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Vicente Pinilla and Henry Willebald[∞]

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TRANSICIÓN Y CAMBIO EN LA AGRICULTURA MUNDIAL DURANTE EL PERÍODO DE ENTREGUERRAS

Vicente Pinilla[†] y Henry Willebald[§]

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RESUMEN

Los años comprendidos entre 1914 y 1950 fueron pródigos en problemas para la economía mundial. El periodo de entreguerras fue también extraordinariamente turbulento para la agricultura mundial debido a la Primera Guerra Mundial, sus consecuencias, la depresión de los años treinta y las medidas adoptadas por los distintos gobiernos en respuesta a ella. Para la agricultura de los países desarrollados fue también un periodo de transición entre los años anteriores a 1914 y los posteriores a la Segunda Guerra Mundial, con el inicio o la profundización de cambios fundamentales: el paso del crecimiento extensivo al crecimiento intensivo; del libre mercado a la intervención del Estado; y, finalmente, de la complementariedad a la competencia en el comercio agrícola mundial. Asimismo, el periodo de entreguerras fue testigo de un importante cambio en el modelo de desarrollo de la periferia mundial y una de sus características distintivas fue la participación activa del Estado en la economía. En el sector agrario, esta característica general se manifestó claramente en al menos tres formas que comenzaron a expresarse en los años de entreguerras y se consolidaron definitivamente en la segunda posguerra: las políticas de sesgo antiagrícola, la protección del consumidor urbano y las *marketing boards*. Además, los problemas de entreguerras fueron una de las causas del progresivo abandono de los modelos de crecimiento dirigidos por las exportaciones de productos primarios.

Palabras clave: Historia económica agraria, desarrollo agrario, políticas agrarias.

ABSTRACT

The years between 1914 and 1950 beheld huge disruptions in the world economy. The interwar period was also extraordinarily turbulent for World agriculture due to World War I, its consequences, the depression of the thirties and the measures taken by the different governments in response to it. It was also a period of transition for agriculture in the developed countries between the years before 1914 and those after World War II, with the onset or deepening of fundamental changes: the shift from extensive to intensive growth; from free markets to state intervention; and, finally, from complementarity to competition in world agricultural trade. Also, the interwar period witnessed a major change in the development model of the world's periphery and one of its distinctive characteristics was the active participation of the State in the economy. In the agricultural sector, this general characteristic was clearly manifested in at least three ways which began to be expressed in the interwar years and definitively consolidated in the second post-war period: anti-agricultural bias policies, urban consumer protection and marketing boards. Moreover, the interwar problems were one of the causes for the progressive abandonment of export-led growth models based on primary commodities.

Keywords: Agricultural Economic History, Agricultural Development, Agricultural Policies.

[†] Universidad de Zaragoza and Instituto Agroalimentario de Aragón (IA2), Spain. E-mail: vpinilla@unizar.es

[§] Universidad de la República, Montevideo, Uruguay. E-mail: hwillebald@iecon.ccee.edu.uy

TRANSITION AND CHANGE IN WORLD AGRICULTURE DURING THE INTERWAR YEARS*

1.- Introduction

There is no doubt that the turbulent years between the two World Wars affected the development of agriculture on a global level. During the first wave of globalization, global production grew significantly. This was achieved thanks to the improvement in productivity in Europe and the clearing of new lands in other continents. The territorial expansion of the United States and of the settler countries (Argentina, Australia, Canada, New Zealand and Uruguay), and the agricultural frontier in Latin America and in the territories in which the Europeans established colonies in Africa and Asia, was enormous. Logically, the exports of agricultural and food products played a fundamental role in the huge increase in trade in the first wave of globalization.

However, the interwar years were not crucial simply because of the economic impact that events such as the two World Wars or the depression of the 1930s had on global agriculture or the trade of its products, but because the interwar period was a pivot, laying the groundwork for certain post-war trends. From 1914, developed countries began to use technologies that would decisively change agriculture in the post-World War II era throughout the world, although at different paces in the different regions. In those countries that had not yet implemented large-scale industrialization processes, these years were also decisive as they lost confidence in their role as suppliers of primary products to the developed world and the objective of imitating their industrialization processes spread. Moreover, the weight of agricultural products in world trade began to decline. Finally, in the interwar years, public intervention in agriculture acquired great importance and would subsequently become highly relevant. Agriculture would no longer be an activity just influenced by market forces and only distorted by protectionist trade policies.

