analysis capabilities in three components: risk management, risk assessment and risk communication. For this purpose the government authorities in the agri-food chain must: I) take into account their financial, technical and development needs, II) assure the capacity on infrastructure, and the recognition of its international counterparts, which will allow the increase of the competitiveness of the agricultural sector, ensuring compliance with the Sanitary and Phytosanitary Measures - SPS Agreement, III) improve regulations in the field of sanitary, phytosanitary, food safety, animal welfare, and agricultural traceability, under the scope of the policy “farm to table approach”; IV) apply the certification of Good Agricultural Practices (known by its Spanish acronym BPA), Good Manufacturing Practices (known by its Spanish acronym BPM), quality systems and other recognized standards required; V) develop and strengthen technical capacities (metrological, calibration and testing) of laboratories that are part of the SPS System, VI) ensure food safety in the agri-food chain to achieve pathogen reduction, and compliance with maximum residue limits for veterinary drugs, pesticides and other chemical contaminants, VII) strengthen risk management for agricultural products and food in border areas; VIII) elaborate and achieve a national sanitary access plan for the agricultural products, that at least must contain (diagnostic, products characterization, markets of interest and technical and financial requirements). All the above throughout the Colombian Intersectoral Commission on Sanitary

and Phytosanitary Measures. (WTO, 2018; DNP, 2018). It is not just a matter of negotiating access to products in international agreements but of having the institutional capacity (financial and human resources) to reach those markets expectedly.

The Inter American Development Bank recommended specific actions strengthening critical areas of the Agricultural Sanitary Authority – Instituto Colombiano Agropecuario ICA : 1) Human Resources; 2) Information Systems; 3) Registration procedures for productive areas; 4) Traceability Systems; 5) General adoption of Good Practices; 6) Risk prevention and management systems (including quarantine procedures); 7) Active vigilance strategies; 8) Laboratories and infrastructure; 9) Regulation procedures and proper follow up of standards. (CASTRO DOROCHESI, 2014)

The OECD identified the opportunity to enhance cooperation between countries in terms of rules of origin, sanitary measures, and other technical barriers. This would help to boost international trade. The OECD also declares that considering more systematically international standards in the development and revision of regulation can reduce trade costs (OECD, 2017). International standards are increasingly pursued in Colombia, although this still rests on a discretionary regulatory framework. As the demand for certified products is growing strongly, there are capacity constraints in Colombian standardization and accreditation systems, so the development of further laboratory and testing facilities would enhance the ability of firms to expand globally (OECD, 2014).

4. Infrastructure and logistics

Establishing regulatory frameworks, investment, incentives, and strategic alliances between the public and private sectors to expand, modernize, and technify the infrastructure for export, as well as to promote the provision of specialized services that meet the international standards. It is also necessary to introduce controls on the operation of the cold chain system to ensure compliance with the commitments of the Montreal protocol signed in September 1987 to protect the earth's ozone layer, and particularly with the Rome declaration signed by Colombia in November 2019 to promote the development of a sustainable cold chain. In addition, it is necessary to have an appropriate infrastructure and the provision of specialized services that enable compliance with the quality, sanitary, and safety requirements established in the export protocols. This infrastructure must have packing houses specialized in the handling of products, the application of quarantine treatments, and the implementation of traceability systems, under the standards required by the international market. The investment in packing houses with these features requires economies of scale, which allow an adequate cost-benefit ratio, which is not possible for all producers and traders. It is also critical to scale up efforts towards universal broadband access, and give people the skills and resources they need to participate in the digital economy (World Bank, 2019)

Adopt a co-financing model for tertiary roads that allows favoring the municipalities with the greatest needs and prioritizing the resources of the different entities of the national government towards closing gaps (DNP, 2016). Prepare an optimization plan for land and river accesses, starting with the main port areas of the country (CPC, 2019). These investments require a long-term approach and commitment therefore the resources must be guaranteed, and the volatility of the assigned budget must be reduced.

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