

Colombia-United States Free Trade Agreement. An observation to the Colombian agricultural microeconomy projected towards development

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Title Page

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1. Abstract

Through this article, the results of the Free Trade Agreement between Colombia and the United States were addressed, based on its effects on the exports of the Colombian agricultural sector and its repercussions on the rural microeconomy, using the following methods: a) Descriptive b) Comparative Method c) Revealed Comparative Advantages (RCA) and d) Prospective Approach, being the main variables, competition, rural poverty in Colombia, concentration of rural property and the investment budget destined for the vulnerable agricultural sector, observing that Colombia's agricultural products do not have significant comparative advantages to compete with the North American market, which is evidenced in the deficit trade balance. Colombia is the most unequal country in the distribution of land in Latin America where the largest extensions are destined to the production of agrofuels and it is the small farmers who generate the largest number of crops for internal consumption, persisting despite the hostile conditions in the Colombian countryside, and the high rates of monetary and multidimensional poverty. These circumstances pose a risk to the country's food sovereignty by becoming dependent on imports, which is why a legal-economic proposal was made for Colombia based on the United Nations Declaration of the Right to Development.

Keywords

Colombia, Free Trade Agreement, competitiveness, food sovereignty, agricultural microeconomics.

2. Introduction

The economic opening of Colombia to the world market has meant an important step towards development, economic exchange and ensuring success in the international arena, however, after 8 years since the entry into force of the Trade Promotion Agreement between Colombia and the United States, the results are not very encouraging due to Colombia has few opportunities to take advantage of the benefits of freely trading agricultural products with the United States, so it is essential to improve its competitiveness (Stellian & Danna, 2017), a scenario that is evident in the limited exportable supply of Colombian products, the highest percentage of which is limited to "primary" products.

Colombia's trade balance with the United States has been in deficit since 2014, reporting a deficit of -1,079.7 (millions of dollars FOB) in 2019 according to the National Administrative Department of Statistics-DANE (2021a), being one of the causes, subsidies to domestic production that generate market distortions as stipulated by the World Trade Organization (2016) where the case of the American Farm Bill is located.

In contrast, the level of monetary poverty in rural Colombia is considerably high, standing for the year 2019 at 47.5% compared to 32.3% in the urban sector, and a Multidimensional Poverty Index of 34.5 % in rural areas, compared to 12.3% in urban capitals (DANE, 2021 b, a). In the same vein, the *World Report on Internal Displacement* (2019) places Colombia in second place of the ten countries with the highest number of people displaced by conflict and violence at the end of 2018, with 5.1 million people.

On the other hand, The Oxford Committee for Famine Relief (Oxfam, 2017) in its Report *Radiography of Inequality*, reports that Colombia is the country with the greatest

inequality in distribution of land in Latin America according to the Gini coefficient, since 1% of the largest farms manage more than 80% of the land, while the remaining 99% is distributed less than 20%. The largest amount of land in Colombia is dedicated to the agroindustrial group according to the National Agricultural Survey (National Agricultural Survey ENA-DANE, 2020 b).

This confirms the importance of small agriculture in the country, since small agricultural producers contribute a little more than half of the production at the national level, with about 80% of coffee production and with a third of the value of livestock production (The Colombian peasant, between economic protagonism and society's ignorance, Forero, 2010), and when analyzing "*The economic efficiency of large, medium and small Colombian agricultural producers*", it is concluded that agricultural producers, regardless of the scale of their productive activity, they manage to be efficient when they access social favorable environmental conditions (Forero, J., Garay, LJ, Barbieri, F., Ramírez, C., Suárez, DM, & Gómez, R. 2012).

However, the investment budget assigned to the vulnerable agricultural sector in the Current Multi-year Investment Plan - PPI (Law 1955 National Development Plan 2018-2022) is worrying, compared to the budget allocated in the law of the Second National Development Plan (2014 -2018) of President Juan Manuel Santos (Law 1753 of 2015).

Thus, the purpose of this research was to analyze the results of the Free Trade Agreement between Colombia and the United States, focused on the agricultural sector and making an observation of the Colombian rural microeconomy as a catalyst for agricultural development, due to there is a threat to the sovereignty and food security of the country,

given the impossibility of producing enough food to satisfy internal demand and become a nation dependent on foreign imports.

3. Methodology

3.1 Descriptive method.

The methodology of this research is initially developed from the *Descriptive Method* (Abreu, 2015) aimed at observing the results of the Free Trade Agreement between Colombia and the United States in the agricultural sector, considering the concepts of asymmetries, equity and reciprocity used by the Constitutional Court in its Approving Sentence C-751 of 2008.

3.2 Revealed Comparative Advantages Method (RCA).

To calculate the comparative advantages of Colombian products versus those of the United States, the method of the *Center for Prospective Studies and International Information-CEPII* called *Revealed Comparative Advantages (ARC)* (Stellian & Danna, 2017) was used. The use of the CEPII method is justified by being the most developed to measure comparative advantages through exchanges, through this, 60 groups composed exclusively of agricultural products were analyzed, according to the Standard Classification for International Trade (SITC) among which are:

- 36 groups, whose code starts with 0, made up of live animals and raw or processed food products (except edible oils and water).
- 4 groups, whose code starts with 1, made up of mineral and carbonated waters (code 111), alcoholic beverages (112), tobacco (121) and their derivatives (122).

- 16 groups, whose code starts with 2, made up of inedible raw materials of animal or vegetable origin (except oils).
- 4 groups, whose code starts with 4, made up of oils of animal or vegetable origin.

3.3 Comparative method.

Through the comparative method (Boddewyn, 1965) an observation was made about the access to agricultural subsidies in Colombia for the benefit of agricultural workers, their access to credit, technical assistance and agricultural insurance compared to the agricultural subsidies in the United States established in the current Farm Bill [2018-2023] (PL115-334, H. Rept. 115-1072), studying Titles I: Commodities-Commodities and Title XI: Crop Insurance.

3.4 Descriptive Analysis - Investment Budget for the Vulnerable Agricultural Sector.

For the development of this item, a descriptive analysis was carried out comparing the Law of the Second National Development Plan 2014-2018 (Law 1753 of 2015- *All for a new country*) of President Juan Manuel Santos and the current Development Plan Law of President Iván Duque 2018-2022 (Law 1955 of 2019- *Pact for Colombia, Pact for Equity*), an analysis that was carried out evaluating the Pluriannual Investment Plan (PPI) of each period in order to study the investment budget (financial coverage) for the vulnerable agricultural sector.

The observation variables that were considered for the analysis were: 1) access to land ownership by agrarian workers 2) reduction of rural poverty (monetary and

multidimensional poverty) and 3) boost competitiveness of the vulnerable rural sector (research and technology transfer for food production), duties of the Colombian State based on articles 64 and 65 of the Constitution.

3.5 Prospective Approach Method.

To address the variables of rural poverty, forced displacement, concentration of rural property and agricultural microeconomics in Colombia: the *prospective approach* was used (Zamora & Monterroso, 2017) that allows collecting the perspectives of key actors who intervene in processes of recognition of collective rights, but that do not necessarily converge in the same space, including different instances of regional government, native communities, Non-Governmental Organizations (NGOs) and researchers.

3.5.1 Rural poverty in Colombia.

3.5.1.1 Monetary Poverty.

Monetary poverty: occurs when the monthly per capita income of a household is below the monetary poverty line (DANE, 2021 b).

3.5.1.2 Multidimensional Poverty.

The Multidimensional Poverty Index -IPM- is composed of 5 dimensions and 15 indicators, as follows: 1. Educational conditions (illiteracy, and low educational achievement). 2. Conditions of childhood and youth (school absence, school delay, access barriers to early childhood care services, and child labor). 3. Work (informal work, and long-term unemployment). 4. Health (without health insurance, and barriers to access to health given a need). 5. Conditions of housing and public services (no access to an

improved water source, inadequate excreta disposal, inadequate flooring material, inadequate wall material, and critical overcrowding) (DANE, 2020 a).

3.5.2 Effects of the internal armed conflict-Forced Displacement.

To develop this section, the figures reported by the *World Report on Internal Displacement* (2019) were considered, as well as the results presented by the Law 1448 of 2011 “*By which measures of care, assistance and comprehensive reparation to victims of the internal armed conflict and other provisions are issued*”, according to the *Radiography Report on Land Restitution in Colombia* (2019).