Within this context, the objective of this study is to explain first, the most prominent features of the evolution of agriculture in the world throughout the first wave of globalization. Next, we will discuss how and why the events of the interwar period called into question the preceding trajectory of agriculture. Subsequently, we will

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successively analyze three features of agriculture that would become fundamental aspects after the Second World War and which began to take shape during the interwar period. The first was the adoption of new mechanical and biological technologies that would pave the way from extensive agricultural growth, based on the use of more productive factors to a predominantly intensive agriculture fostered by the adoption of innovations. The second feature was the intervention of governments in agriculture to modulate production and subsidize the income of farmers. Finally, international trade experienced a transition from the exchange of manufactured products for primary products depending on the comparative advantage of each country to a new trading system in which agricultural trade played a smaller role, as trade came to be principally based on manufactured products or components and the establishment of global value chains. We will finish by presenting conclusions that seek to highlight the legacy of these years for agriculture after the second post-war period.

2.- The end of an era: What came before?

The First World War represented the end of an era characterized by a long period of global frontier expansion.¹ We can identify four key regions of global economic development (Barbier 2011): the core of the world economy represented, mainly, by Western Europe; an extensive and heterogeneous periphery composed of a “Great Frontier” comprising temperate North and South America, Australia, New Zealand and South Africa (often referred to as settler economies: Denoon 1983, Lloyd et al. 2013)²; a “Tropical Frontier” which includes tropical Latin America and the Caribbean, Asia and Africa; and the “Land-Based Empires” consisting of the Ottoman Empire in West Asia and the Middle East, the Russian Empire, the successive dynasties of China and the Mughal Empire in India.

Prior to the twentieth century, Europe had become a central player in the global agro-food trade. Before the First World War, it represented three-quarters of global imports of agricultural and food products. Its weight of exports, while relevant, was lower, accounting for around one-third (Aparicio et al. 2019).

Growing internal and external demand and market integration drove European agricultural transformations throughout the nineteenth century, particularly from 1870 onwards (Van Zanden 1991, O’Brien and Prados de la Escosura 1992, Federico 2005,

¹ Frontier expansion is an old concept that has been systematically used and redefined by a long series of scholars from the pioneer article of Frederick Turner (1897) to recent contributions, such as Beckert et al. (2021, 467) where “The commodity frontier [...] is not simply a place. It is a relational concept that grasps the flows of materials and energy between nature and society, between different societies and within them. These flows connect regions of extraction with the sites of production that organize capitalist modernity on a world scale.”

² The world’s average annual growth rate of cropland was 0.52% in 1700-1800, 0.46% in 1800-1870 and 0.69% in 1870-1910. Those regions characterized by open frontier in the end of the nineteenth century experienced the highest rates in the last period: Australia and New Zealand (2.28%), Latin America (2.14%) and North America (2.16%) (Barbier 2011, 380).

Lains and Pinilla 2009, Dennison and Simpson 2010). The very uneven economic growth in the different regions of the continent and the ensuing demographic transition, comprising a substantial reduction in the death rate coupled with a fertility rate which initially remained at high levels, implied an increase in the demand for food and agricultural raw materials, due to the increase in the population or income per inhabitant. Furthermore, the growing specialization in manufactured goods in the most advanced nations, particularly the United Kingdom, meant that these countries had to meet some needs through imports. The international division of labor that expanded as globalization advanced (The Great Specialization) led to a considerable growth in international trade (Federico and Tena 2016). Trade liberalization and falling transportation costs (Jacks 2006, Jacks et al. 2011, O'Rourke and Williamson 2000) facilitated integration in global markets. In addition to economic growth, improvements in internal transport and the abolition of internal tariffs led to a high level of integration of domestic markets.

The resulting market integration and a more efficient allocation of resources led to growth in production (Broadberry et al. 2010, Kopsidis and Wolf 2012). Technological innovation also played a fundamental role. Given that the European continent had very little scope to increase production through further land clearing, as there was only a small amount of land that could be used for agriculture, the more intensive use of the land, an increase in capital and workers, and certain innovations were the principal driving forces. During much of the century and in those European regions that were ecologically suited to it, innovations were adapted from areas such as England or the Netherlands. These included new crop rotations with the introduction of pulses and other fodder crops which allowed the elimination of the fallow systems, more intensive fertilization, and new fertilizers such as guano originating from the Pacific coast of South America (Chorley 1981, Allen 1994, Cushman 2013).

In the second half of the nineteenth century, animal-powered harvesters, steam threshers, chemical and inorganic fertilizers and concentrated feed for cattle increased productivity and production. This started the fundamental industrialization of agriculture, leading to fairly widespread growth in agricultural production and structural changes (Federico 2005). Grains tended to lose weight in production, while products with a higher elasticity of demand increased with respect to income, such as livestock products, including meat and dairy products or fresh fruit and vegetables. Not only was a larger population demanding more food but the nutritional transition also implied that European diets were changing.

Different European regions followed different paths of agricultural transformation. Some specialized in producing and exporting products for which they had comparative advantages. Western Mediterranean countries, and to a lesser extent those in the eastern Mediterranean, focused on products characteristic of these regions, such as wine, oil or fresh fruit and vegetables (Pinilla 2021, Petmetzas 2009, Federico, 2009). Russia became a large exporter of grain to the rest of the continent and the Scandinavian countries developed the production and export of butter or bacon in Denmark or forestry products in Sweden and Norway (Lampe and Sharp 2019).

The United Kingdom became the world's leading importer of agricultural raw materials, opening up its markets to the exports of other countries, although this implied a significant step backwards in its agricultural sector. Other large continental countries, such as France or Germany, also industrialized and increased their production in an attempt to supply their domestic markets although they had to import certain products (Vivier 2009, Grant 2009).

The world economic boom from 1830 to 1913 profoundly transformed economies outside of Europe too. Buoyant global demand for raw materials and food boosted growth in various primary-producing countries in both temperate and tropical regions. This era is usually identified with a golden age of resource-based development or an export-led growth models (Findlay and Lundahl 1999, Findlay and O'Rourke 2007, O'Brien 1997, 2006, O'Rourke and Williamson 1999, Schedvin 1990, Williamson 2006).

The rapid industrialization of European economies increased their need to exploit cheap natural resources from the new frontiers. Many core countries obtained an immense range of natural wealth, not only through new lands that constituted an outlet for poor emigrants searching for better economic opportunities but also through new sources of fishing, plantation, mining and other resource frontiers (Barbier 2015). Four main global "frontiers" provided "vast, varied, and cheap" supplies of "extra-European resources": ocean fisheries, including whale and seal fisheries; boreal forests around the Baltic region, Scandinavia and Russia; tropical land for plantation and smallholder commercial crops (sugar, tobacco, cotton, rice, indigo); and temperate arable land for grains (Jones 1987, 80-82).

As the periphery economies improved their conditions to offer resource-based exports, they needed more foreign capital and labor. Steamships and railways radically reduced the cost and time of transporting commodities and people across water and land (Mohammed and Williamson 2004). This accelerated the flow of primary-product exports to Europe, and the corresponding movements of capital³ and labor⁴ to the developing world, especially in the last third of the nineteenth century. Falling transport costs also meant that the expanding European demand for food and raw materials increased prices in frontier regions for these commodities. In this sense, agricultural development, specialized in the production of goods for export, drove frontier-based development in many temperate and tropical regions of the world (Barbier 2011).

The expansion of the long-distance transportation and trade boom of the late nineteenth century translated into an export boom of primary-products, mainly from frontier regions and the European periphery to industrialized Western Europe, the world's

³ In around 1914, UK, France and Germany accounted for three-quarters of global foreign investment, but Europe represented only 27% as a host region. The main recipients were: North America (24%), Latin America (19%) and Asia (16%) (Cameron and Neal 2014, 343).

⁴ In 1870-1913, world population recorded an annual average growth of 0.77%. The ratio of Western Europe (0.18%) contrasted significantly with those of the periphery: Western Offshoots (2.07%) and Latin America 1.63%). However, Asia (0.55%) and Africa (0.75%) showed lower records (Maddison, 2003).

leading market (Aparicio et al. 2009, 2018). The worldwide export boom in primary products was shared equally by temperate and tropical regions. Exported foodstuffs consisted of tropical groceries, such as coffee, sugar, tea, tobacco, vegetable oils, rice, spices, nuts, and fruit (O'Brien 1997). Large volumes of food and raw material exports from temperate "frontier" regions to Europe, such as South America (especially Argentina, Uruguay and Chile), Oceania (Australia, New Zealand), North America (United States, Canada) and Africa (South Africa), included raw cotton, wheat, corn, hides and skins, wool and meat products (Hanson 1980, Pinilla and Aparicio 2015).