3.5.3 Concentration of rural property in Colombia.

With the prospective approach method, the figures presented by the Oxfam International Corporation (2017) in its *Report Radiography of Inequality*, and the *Analysis of the Distribution of Rural Property in Colombia-Methodological Proposal* (2016) were studied, both investigations are based on the Gini Index updated with the new data from the *Third National Agricultural Census-2016 [CNA]* (DANE, 2016).

3.5.4 Agricultural Microeconomics.

Small agriculture contributes a significant percentage in the production of food at the national level, this is found in different investigations, such as *The Colombian peasant, between the economic protagonism and the ignorance of society* (Forero, 2010) who uses the methodology of static comparative to demonstrate the importance of small agriculture in the country, in addition to the research entitled: *The economic efficiency of large, medium and small Colombian agricultural producers*, carried out by (Forero et al., 2012).

4. Results

4.1 Approval of the Free Trade Agreement (FTA) between Colombia and the United States. Concepts of Asymmetries, Equity and Reciprocity.

The Trade Promotion Agreement between Colombia and the United States entered into force since May 15, 2012 (Ministry of Commerce, Industry and Tourism). Initially, it was mentioned that the treaty implied multiple advantages for Colombia, such as commercial integration with the largest market in the world, permanent preferential access to the United States market and achieving the consolidation of the benefits that at the time were granted by the ATPDEA (Andean Trade Preference Act), in order to turn Colombia into an export platform and an attractive pole for foreign investment (Organization of American States-OAS).

The Constitutional Court of Colombia, in its ruling on the enforceability of the treaty, indicated that the recognition of asymmetries in trade liberalization treaties as a result of the level of growth and economic development of each State Party, guaranteed compliance with the mandates of equity and reciprocity in the promotion of economic and commercial integration, which could be contemplated in the progressive elimination of customs duties on goods originating in both countries, taking into account the reduction list in Annex 2.3, which would allow the use of the comparative advantages of each country (Constitutional Court Sentence C-750 of 2008).

4.2 Observation on the economic results of the Free Trade Agreement (FTA) between Colombia and the United States in agricultural matters.

For the entry into force of the treaty in 2012, 87.1% of agricultural products already had a tariff elimination carried out in that year or that would have to be completed no later than in 2017 according to the reduction categories (Annex. 2.3), the remaining 12.9%, has deductions between 8 to 19 years, being some products benefiting from tariff quotas, having free access in both countries as long as they do not exceed the agreed metric tons, otherwise, they must pay the base tariffs according to Annexes 2.3., until the years established in Appendix I of each country are completed, until the annual limit of the quotas is withdrawn and the tariffs reach zero, resulting in a free exchange of products between both countries (Stellian & Danna, 2017), as can be seen:

Table 1

Free trade agreement between Colombia and United States: agricultural products protected by provisional tariff quotas

Product type (in parentheses: year of elimination of the quota and the corresponding tariffs; "1" = 2012)	
Colombia	United States
Food for domestic animals (8/9)	-
Meat of bovine animals, of standard quality* Offal of bovine animals (10)	Meat of bovine animals * (10)
Crude soybean oil (10)	-
Glucose (10)	-
Dry beans* (10)	-
-	Liquid milk and cream (11)
	Ice cream (11)
	Butter (11)
Maize and sorghum (12)	-
Milk in powder and yoghurt (15)	-
	Tobacco (15)
	Cheese and processed dairy products (15)
Birds with finished production cycle* (18)	-
Poultry leg quarters* (18)	-
Rice* (19)	-

Note: Products marked with an asterisk are subject to special safeguards (see section II). All tariff elimination is implemented in equal annual stages (EAS), except in the following cases (Colombia): dry beans, 33% tariff reduction in year 1 of the FTA, then elimination in

nine EAS (years 2-10); Chicken hindquarters, the base rate is maintained until year 5 (10), then elimination in 13 (8) EAS in years 6-18 (11-18); Rice, the base rate is maintained until year 6, then elimination in 13 EAS (years 7-19).
Source: Stellian & Danna (2017).

4.2.1 Competitiveness of Colombian agricultural products under the FTA.

When applying the Comparative Advantage Indicator (VCR) on 60 agricultural groups according to the Uniform Classification for International Trade (SITC), it was possible to verify the results reveal sustainable comparative advantages over time for only three of them (category K1), while another four have the potential to have them (category K2). The other groups do not present any advantage or present disadvantages, among this category the groups [061] and [062] (sugar and its derivatives) are excepted, where the limit of the quota assigned to Colombia does not disappear, but the initial 50,000 tons are increased by 750 tons per year and continue to do so once year 15 is over.

However, the United States may at its option limit sugar exports by offering a compensation mechanism in any year (Chapter 2. Art. 2.19), which means that Colombia will not be able to freely access the United States market with one of its main products¹. (Stellian and Danna, 2017).

1 List of groups studied according to the Standard Classification for International Trade (SITC).

K1- [034] Fish, fresh (live or dead), chilled or frozen, [071] Coffee and coffee substitutes, [292] Vegetable products raw.

K2- [037] Fish, crustaceans, molluscs and other aquatic invertebrates, prepared or preserved, [057] Fruits and nuts (except oleaginous nuts, fresh or dried), [61] (E) Sugars, molasses and honey, [062] E Confectionery made with sugar.

K3- [011] Bovine meat, fresh, chilled or frozen, [016] Meats and edible meat offals, salted, in brine, dried or smoked; edible meal of meat or meat offal, [023] Butter and other fats and oils derived from milk, [025] Poultry eggs and egg yolks; Egg albumin, [035] * Fish, dried, salted or in brine; smoked fish, [045] Unmilled cereals (except wheat, rice, barley and maize), [046] Semolina and wheat flour and morcajo flour, [047] Other semolina and cereal flours, [072] Cocoa, [075] Spices, [091] Margarine and shortening, [121] Raw tobacco; tobacco residues, [211] Raw hides and skins (except fine hides), [212] Raw raw hides (including heads, tails, feet and other parts or cuts suitable for furskins), except for the hides and skins of the group [211], [231] Natural rubber, balata, gutta-percha, guayule, chicle and natural rubbers and the like, in primary forms (including latex) or in plates, sheets or strips, [245] Firewood (except wood waste) and charcoal [246], Wood chips or particles and wood waste, [247] Wood in the rough or just squared, [248] Wood simply worked and wooden railway sleepers, [261] Silk, [265] * Vegetable textile fibers (except cotton and jute), [268] Wool and other animal hairs (including wool tops), [422] * Fats and fixed oils of vegetable origin, except " soft ".

K4- [001] Live animals not included in chapter [03], [036] Crustaceans, molluscs and aquatic invertebrates, peeled or unpeeled, fresh (live or dead), chilled, frozen, dried, salted or in brine; crustaceans, unpeeled, steamed or steamed in water, [043] Unmilled barley, [048] Cereal preparations and preparations of fruit or vegetable flour or starch, [054] Legumes, fresh, chilled, frozen or simply preserved (including legumes dry); roots, tubers and other edible plant products, n.e.s, fresh or dried, [058] Preserved fruits and fruit preparations (except fruit juices, [059] Fruit juices (including grape must) and legume juices, [074] Tea and mate, [111] Non-alcoholic beverages , n.e.s, [112] Alcoholic beverages, [122] * Manufactured tobacco, [291] Raw animal products, n.e.s, [411] Oils and fats of animal origin, [431] * Fats and oils of animal or vegetable origin, n.e.s.

Table 2

Colombia and the United States: agricultural product groups of the International Standard Classification for International Trade (SITC) classified by category of (dis)advantages

Category	Meaning	SITC Groups	TOTAL
K_1	Time-sustainable comparative advantages	[034] [071] [292]	3
K_2	Potentially time-sustainable comparative advantages	[037] [057] [061](E) [062](E)	4
K_3	Weak advantages or disadvantages	[011] [016] [023] [025] [035] [045] [046] [047] [072] [075] [091] [121] [211] [212] [231] [245] [246] [247] [248] [261] [265] [268] [422]	23
K_4	Weak advantages or disadvantages in fine	[001] [036] [043] [048] [054] [058] [059] [074] [111] [112] [122] [291] [411] [431]	14
K_5	Potentially time-recurrent comparative disadvantages	[022](C) [024](C) [056] [073] [223]	5
K_6	Time-recurrent comparative disadvantages	[012] [017] [041] [042](C) [044](C) [081] (C) [098] [222](C) [251] [263] [421]	11

Note: “E” identifies products that the United States continues to protect (sugar and its derivatives). “C” refers to products with comparative disadvantages (K_5 and K_6) to which Colombia applies a provisional protectionist regime.