The primary-product trade boom generated an extraordinary expansion of cropland across the global frontiers. In all regions, this expansion between 1700 and 1910 occurred mostly at the expense of forest land, savannah and grassland. Although global cropland area increased by over 50 percent in the eighteenth century, this rate doubled in the nineteenth century and clearly accelerated from 1870 to 1913, with the majority of this expansion occurring in those regions with abundant land for conversion to agriculture (typically the settler economies; Barbier 2011).⁵ Likewise, by 1870, the three largest and most populated Asian countries – China, Java (Indonesia) and India – had limited territory on which to expand the frontier for new cultivation, despite significant population pressures. Instead, cropland expansion occurred in small tropical countries of Asia where land was available, such as Burma (Myanmar), Ceylon (Sri Lanka), Malaya (Malaysia) and Thailand. Finally, in Africa, cropland expansion increased modestly and mainly in a few countries with abundant land, such as Egypt, South Africa, and the Gold Coast (Ghana). The colonization by the Europeans of a large part of these territories was, undoubtedly, a key factor explaining this territorial expansion.

3.- The Age of Dislocation (from 1914 to 1950)

The years between 1914 and 1950 saw huge disruptions in the world economy, described as the "Age of Dislocation" by some scholars (Lewis 1949, Barbier 2011). The Age of Dislocation became an era of anti-globalization forces, that combined trade protectionism (Williamson 2006, Findlay and O'Rourke 2007), stagnant transport costs (Findlay and O'Rourke 2007) and the abandonment of the international gold standard (Bulmer-Thomas 2003). The outbreak of the First World War ended global trade expansion and, with it, the boom in the exploitation of natural resources and new economic opportunities. After the First World War, the United States became the predominant economic and political power on a global scale, surpassing the United Kingdom and other Western European economies (Bulmer-Thomas, 2018). The other country of the Great Frontier club that showed signs of successful industrialization was Canada. Other countries, notably the southern settler economies like Argentina, Chile,

⁵ As Findlay (2017, 262) explains: conquest "opened up a new 'frontier' where land could be extended indefinitely but only at a rising marginal cost in terms of other real resource". This economic criterion worked in regions with low population densities and relatively weak indigenous populations whom industrialized (and militarized) settlers and colonists overran.

Uruguay, South Africa, Australia and New Zealand, showed more diverse results.⁶ The four Land-Based Empires (Ottoman, Russian, Chinese and the Mughal Empire in India) had dissolved. Although the successor of the Russian Empire, the Soviet Union, pursued a sustained process of industrialization, the countries that evolved from the other three former empires –China, India (as well as Pakistan), and Turkey– began a trajectory of persistent backwardness. On the other hand, in Asia, Japan had become fully industrialized and had achieved high levels of economic welfare on the eve of the Second World War.

The widening gap in economic development between a few rich industrial countries and primary-producing countries (underdeveloped periphery) continued more or less relentlessly throughout the first half of the twentieth century. Only a handful of peripheral countries improved their positions to draw closer to the leaders.⁷ The long-term trend in “unequal development” since 1800 was manifest by absolute factor price divergence between core and periphery, a rate of divergence between 1800-1940 greater than at any other time in the history of the world economy (Williamson 2006).

Despite transitory peaks during both world wars, all primary-producing economies experienced a long-term decline in their terms of trade⁸ compared to the late nineteenth century (Clemens and Williamson 2004). Between 1924 and 1932, the terms of trade of agri-food exports, with respect to manufactured products, deteriorated by 20-45% depending on the weight of the different products in the various regions of the world. In 1934-38, they were still 15-40% lower; Asia was the most affected, South America and Oceania less so (Pinilla and Aparicio 2015). This trend was worsened by increasing tariff rates and other trade barriers implemented in the primary products markets of Western Europe and the United States. The periphery responded by imposing and increasing its own tariffs and restrictions on imports of manufactured goods.