Source: Retrieved from Stellian & Danna (2017).

4.2.2 Colombia-United States Trade Balance 2019-2020.

The trade balance between Colombia and the United States since 2014 has been in deficit, for 2019 it had a deficit of \$US -1,079.7 (millions of FOB dollars) and \$US -992,7 (millions of FOB dollars) in 2020, it can also be identified that the mainly exported

K5-[022C] Milk, cream and dairy products, except butter and cheese, [024C] Cheese and curd, [056] Legumes, roots and tubers, prepared or preserved, n.e.s, [073] Chocolate and other food preparations that contain cocoa, n.e.s, [223] Whole or broken oil seeds and oleaginous fruits, of a kind used for the extraction of other fixed vegetable oils (including meal from oil seeds or oleaginous fruits, n.e.s).

K6- [012] * Other meats and edible meat offal, fresh, frozen or chilled, [017] Meat and meat offal, prepared or preserved, n.e.s, [041] Wheat (including spelled) and morcajo or calico, not milled, [042] (C) Rice, [044] (C) [044] Corn (except sweet corn), unmilled, [081] (C) Animal feed (except unmilled cereals), [098] Products and preparations edibles, n.e.s, [222] (C) Oil seeds and oleaginous fruits of a kind used for the extraction of fixed “soft” vegetable oils (except flour), [251] Pulp and paper waste, [263] Cotton, [421]*, fixed oils and fats of vegetable origin, “soft”.

Source: Stellian & Danna (2017). United Nations Statistics Division “SITC Rev. 3”. Retrived from: <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=14&Lg=3>.

Note: The description of the groups with an asterisk is simplified. More details can be seen in the source.
n.e.s: Not specified (or not included) elsewhere.

products to that country during this year were primary, like oil, flowers, coffee and mining, with the agricultural sector having a participation of 21.3% (DANE, 2020 a)².

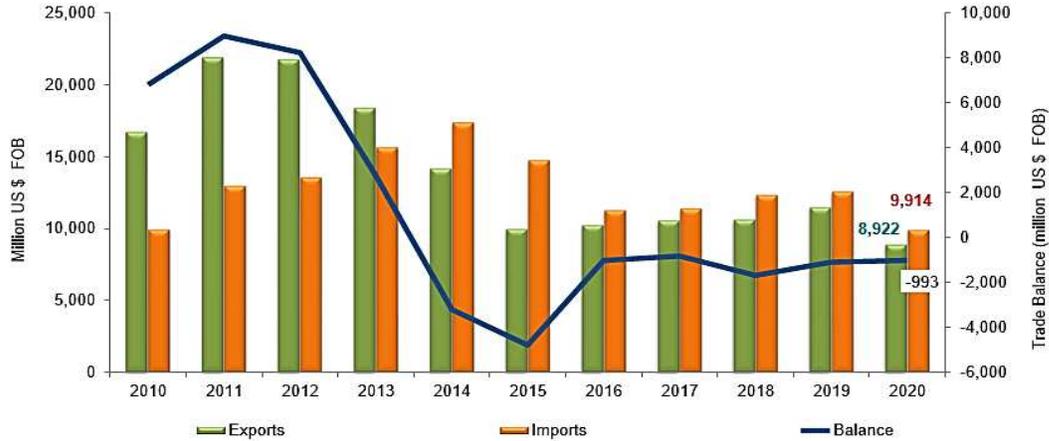


Figure 1. Trade balance (millions of USD \$ FOB) Colombia and the United States 2009-2020.
Source: Ministry of Commerce, Industry and Tourism-Mincit (2021). Macroeconomic Context of the United States.

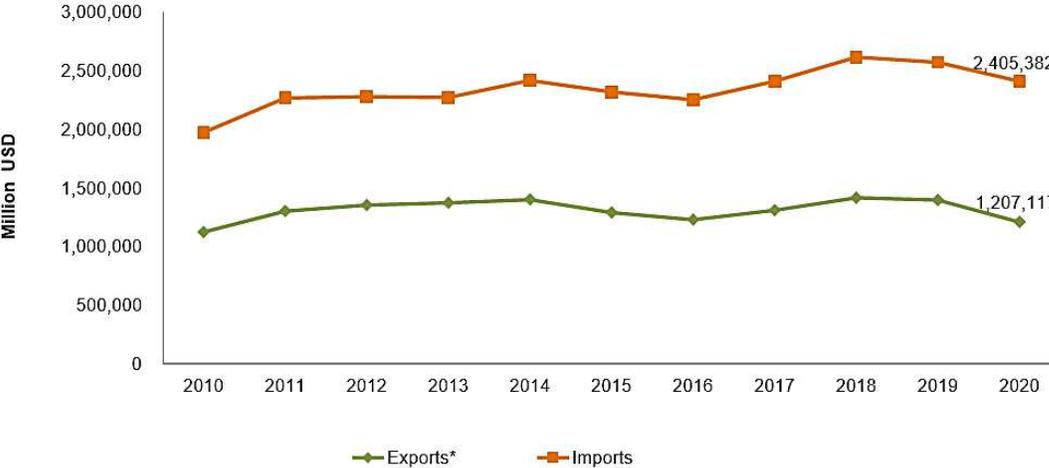


Figure 2. Foreign trade of goods (Millions of USD).
Source: Ministry of Commerce, Industry and Tourism-Mincit (2021). 2021). Macroeconomic Context of the United.

² The trade balance between Colombia and the United States, for the years 2014 to 2019, has been in deficit, with the following values: 2014 (-3.185,6), 2015 (-4.773,6), 2016 (-1.007,0), 2017 (-802,5), 2018 (-1.669,1), 2019 (1.079,7), 2020 (-992,7), February 2021(-245,6) (Millions of dollars FOB) (DANE, 2021 a).

Table 3*Main sectors 2020. Imports Exports*

Exports	Thousands of USD	Part. %
Petroleum	2,639,379	29.6
Other miners	1,163,297	13.0
Flowers	1,124,662	12.6
Coffee	984,258	11.0
Derivatives of oil	788,278	8.8
Rest	2,221,894	24.9
Total exported to the United States	8,921,768	100.0
Imports	Thousands of USD	Part. %
Basic Chemistry	2,556,268	24.3
Machinery and equipment	1,946,208	18.5
Derivatives of oil	1,786,712	17.0
Agricultural strips	1,764,363	16.7
Agroindustrial strips	723,162	6.9
Rest	1,763,044	16.7
Total imported from the United States (CIF)	10,539,757	100.0
Imports (FOB)	9,914,496	
Trade Balance (FOB)	-992,729	

Source: Ministry of Commerce, Industry and Tourism-Mincit (2021). Macroeconomic Context of the United States.

Table 4*Main sectors 2021. Imports Exports*

Exports	Thousands of USD	Part. %
Petroleum	716,238	28%
Flowers	378,965	15%
Coffee	323,781	13%
Other miners	283,430	11%
Derivatives of oil	257,706	10%
Rest	583,388	23%
Total exported to the United States	2,543,509	100%
Imports (January-February)	Thousands of USD	Part. %
Basic Chemistry	499,890	25%
Agricultural strips	392,337	20%
Derivatives of oil	371,451	19%
Machinery and equipment	283,531	14%
Agroindustrial strips	146,213	7%
Rest	275,804	14%
Total imported from the United States (CIF)	1,969,226	100%
Imports (FOB)	1,871,081	
Trade Balance (FOB) (January-February)	-245,581	

Source: Ministry of Commerce, Industry and Tourism-Mincit (2021). Macroeconomic Context of the United States.

4.2.3 Agricultural subsidies in Colombia vs. agricultural subsidies in the United States.

4.2.3.1 Agricultural insurance in Colombia.

The agricultural insurance market has an incredibly low historical performance; Until 2006, the total area covered did not exceed 5,000 hectares, which represents less than 0.1 percent of the cultivated area of the country. It is interesting to note that in 2010 the insured area corresponded to approximately 1% of the total cultivated area and in 2015 this proportion reached 2% with 186,884 hectares (Figueroa, 2017).

For 2019, approximately 175,000 hectares were insured, with an incentive payment worth \$ 33,809 million pesos equivalent to US \$ 9,286,658.45, without a significant increase at the national level, since the area with agricultural use in Colombia is of 7.1 million hectares (CNA, 2016, p. 53), on the other hand, the Incentive for Agricultural Insurance, was granted 30% for sugar cane, 22% for forestry, 15% for bananas, 13 % for rice, 9% for corn and 5% for coffee, showing a limitation in the coverage of insured products (Fund for the Financing of the Agricultural Sector -FINAGRO, 2019). During the COVID-19 pandemic in 2020 about 145 thousand hectares were insured (FINAGRO, 2020).

4.2.3.2 Number of producers as natural persons, by holding agricultural insurance - 2019.

For the second half of 2019, only 11,480 of the producers with the legal status of natural person had agricultural insurance in the Agricultural Production Unit (UPA) 3,320 had

agricultural insurance in another UPA, however, 1,922,944 of producers declare that they do not have agricultural insurance in the agricultural production unit. (DANE, National Agricultural Survey -ENA, 2020b).

Table 5

Number of producers in the condition of natural persons, by holding agricultural insurance

National total Second semester 2019

Total producers			Counts with agricultural insurance			Counts with agricultural insurance in other UPA			Does not have agricultural insurance			Does not inform		
Producers	Cve	IC95%±	Producers	Cve	IC95%±	Producers	Cve	IC95%±	Producers	Cve	IC95%±	Producers	Cve	IC95%±
2.033.967	1,4	57.369	11.480	10,8	2.420	3.320	17,3	1.123	1.922.944	1,5	57.757	96.854	5,6	10.575

Source: National Administrative Department of Statistics-DANE. National Agricultural Survey -ENA (2020b).

4.2.3.3 Access to machinery, technical assistance and credit.

According to the CNA National Agricultural Census (2016), only in 16.4% of the Agricultural Production Units (UPAs) in Colombia, the producers declared having machinery for the development of their agricultural activities, while 83.6% do not have (CNA, p. 102), with respect to technical assistance, only 16.5% received it and 83.5% did not have access to it (CNA, p. 109), in relation to access to agricultural credit, only the 10.7% requested it while 89.3% did not (ibid, p. 116).

During the first semester of 2019, of the 2,020,662 Agricultural Production Units - UPA, 385,293 (19.1%) used machinery for the tasks associated with the different agronomic phases of the crops; while 1,630,994 (80.7%) UPA do not use machinery (heavy or light). 0.2% of the remaining UPA did not report (DANE, ENA, 2020b).

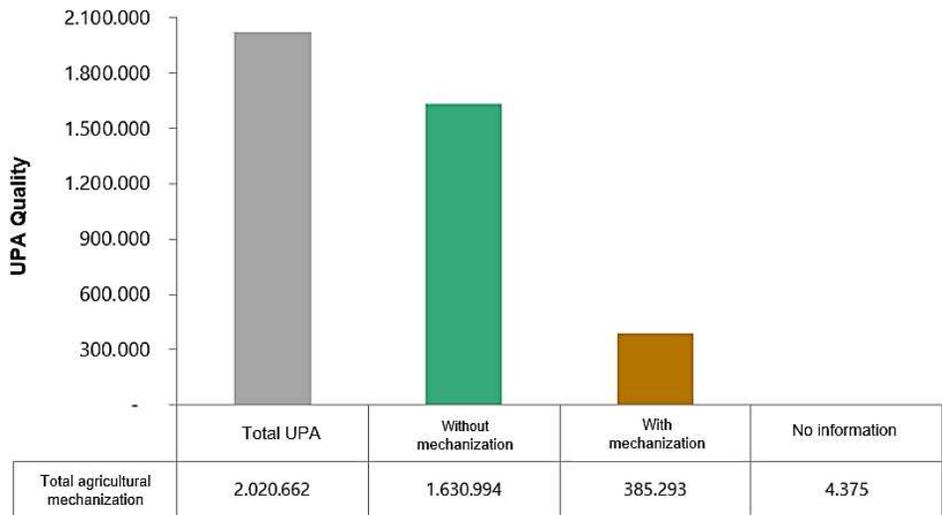


Figure 3. Amount of UPA, by use of agricultural machinery in the different agronomic phases of the crops. National total. First semester 2019.

Source: National Administrative Department of Statistics-DANE, National Agricultural Survey ENA (2020b)

4.2.4 The Agricultural Improvement Act of 2018. The American Farm Bill.

The agricultural bill (PL115-334, H. Rept. 115-1072) was approved for an amount of US \$ 867 billion, whose provisions expire in 2023, contains 12 titles that include income support for products basic, agricultural credit, trade, agricultural conservation, research, rural development, energy, and national and foreign food programs, among other programs (Congressional Research Service, 2019).

4.2.4.1 Title I: Basic Products-Commodities.

The commodity title authorizes support programs for covered dairy, sugar, and commodities, including major crops of grains, oilseeds, and legumes, as well as agricultural disaster assistance. Major field crop programs include Loss of Price Hedge (PLC), Agricultural Risk Hedge (ARC) and Marketing Assistance Loans (MAL).

4.2.4.2 Title XI: Crop insurance.

The title of Crop Insurance modifies the Federal Law of Crop Insurance with permanent authorization. The federal crop insurance program offers subsidized policies to farmers to protect against losses in yield, crop income, or farm-wide income.

Table 6

Projected Outlays of the 2018 Farm Bill Since Enactment (millions of dollars, five-year totals, mandatory spending)

Selected farm bill titles	At enactment, December 2018		Most recently, May 2019	
	Projection for FY2019-FY2023	Share	Projection for FY2019-FY2023	Change since enactment
Nutrition	326,020	76.1%	321,405	-4,615
Crop Insurance	38,010	8.9%	40,882	+2,872
Commodities and Disaster	31,440	7.3%	26,763	-4,677
Conservation	29,270	6.8%	28,477	-793
Subtotal, four largest titles	424,740	99.2%	417,527	-7,213
Total, 12 titles (see Table 1)	428,282	100.0%	na	na

Note: CRS, using CBO data. See Table 1 and based on CBO data in “Details About Baseline Projections for Selected Programs,” May 2019. Notes: “na” indicates that sufficient detail is not available to compile data for all titles in non-farm-bill years.

Source: Congressional Research Service (2019).

Table 7*Budget for the 2018 Farm Bill**(millions of dollars, five-and 10-year totals, mandatory spending)*

Farm bill titles	Five years (FY2019-FY2023)			10 years (FY2019-FY2028)		
	CBO baseline April 2018	Score of 2018 farm bill	Projected outlays at enactment	CBO baseline April 2018	Score of 2018 farm bill	Projected outlays at enactment
Commodities	31,340	+101	31,440	61,151	+263	61,414
Conservation	28,715	+555	29,270	59,754	-6	59,748
Trade	1,809	+235	2,044	3,624	+470	4,094
Nutrition	325,922	+98	326,020	663,828	+0	663,828
Credit	-2,205	+0	-2,205	-4,558	+0	-4,558
Rural Development	98	-530	-432	168	-2,530	-2,362
Research	329	+365	694	604	+615	1,219
Forestry	5	+0	5	10	+0	10
Energy	362	+109	471	612	+125	737
Horticulture	772	+250	1,022	1,547	+500	2,047
Crop Insurance	38,057	-47	38,010	78,037	-104	77,933
Miscellaneous	1,259	+685	1,944	2,423	+738	3,161
Subtotal	426,462	+1,820	428,282	867,200	+70	867,270
- Increase revenue	-	+35	35	-	+70	70
Total	426,462	+1,785	428,247	867,200	+0	867,200

Note: CRS. Compiled from the CBO Baseline by Title (unpublished; April 2018); and CBO cost estimate of the conference agreement for H.R. 2, December 11, 2018. Baseline for the Credit title is negative because of receipts to the Farm Credit System Insurance Fund. Baseline for the Rural Development “cushion of credit” is accounted for outside of the farm bill.