Latin American countries provide an example of these dynamics. The Great Depression played a decisive role in Latin America’s economic development during the first half of the twentieth century. The main change was a clear disruption of the export-led strategy based on exploiting natural resources which was replaced by an import

⁶ Of this group of countries, only Australia experienced a progressive –but modest– industrialization process from the beginning of the twentieth century. Such a high share was possible despite Australia’s strong comparative advantage in primary products only because the manufacturing sector was protected more highly than all other advanced economies, except New Zealand and almost as much as Argentina (Anderson, 2018)

⁷ Comparing the GDP per capita of large regions of the world in 1900 and 1950 with that of Western Europe shows that the level of the ratio did not change for Eastern Europe, Asia, Middle East and Sub-Saharan Africa, hardly improved for Latin America (from 0.4 to 0.5) and the only exception was the Western Offshoots. In this case the ratio increased from 1.6 to 2, illustrating the success of the world’s periphery (Maddison Project Database-MPD 2020).

⁸ The terms of trade of each country refer to the ratio between an export price index and an import price index as a proxy of the domestic impact of the international evolution of good prices. Usually, considering the different productive specialization of core and periphery countries, the indicator is calculated as the ratio between prices of agri-food exports and manufactured products (with the adequate shares in the national trade baskets).

substituting industrialization (Bulmer-Thomas 2003, Thorp 1998, Bértola and Ocampo 2013). Inward-looking development based on import substitution and state-led industrialization defined much of Latin America's economic development from the 1930s to the 1980s. These countries depended on a handful of primary-product exports, which meant that they were exposed to the international price volatility of the two world wars and the Great Depression. Despite the 1929 crash and the impact of the depression on trade, the region's exports increased even more, especially tropical products, which performed somewhat better than those from temperate areas. Both wars increased demand for Latin America's products, as this region had the advantage of being far from the theatres of the war, although the difficulties of maritime transport and its high cost limited the possibilities of the region. The international depression of the 1930s produced a demand-side shock reducing global prices and imports. Consequently, the deterioration in the terms of trade was very significant (between 20-25% over the decade). As a result, the purchasing power of South American agricultural exporters reduced considerably, since the slight increase in export volume far from compensated for the deterioration in the terms of trade (Pinilla and Aparicio 2015).

The growth of exports of tropical countries was high compared to the pre-war level in the 1920s, but much slower in the 1930s. However, the deterioration of their relative prices was enormous, so that purchasing power deteriorated significantly in all regions, except in Africa, where the strong increase in the volume exported, due to the privileged access of the colonies to metropolitan markets, compensated on the whole for the fall in prices (Pinilla and Aparicio 2015).

The economic disruptions of the Age of Dislocation also reduced global capital investment. The two world wars and the Great Depression were obviously explanatory factors of this decreasing trend, but long-term foreign investments, mainly from Europe, but also the United States, were also affected by protracted currency instability and increased limitations to movements of financial resources (O'Brien 1997).

International migration also reduced significantly from 1914 to 1950. Migration to North and South America and the major "settler" economies of Oceania, was subject to ever more restrictive immigration policies that began in the 1890s but were firmly imposed in the early 1920s.

Although the global cropland expansion at the expense of forest, savannah and grassland continued, this process occurred at a slower rate than in the previous era. However, there were noticeable differences between regions. Cropland expansion slowed notably in North America, Australia, New Zealand, and in Latin America and the Caribbean, but frontier expansion continued to increase quickly in Africa and Asia. In comparison, Tropical Frontier countries and the former Land-Based Empires of China, Russia and Turkey all showed remarkable increases in cropland area, despite economic instabilities. During these years, frontier expansion was not a response to increasing demand for primary products from the periphery but an outlet for absorbing the growing numbers of the rural poor (Barbier 2011).

Both the world war and its immediate aftermath meant that agriculture was extraordinarily turbulent in Europe even before the Great Depression. Federico (2004) estimates a fall of 40.7% in agricultural production in Eastern Europe, 19.6% in North-Western Europe and 7.1% in Southern Europe during the First World War, largely because much of the rural population mobilized to the front or urban industrial production. Furthermore, agricultural trade shrank between 1913 and 1918 at an annual rate of 10.9% (Aparicio et al. 2009) due to the Allies' attempt to blockade Germany and Austria-Hungary and the mobilization of resources for the war effort. Another important factor was the Bolshevik Revolution and the food provision problems which ended Russian grain exports.

The end of the war marked the end of wartime distortions and a rapid recovery of agricultural trade, with the exception of Russian exports. The recovery of production in Europe and the increase of some large exporters during the conflict generated growing tension in international markets, with excess supply, stock increases of certain products and resulting reductions in price, which was particularly noteworthy in the case of wheat, which increased their production significantly in the Americas and Australia (by 46%) between 1914 and 1925.