Source: Congressional Research Service (2019).

4.3 The investment budget for the vulnerable agricultural sector. Periods (2014-2018) (2018-2022)

4.3.1 Law 1753 of 2015 “By which the National Development Plan is issued

2014-2018: All for a new country”.

In the 2015-2018 Pluriannual Investment and Budgeting Plan, a value of seven hundred three point nine (\$ 703.9) billion pesos was estimated, earmarking for the *Countryside Transformation strategy*, 49,271,574 billion pesos, which made up only 7% of the Multi-

Year Plan. The total resources assigned for each objective corresponding to the Transformation of the Field strategy in millions of pesos for 2014 are presented below (Article. 5).

Table 8

Transformation of the field. Investment Plan 2015-2018. Figures in millions of pesos in 2014

Strategy-Objective	Total
Field transformation	49.271.574
Reducing poverty and expanding the rural middle class	3.129.143
Boost rural competitiveness	42.784.512
Institutional strengthening of the territorial presence	241.057
Land use planning and rural access	853.745
Close the urban-rural gap and lay the foundations for social mobility	2.263.116

Source: Law 1753 of 2015 “By which the National Development Plan is issued 2014-2018: All for a new country”.

1.1.1 Law 1955 of May 25, 2019 “By which the 2018-2022 National Development Plan is issued. "Pact for Colombia, Pact for Equity".

The National Public Investment Plan (PPI) 2019-2022 was estimated at a value of one thousand ninety-six, point one (\$ 1,096.1) billion of 2018 pesos, which includes the transversal component, Multi-year Investment Plan for Peace that was estimated at a value of thirty-seven point one (\$ 37.1) billion pesos. In this period, the budget for the agriculture and rural development sector was 23.2 billion pesos equivalent to US \$ 6,367,676.49 (PPI, p. 8), however, the “Field with Progress” strategy has \$12,054 billion pesos (PPI 2018-2022, p. 14).

In the Pluriannual Investment Plan for Peace, an amount of 2,016.2 billion pesos was allocated for the line "*Countryside with progress: an alliance to boost development and productivity in rural Colombia*" (p. 36), for a total of 14,070 ,2 billion pesos for the National Development Plan in force. The difference between both Investment Plans is considerable.

1.2 Brief description of the agricultural panorama in Colombia: Rural poverty, concentration of rural property and agricultural microeconomics in Colombia.

1.2.1 Monetary Poverty.

In 2019, the percentage of people classified as poor with respect to the total national population was 35.7%. In the municipal capitals this proportion was 32.3% in the populated centers and dispersed rural 47.5%, thus, the incidence of poverty in the populated centers and dispersed rural is equivalent to 1.5 times the incidence in the municipal capitals.

At the national level, in 2020 monetary poverty was 6.8 percentage points higher than the registered in 2019, when it was 35.7%.

The municipal seats registered in 2020 an incidence of monetary poverty of 42.4%. In the populated centers and dispersed rural the incidence was 42.9%. (DANE, 2021b).

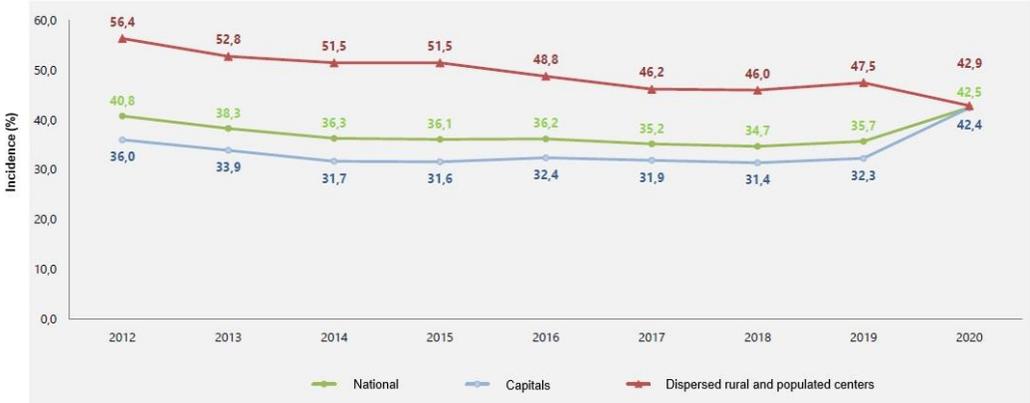


Figure 4. Incidence of Monetary Poverty (percentage). National total, headwaters and populated centers and dispersed rural. 2012-2020
Source: National Administrative Department of Statistics-DANE (2021b).

4.4.1.2 Multidimensional Poverty Index.

In 2019, multidimensional poverty in the municipal capitals of the country was 12.3% (0.9 percentage points less than in 2018), and in the populated and dispersed rural centers it was 34.5% (4.1 percentage points below the one registered in 2018) (DANE, 2020 a).

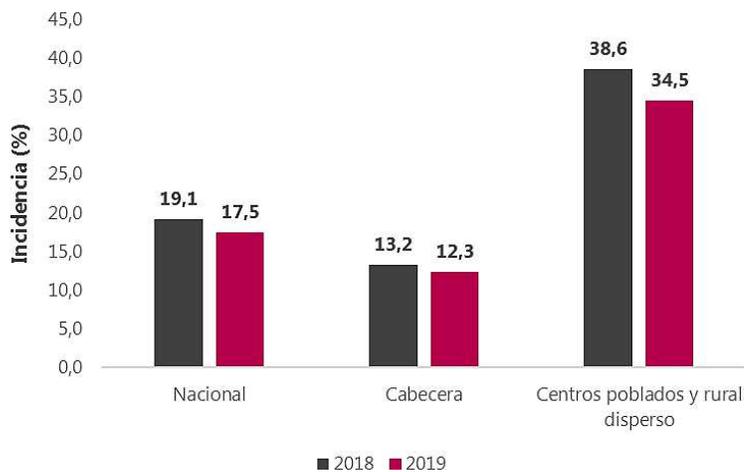


Figure 5. Incidence of multidimensional poverty- Major domains 2018 and 2019
Source: National Administrative Department of Statistics -DANE (2020a).

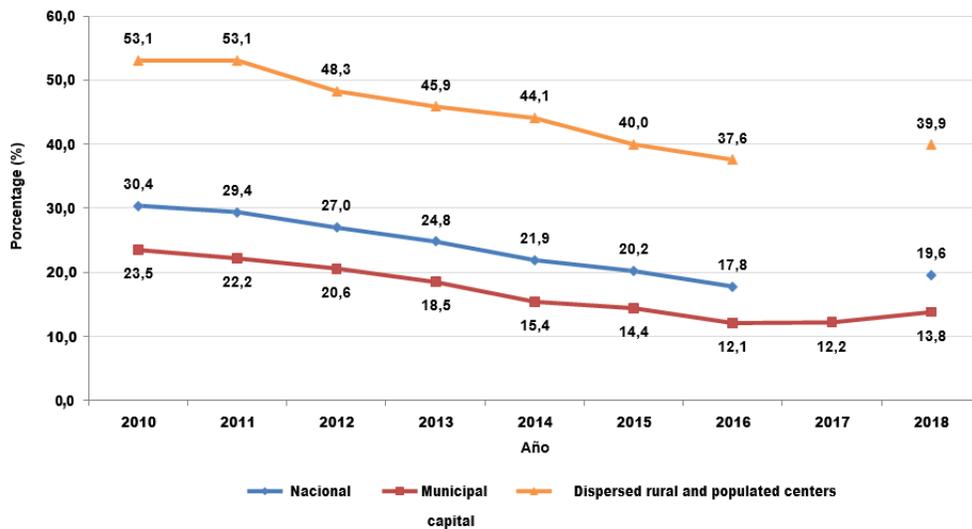


Figure 6: Multidimensional Poverty Results. Quality of Life Survey ECV 2010-2018. The estimates were made using the expansion factors of the 2005 Census.
Source: Administrative Department of Statistics-DANE. (2020a). Press conference presentation.

In terms of multidimensional poverty, the highest percentages for 2019, in the Populated and Rural Dispersed Centers are represented by the variables of low educational achievement with 77.6%, school lag with 30.9%, without access to an improved water source with 41.2% and informal work with 90.6%:

Table 9

Percentage of private households by indicator- National total, capital cities, populated centers and dispersed rural areas. 2018-2019.

Figures in percentage Variable	National total		Change 2018-2019		Municipal capital		Change 2018-2019		Dispersed rural and populated centers		Change 2018-2019	
	2018	2019			2018	2019			2018	2019		
Illiteracy	10,0	9,3	-0,7*	↓	6,3	6,0	-0,3	↓	22,6	20,5	-2,1*	↓
Low educational achievement	44,5	44,0	-0,5	↓	34,4	34,1	-0,3	↓	78,8	77,6	-1,2*	↓
Barriers to early childhood care services	8,3	7,9	-0,4*	↓	8,6	8,3	-0,3	↓	7,1	6,6	-0,5	↓
Barriers to access to health services	6,2	5,5	-0,7	↓	5,7	5,6	-0,1	↓	7,8	5,4	-2,4*	↓
Long-term unemployment	12,1	12,4	0,3	↑	12,7	12,9	0,2	↑	10,0	11,0	1,0	↑
Critical overcrowding	8,3	8,6	0,3	↑	8,4	8,9	0,5	↑	8,1	7,5	-0,6	↓
Inadequate disposal of excreta	11,6	11,0	-0,6	↓	7,4	7,2	-0,2	↓	26,0	23,7	-2,3*	↓
School absence	3,1	2,7	-0,4*	↓	2,5	2,1	-0,4*	↓	5,3	4,6	-0,7*	↓
Unsuitable exterior wall material	2,7	2,6	-0,1	↓	2,9	2,7	-0,2	↓	2,0	2,6	0,6*	↑
Unsuitable flooring material	6,2	6,4	0,2	↑	1,9	2,0	0,1	↑	20,7	21,4	0,7	↑
School behind	27,4	25,8	-1,6*	↓	25,5	24,3	-1,2*	↓	33,9	30,9	-3,0	↓
No access to improved water source	11,7	11,5	-0,2	↓	2,9	2,8	-0,1	↓	41,5	41,2	-0,3	↓
No health insurance	11,0	11,3	0,3	↑	11,1	11,9	0,8	↑	10,6	9,5	-1,1*	↓
Child labor	2,0	1,7	-0,3*	↓	1,4	1,2	-0,2	↓	4,2	3,4	-0,8*	↓
Informal work	72,7	72,9	0,2	↑	67,5	67,7	0,2	↑	90,5	90,6	0,1	↑

Note: The abbreviations CP and RD correspond to populated centers and dispersed rural.
Source: National Administrative Department of Statistics -DANE (2020a).

1.2.2 Colombia: The Latin American nation with the highest concentration of land

According to the *Radiography Report of Inequality* prepared by Oxfam International (2017), Colombia is ranked first in the ranking of inequality in the distribution of land, followed by Peru, Chile and Paraguay, in addition to adding that in Colombia, 1% of the largest farms manage more than 80% of the land, while the remaining 99% distribute less than 20% of it (Oxfam, 2017 p. 13).

1.2.2.1 Gini index of the area of private rural property owners with agricultural destinations in Colombia.

According to the *Analysis of Distribution of Property in Colombia. Methodological Proposal (2016)*, in accordance with the Agustin Codazzi Geographical Institute and the Antioquia, Bogotá and Medellín (2014) cadasters, the indicator of 0.8789 for Colombia was established, finding this value in the range of 0.6 to 1, which "corresponds to a high inequality in the distribution of property, in this case of land area of rural properties" (p. 115).

The above means that instead of having an equal distribution where 10% of the owners have 10% of the area, it can be observed that between 80% and 90% of the owners barely reach around 10% of the area, which means that the remaining 90% of the area corresponds to 10% of the owners with the largest areas of land.

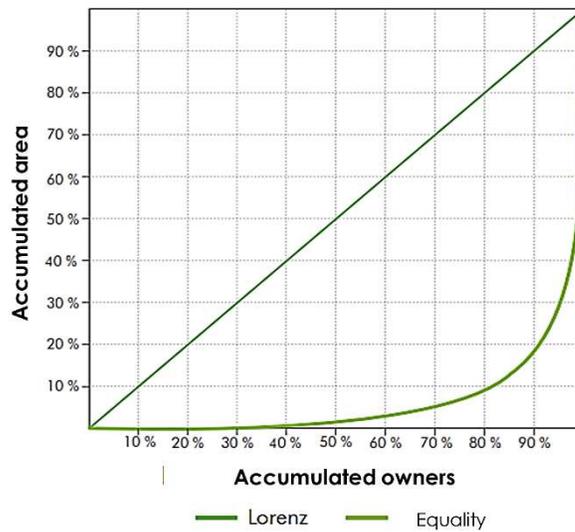


Figure 7. Colombia: Lorenz curve for the area of owners of private rural properties with agricultural destination (2014)
Source: Ministry of Agriculture and Rural Development, Rural Agricultural Planning Unit -UPRA (2016).

1.2.2.2 Accumulation of Agricultural Production Units (UPA).

The classification by size of the Agricultural Production Units (UPA) shows that 70.4% of the UPA (1,669,287 units) have less than 5 hectares and occupy 2.0% (2,160,347 ha) of the rural area census dispersed; while 0.2% of the UPAs have 1,000 hectares or more and occupy 73.8% of the dispersed rural area surveyed. (National Agricultural Census, p. 67)

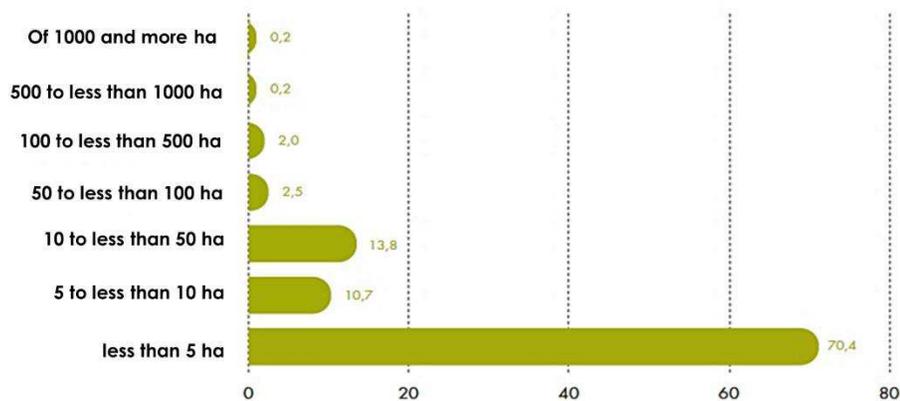


Figure 8. Distribution (%) of the number of UPAs in the dispersed rural area surveyed, according to size (ha)
Source: Ministry of Agriculture and Rural Development, Rural Agricultural Planning Unit -UPRA (2016).

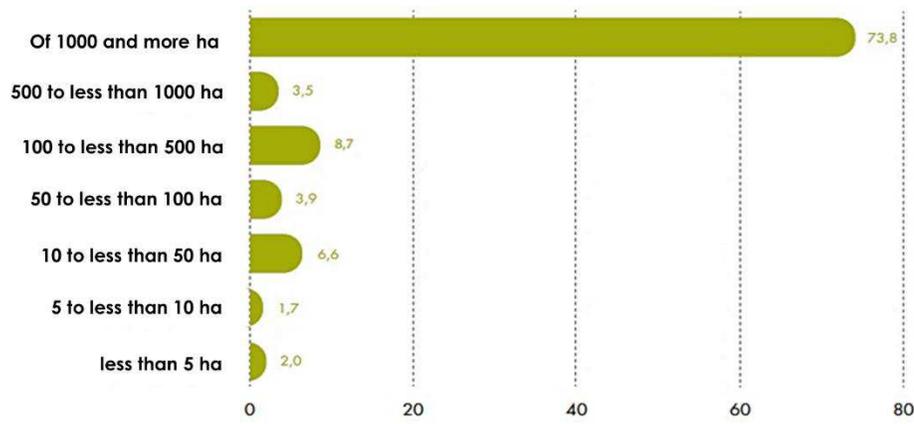


Figure 9. Distribution (%) of the number of UPAs in the dispersed rural area surveyed, according to size (ha)
Source: Ministry of Agriculture and Rural Development, Rural Agricultural Planning Unit -UPRA (2016).