Turbulence continued into the second half of the 1920s when protectionism increased in response to demand-supply imbalances. Demand slowed in importing countries, particularly the United Kingdom, due to the lower growth of its population and a strong increase in supply. Supply increased for two reasons. First, technological innovations like fertilizers or selected seeds were introduced into Europe. Second, large agricultural export countries, particularly on the American continent, had massively expanded production. This excess supply was most prominent in grains, but tropical commodities experienced similar growth (Aparicio and Pinilla 2019). The increase in protectionism, with appreciable tariff increases from 1926 in countries such as France or Germany, and the support of domestic production, particularly of cereals, intensified the problem.

Within this context, the crash of 1929 and the Depression of the 1930s aggravated the situation. Widespread attacks on international trade, strong increases in tariffs, the establishment of quotas and other mechanisms to control exchanges and the support of domestic agriculture were the most noteworthy features of those years. The prices of agricultural products fell dramatically and their volume of international trade diminished by 13% in absolute terms between 1929 and 1934. The United Kingdom implemented the imperial preference system at the Ottawa conference in 1932. This system not only launched a new attack on trade by the world's principal importer of agricultural products. These agreements implied, first, the protecting of the British market but also facilitated, where possible, the maintenance of trade with its territories, putting an end to the traditional liberal trade policy.

In the United States, agricultural production increased at a very fast pace from 1910 until the beginning of the crisis in 1929. American agriculture faced challenges from

the early 1920s, because purchase prices worsened for farmers relative to prices paid for the necessary inputs. During the whole decade, attempts were made, and usually failed, to increase the prices paid to the farmers. The farmers formed cooperatives of basic commodities in order to improve their situation, while the state established public intervention mechanisms with the same objective. The real turning point was the beginning of the crisis in 1929. Between 1929 and 1932, agricultural prices fell significantly. The collapse in farm income, foreclosures, and distressed rural banks and farm suppliers eventually convinced Democratic politicians to act. The most important measure, the Agricultural Adjustment Act (AAA) in 1933, aimed to increase the real income of the farmers, restricting production, guaranteeing minimum prices and retiring cultivated land in exchange for compensation. A high percentage of farmers (over 25% of corn growers, 60% of hog producers and 40% of wheat growers) signed contracts with the government to adopt these programs. The result was an increase in prices and income for the farmers, although the overall impact is still unclear for the different authors (Olmstead and Rhode 2000).

The remaining “southern cone” economies of the Great Frontier (temperate Latin America, South Africa, Australia and New Zealand) did not perform as well as the United States or the other industrial core economies. In the century before the First World War, settler economies took full advantage of the new technological and market opportunities created by the Industrial Revolution, to reach levels of prosperity which had been unimaginable a century before (Denoon 1983, Lloyd et al. 2013). However, these new capacities did not generally lead to diversified productive structures and a varied export portfolio (Willebald 2007). Even Australia –with a federated political composition, a significant variety of export staples and a solid tradition of state intervention– moved timidly towards a modest diversification. In other places the limits were even narrower.

The southern cone economies were highly vulnerable to economic disruptions and external shocks due to the low diversification of production, dependence on a few resource-based primary-product exports, and reduced domestic markets. However, economic policy responses to the shocks diverged considerably.

Australia’s initial reaction to the Great Depression was to strengthen its capacity to produce and export natural resource-based commodities, especially wheat (Rothermund 1996). The government designed and launched the “Grow More Wheat” campaign to spur the expansion of cereal production and maintain export revenues as international wheat prices fell. In the 1920s, farmers cleared 3 million hectares of new land. During the Depression, a further 1.5 million hectares were added to make a total of 9 million hectares under cultivation (an area larger than the entire wheat-producing area of France, Germany and the United Kingdom together at that time). But the decline in wheat prices was so significant that farmers had to sell cereal below the cost of production. The government addressed the difficulties by devaluing the Australian pound in January 1931, programming official purchases of grain at stable domestic prices, and “dumping” wheat on world markets. As a result, Australia may have managed the adverse conditions better than most economies, including those of the southern cone, but

diversification away from a few staple exports (wheat, wool, minerals) was deferred until the post-1945 period.