1.2.2.3 Prevalence of agroindustrial crops in Colombia. Results of the National Agricultural Survey (ENA-2020).

The total area planted in the country during 2019 was 5,311,977 hectares, finding that, agroindustrial crops presented the highest participation with 41.2% and an area of 2,186,389 hectares, followed by cereals that represented the 18.5% with an area of 984,859 hectares and forest plantations with 13.5% and an area of 716,501 hectares. Tubers and banana had a participation of 10.8% and an area of 574,770 hectares, followed by fruit trees with 9.5% and an area of 505,164 hectares, the group of vegetables, vegetables and legumes with 5.4% and an area of 288,212 hectares and the other cultivated areas with 1.1% and an area of 56,083 hectares (ENA, 2020b).

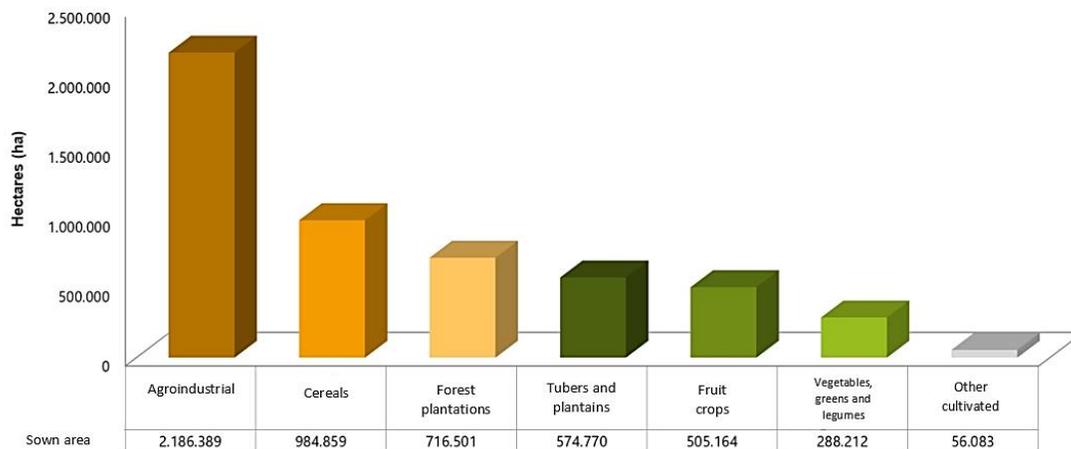


Figure 10. Sown area or planted by crop groups (hectares) National total. 2019

Source: National Administrative Department of Statistics-DANE, National Agricultural Survey ENA (2020b)

1.2.2.4 Figures of forced displacement and land restitution in Colombia.

According to the *World Report on Internal Displacement (2019)*, Colombia ranks second out of the ten countries with the highest number of people displaced by conflict and violence at the end of 2018, with 5.1 million people living in a situation of internal displacement (IDMC, 2019 p. 48).

On the other hand, Law 1448 of 2011 “*By which measures of care, assistance and comprehensive reparation are issued to the victims of the internal armed conflict and other provisions are issued*”, in its article 208 established that it would be valid for ten (10) years, this is until June 10, 2021 and for 2019, restitution sentences were achieved in less than 350 thousand hectares when the problem of dispossession was initially calculated at 6 million hectares, in the same sense, the Restitution Unit de Tierras, has denied more than 63% of the victims access to the judicial restitution procedure (Colombian Commission of Jurists, 2019, p. 12).

By 2018, the restitution order of 4,239 properties plus six ethnic territories had been reached. In other words, 216,000 hectares have been restored so far throughout the country. In judicial offices there are requests for another 600,000 hectares (El Tiempo, 2018)³.

1.3 Agricultural microeconomics in Colombia.

For the previous reasons, the question of the efficiency of small farmers in comparison with medium and large agricultural entrepreneurs is raised, research that was carried out by (Forero et al, 2012) using as indicators of economic efficiency the concepts of technical profitability, net profitability and technical efficiency in the use of land.

And the answer, after analyzing the information collected in twelve areas of the country, was that, on average, both large and small producers present relatively similar economic efficiency indicators.

Table 9

Technical profitability, net profitability and technical efficiency in the use of the land, for family producers for ten areas. 2012. (Conventional method)

	Number of producers	Net profitability	Technical profitability	Technical efficiency of land use. Pesos per hectare
Family	289	45%	48%	1.830.080
		9%	9%	15%
Large	116	48%	51%	2.803.847
		13%	13%	14%
Medium	249	48%	51%	2.551.618
		10%	10%	12%
Small non-family producers	743	55%	58%	3.026.582
		5%	5%	6%
Total	1388	51%	54%	2.673.634
		4%	4%	5%
Differences		**Fp	**Fp	**Fp *fm ***F p

Coefficients of variation (c.v.c) in italics

³ See the special report prepared by the newspaper El Tiempo “We still haven't reached the promised land: balance of land restitution in Colombia” available at <https://www.eltiempo.com/datos/balance-de-la-restitucion-of-lands-in-colomba-119708>

Note: LM significant differences between large and medium producers. LS significant differences between large and small producers. MS significant differences between medium and small producers. FS significant differences between familiar and small non-family producers *** at 1% (extremely high level of probability of finding differences) ** at 5% (very high) * at 10% (high).
Source: (Forero et al, 2012).

Table 10

Relationship between net agricultural income and the rural poverty line. Colombia ten agricultural areas, 2012

Net agricultural income / poverty line	Ten zones			
	L	M	S	Differences
	44.11	6.59	1.58	***LM LS
	2%	14%	4%	MS
				Total
				6.03
				5%

Note: To understand the indicator LM, LS and MS, consider the explanations indicated in Table 7.
Source: (Forero et al, 2012).

This study concluded that agricultural producers, regardless of the scale of their productive activity, manage to be efficient when they access favorable environmental conditions, and that small producers, as well as family farmers, clearly show not only efficiency but also the ability to generate economic development and effective solutions to rural poverty⁴.

1.3.1 Importance of small producers in national agricultural production.

According to Leibovich et al., in Perfetti (2013), small producers, considered as those who carry out their activity in farms less than the equivalent of two-Family Agricultural Units (UAF) represent 72% of the 2.9 million workers linked to agriculture and contribute between 50% and 68% of national production (pp 189; 193).

⁴ It should be clarified that the results of large, medium and small producers are valid for the universe of the population considered, while those of family farming are valid only at the level of the selected sample.

1.3.2 Micro-scale economies.

The micro-scale economies arise from the direct relationship of the small producer with his crop lots and his animals, which leads him to implement specific management practices that result in an efficient use of his labor, as well as of the contracted workers. and the farm's resources (Forero, 2010).

According to Berry (2017) in 2014, small units generated almost all permanent work, those with less than five hectares generated 66% and those with less than 50 hectares 93.7% while occupying only the 24.7% of the territory, the difference corresponding to a work / land ratio 45 times higher in units of less than 50 hectares in relation to those of more than 50.

2. Discussion and conclusions

Evidently, the results for Colombia derived from the treaty with the United States have been negative, because so far, the country still does not have sufficient comparative advantages to compete with that market, since only 3 of the 60 groups of products analyzed have advantages sustainable comparatives over time, a very minimal amount that is reflected in the limited exportable supply and in turn in the deficit trade balance with the United States.

Otherwise, coverage in subsidies for agricultural insurance, credit, access to machinery and technical assistance is limited at a national level, different from the destination granted with the US Farm Bill (2014-2018; 2018-2023), situations that become complex with the notorious decrease in the budget for investment in the vulnerable rural population in the present National Development Plan.

The high percentage of monetary and multidimensional rural poverty and the little progress in terms of land restitution is considerable, figures that are aggravated by the high concentration of rural property and the expansion of crops destined for agribusiness and agrofuels, all this shows that Colombia has an obvious risk as far as its food sovereignty is concerned.

On the other hand, the participation of the peasant economy in agriculture continues to be of the order of 70%, contributing with its economies of scale to the country's food security and confirming its efficiency even in the difficult environments of violence where they operate.

Despite the fact that both the previous and current governments have undertaken actions to mitigate these indices, the figures are still considerably high, so it is recommended to take radical measures to recover land, especially the vacant lots accumulated irregularly by part of national and foreign multinationals (CONTRALORÍA GENERAL DE LA REPÚBLICA, 2014).

Therefore, it is recommended to increase investment for infrastructure and public goods, including access to improved water sources, expansion of coverage in technical assistance, innovation and technological development of the rural area, promotion of rural educational systems that respond to realities of life in the countryside and that allow the study of alternative production techniques, the effective advance of the policy of restitution of lands despoiled by the conflict, expansion of national coverage in subsidies for credit, insurance, agricultural machinery, implement effective measures that mitigate low educational attainment in the countryside and educational backwardness, through education aimed at

promoting development in the countryside for rural families and thus reduce informal work rates in rural areas.

The foregoing is formulated within the framework of the United Nations Declaration on the Right to Development (1986), where the States must adopt, at the national level, all the necessary measures for the realization of the right to development and guarantee, among others things, equal opportunities for all in terms of access to basic resources, education, health services, food, housing, employment and a fair distribution of income.

Appendix A. Main export products to the United States

Table 11

Colombia's bilateral trade with the United States. Main export products to the United States

Descriptive*	Thousands of USD FOB					Var % 2021/2020	Part. % 2021
	2018	2019	2020	January-March			
				2020	2021		
Crude petroleum or bituminous mineral oils.	4,344,555.7	4,898,842.9	2,639,379.0	991,365.8	716,238.2	-27.8	28.2
Gold (including platinum gold), unworked, semi-worked or in powder.	537,028.5	513,161.0	1,143,459.3	167,071.2	274,725.7	64.4	10.8
Flowers and buds, cut for bouquets or ornaments, fresh, dried, bleached, dyed, impregnated or otherwise prepared.	1,138,912.8	1,149,308.3	1,124,661.8	336,093.2	378,965.3	12.8	14.9
Coffee, whether or not roasted or decaffeinated; coffee husk and husk; coffee substitutes containing coffee in any proportion.	1,058,067.6	1,052,993.4	1,039,812.4	266,204.4	340,750.1	28.0	13.4
Petroleum or bituminous oils, except crude oils; preparations not elsewhere specified or included, with a petroleum or bituminous mineral oil content greater than or equal to 70% by weight, in which these oils constitute the base element; oil waste.	1,360,137.7	1,522,202.0	764,328.2	225,601.0	255,193.6	13.1	10.0
Constructions and their parts (for example: bridges and their parts, towers, masts, piers, columns, roof trusses, roofs, doors and windows and their frames, counter frames and thresholds, railings) of aluminum, except prefabricated constructions of the heading 94.06; aluminum sheets, bars, profiles, tubes and the like prepared for construction.	147,562.6	227,218.3	196,810.8	42,196.6	61,520.1	45.8	2.4
Bananas, including plantains, fresh or dried.	169,641.6	148,862.7	167,878.3	38,887.0	33,373.8	-14.2	1.3
Coals; briquettes, ovoids and solid fuels or similar obtained from coal.	144,725.8	200,611.9	120,278.6	34,083.2	15,393.1	-54.8	0.6
Extracts, essences or concentrates of coffee, tea or yerba mate and preparations based on these products or based on coffee, tea or yerba mate; roasted chicory and other roasted coffee substitutes and their extracts, essences and concentrates.	62,066.9	70,980.8	92,256.0	20,416.1	22,612.9	10.8	0.9
Cane or beet sugar and chemically pure sucrose, in solid state	71,051.9	67,224.9	91,747.7	18,495.0	19,614.0	6.1	0.8
Disks, tapes, permanent data storage devices based on semiconductors, smart cards and other media for recording sound or similar recordings, recorded or not, including galvanic matrices and molds for the manufacture of discs, except those products of Chapter 37.	396.6	5,568.7	55,438.9	3,141.6	8,378.9	166.7	0.3
Fruits or other fruits and other edible parts of plants otherwise prepared or preserved, whether or not with the addition of sugar or other sweetener or alcohol, not elsewhere specified or included.	46,726.7	50,408.9	49,522.3	12,502.0	12,503.6	0.0	0.5
Fish fillets and other fish meat (even minced), fresh, chilled or frozen.	52,852.6	44,377.4	48,200.4	8,692.2	11,070.6	27.4	0.4

Bras (bras), girdles, corsets, suspenders (braces), garters and similar articles, and parts thereof, whether or not knitted.	36,952.1	37,832.6	44,165.9	7,951.1	15,642.7	96.7	0.6
Articles for transport or packaging, of plastic; stoppers, lids, caps and other closure devices of plastic.	37,495.1	44,859.5	43,167.0	11,500.1	9,975.2	-13.3	0.4
Subtotal	9,208,174.0	10,034,452.9	7,621,106.7	2,184,200.5	2,175,957.8	-0.4	85.5
Participation %	86.3%	87.1%	85.4%	87.1%	85.5%		
Total Exported to the United States	10,674,259.9	11,520,118.7	8,921,767.8	2,507,475.3	2,543,508.6	1.4	100.0

Source: Ministry of Commerce, Industry and Tourism-Mincit (2021). Macroeconomic Context of the United States.

APPENDIX B. Revealed Comparative Advantage Method

The method of the Center for Prospective Studies and International Information (CEPII) called Revealed Comparative Advantages (RCA) carried out by (De-Saint-Vaulry, 2008) was used. The CEPII indicator measures comparative advantages in a standard way, revealing them through an analysis of exchanges, as the index initially proposed by Balassa (1965) and has its antecedents in David Ricardo's theory of “comparative advantage”.

Below is the calculation formulated:

$$RCA_{kit} := \frac{1000}{Y_{it}} \left[X'_{kit} - M'_{kit} - v_{kt} \sum_{k=1}^K (X'_{kit} - M'_{kit}) \right] \in \mathbb{R}$$

where:

Y_{it} is the GDP of country i in time t

$$v_{kt} := W_{kt}/W_t$$

$$W_{kt} := \sum_{i=1}^n (X_{kit} + M_{kit}); W_t := \sum_{k=1}^k W_{kt}$$

$$X'_{kit} := X_{kit} \cdot e_{kt}; M'_{kit} := M_{kit} \cdot e_{kt}$$

$$e_{kt} := 1 \text{ si } W_{kt}/W_t = 0; \text{ otherwise } e_{kt} := \frac{W_{kr}/W_r}{W_{kt}/W_t}$$

The evaluated zone may be the world, the members of the World Trade Organization (WTO), or a group of at least two countries, however the index and the variables that enable its calculation refers only to the selected zone. The identification of a country that belongs to a zone is identified by the letter i , a group of products by the letter k and a time

period by the letter t . “The variable denotes the RCA_{kit} index of country i with respect to the product (or group of products) k in period t (and within the zone)”. (Stellian & Danna p. 133)

The starting point is W_{kt} , which represents trade in k by all the countries in the zone in period t , X_{kit} denotes total exports by country i in time t , for the K product groups considered in the nomenclature, otherwise $X_{kit} \in \mathbb{R}_+$ represents exports of k (in monetary units) made by country i in time-period t .

Once W_{kt} has been calculated for each k , it is possible to sum $W_{1t} + W_{2t} + \dots + W_{kt}$ and calculate W_t , which represents “global” trade defined as the trade in all K product groups in t by all countries in the zone. The coefficient e_{kt} is determined by selecting a “reference period” denoted by the letter r . Thus, W_{kt} / W_r is the share of k in global trade in the reference period r . It is assumed that W_{kt} / W_r reflects the structural factors of k trade irrespective of short-term fluctuations.

According to Stellian & Buitrago, i denotes Colombia, to identify Colombia’s comparative (dis)advantages in the bilateral trade zone with the United States (then $n = 2$). Data for exports and imports are taken from UNCTADstat (unctadstat.unctad.org), supplied according to the three-digit SITC Rev.3 nomenclature.

The evaluation period was from the implementation of the treaty and the joint bias was 2014.

Declarations

Availability of data and material: All data generated or analyzed during this study are included in this published article (and its supplementary information files).

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