In New Zealand, two issues were strongly debated in the 1920s: the instability of farm incomes and the need for government provision of finance to the agricultural sector. The predominant response was institutional. The creation of the Meat Producers Board (1922),⁹ the Dairy Produce Export Control Act (1923) and the Rural Intermediate Credit Act (1927) empowered the government to set up local finance boards (Fleming 1999). The increasing strength of trade union, farming, and manufacturing groups was a major feature of New Zealand politics during the 1920s and continued into the 1930s. Sectional interest groups pressed strongly and effectively for specific support from the government in the face of increasing levels of disruption in world trade.

In the case of Latin America, the interwar period laid the groundwork for trends that would dominate post-war economies. In the 1920s and 1930s the organizations created to support specific economic sectors multiplied in Argentina and Uruguay (Rapoport 2018, Frega et al. 1982) (*juntas reguladoras*). But, in general, instead of promoting better productive, technological and labor conditions, these agricultural boards channeled sectoral interests. The expansion of agribusiness mostly went hand in hand with a backward *campesino* sector or, more generally, a rural society that lagged behind the rest of the country. Trade policy discriminated against agriculture but this mainly resulted from explicit or implicit taxes (e.g., via differential exchange rates) on traditional export products (coffee, sugar, etc.). The other side of this discrimination was the protection of agricultural production that competed with imports (Bértola and Ocampo 2013). These broader factors contributed to increasing dualism in the agriculture sector between large agribusiness and smaller rural producers.

South Africa was one southern settler economy that did extraordinarily well during the Great Depression and the following decade. The successful expansion of mines and commercial agriculture (known as the maize and gold alliance, Greyling et al. 2018) led to substantial exports of diamonds, gold, wheat, wool and rice. Economic growth attracted workers from all over southern Africa, and, in turn, led to increased food production even in the peasant sector. Initially, the crisis caused a significant reduction in commodity exports, in particular, a collapse in grain prices due to global overproduction. However, after 1932, economic performance improved, boosted by the revival of world demand for ores (Feinstein 2005). In the 1930s, South Africa continued to diversify and industrialize, while encouraging its primary product exports, domestic food production capacity and official programs for controlling soil erosion and conserving land.

The populations of Africa and Latin America almost doubled between 1913 and 1950, and rose by almost 50% in Asia. But economic opportunities for absorbing the growing population were drastically diminished in the formal markets. Plantations, mines

⁹ The Meat Producers' Board was the earliest export monopoly board in the world (Capie, 1978).

and export-oriented peasant agriculture suffered severely from the slowdown in world demand for primary commodities. The vicious cycle of deteriorating terms of trade, falling agricultural and mining returns, expanding debt and increased land abandonment in the peasant and plantation export sectors dominated the 1930s. Given these economic difficulties, the absorption of labor in tropical regions occurred mostly in the non-traded agricultural and small-scale manufacturing sectors. In agriculture, production was either oriented towards subsistence or to local and regional markets as a version of the “dualism” scenarios described in Lewis (1954).¹⁰ Or, in a similar way, assuming that only the most successful and prosperous farmers, encouraged by their previous success, would decide to devote more of their time and efforts to specialized cash-crop export production, these were likely to become bigger while at the other end of the spectrum the number of dependent small farmers would increase. Inequality would therefore surge (see the case of Ghana in Gunnarsson 2018).

Cropland expansion in the immense majority of Tropical Frontier economies advanced at a faster pace between 1910 and 1950 than in the preceding four decades. For some countries, especially in the 1930s and 1940s, increased cropland area for food production was a major factor (Peru, Thailand, Philippines, Assam-India, Morocco). This occurred through applying traditional agricultural techniques (Barbier 2011) and reproducing traditional varieties over more land (Booth 2007, for Southeast Asia). Particularly important in the Southeast Asian context was the effect of the expansion of estate agriculture on the land available for smallholder producers (Booth 2007). Meanwhile, in the 1950s, independent governments gave more support to smallholders, in the form of research, extension, marketing support, land reform, and formula pricing, depending on the country and commodity (Byerlee and Viswanathan 2018).

Although it may seem that land was abundant in many tropical regions, most of the frontier cropland expansion carried out in the 1930s and 1940s to absorb the rural poor occurred on marginal rather than good quality land (sub-Saharan Africa was a clear example; see Austin 2008). A transcendent institutional factor constraining the availability of good quality land in many countries of the Tropical periphery was colonial land use policies. The agricultural economy of the colonies operated on two levels with Europeans benefitting from preferential treatment. Europeans principally owned and managed the commercial export enclaves, and much of the good quality land allocated to these productive establishments (Northern Rhodesia, Algeria, the Congo, Kenya, Morocco, Nigeria and Southern Rhodesia) (Griffin et al. 2002). In Asia, this pattern was extensively repeated in the case of jute, sugar, tea and other plantation estates in Ceylon, Malaya, India, Indochina and the Dutch East Indies, with the European establishments receiving the best quality arable land and the expansion of food crops by peasant farmers confined to converted forest, steep hillsides and other marginal lands (Barbier 2011,

¹⁰ The classical theoretical model of economic development of Lewis (1954) is premised on two assumptions that there was an unlimited supply of labor in the traditional agricultural sector of the less developed countries and that, as the modern industrial urban sector in these countries grew, this vast pool of surplus labor would be absorbed. Therefore, the mentioned non-traded agricultural and small-scale manufacturing sectors were able to act.

Reynolds 1985). In the case of tropical Latin America, an inherited colonial legacy led to the best quality land being concentrated in the hands of rural elites descended from European settlers. This not only skewed the distribution of land holdings (with a clear production gap between *latifundistas* (owners of large-scale farms) and *minifundistas* (owners of very small farms); Bértola and Ocampo 2012) but ensured that the wealthy elite retained the best quality land (Griffin et al. 2002).¹¹

Public investment and economic policy significantly affected agricultural trade in the 1930s and 1940s. There was a lack of “complementary” public investments in large-scale infrastructure projects, such as railways, ports and shipping, telecommunications and public utilities (Barbier 2011). Economic policy also distorted markets. The British colonial authorities of Zambia, under pressure from settlers, distorted the market against local producers (indigenous Africans) who were paid lower prices (Hillbom and Jenkin 2018). In Botswana, the colonial state made investments in veterinary services and agriculture, a strategy that promoted the development of a mono-product economy based on beef exports (Hillbom 2015). As in the case of Latin America, the creation of agricultural marketing boards was a widespread practice in tropical Africa (Jones 1987).

With the Great Depression (and later WWII), colonial governments saw their principal sources of revenue severely reduced and both European and African populations faced serious financial difficulties. Marketing boards originated in the United Kingdom, but similar efforts were made in French and Belgian Africa. The first marketing boards were authorized partly in response to the widespread belief that they would raise prices, farm incomes, and export proceeds. It was also believed that governmental control would reduce marketing costs to the benefit of producers. The resulting experiences were varied, and the debate is still open as to their effects.

The interwar period was crucial for agriculture because it represented a transitional moment in three main ways. First the move from extensive to intensive growth began. Second, major state intervention began in agriculture, kicked off by the First World War. Third, primary goods started to decrease as a share of world trade. The following sections discuss these structural transformations.

4.- The Move from Extensive to Intensive Growth

The move from extensive to intensive growth occurred in the most developed countries during the interwar period, though much later in other regions.¹² Over the last two centuries, global agriculture was able to feed a rapidly growing population. Although the data prior to 1870 are precarious, in most parts of the world, production probably grew at a parallel rate to population growth and in some, even faster (Federico 2005). From

¹¹ The high Gini indexes of landownership is another clear expression of this issue.

¹² This movement meant the transformation of an agriculture growth based on the accumulation of factors of production (labor, capital) to another based on efficiency gains and technological change.

1870, production growth accelerated, but it slowed down considerably in the interwar period and resumed once again at an even faster pace after the Second World War (Federico 2004). Malnutrition or extreme famines were not due to insufficient supply but to problems of accessing food given low incomes or an inadequate distribution of production.

Myriad causes explain the increase in agricultural production, which occurred unequally in different regions of the world throughout the nineteenth century. The growth in production was based on the use of more productive factors as workforce, infrastructure and livestock. Rising demand for food and agricultural raw materials for industry increased production partly based on cultivating new land and colonizing indigenous people's territories. The expansion of the agricultural frontier was an important phenomenon in the Americas, Africa, Asia and Oceania. Only Europe, with some exceptions, remained outside of this movement.

More cultivated land required more labor. The active agricultural population continued to grow in absolute terms throughout the world, with few exceptions, such as the United Kingdom. European settlers expanded the frontier in North and South America towards the west, and in Australia, from the south-east onwards. In other regions, the local population cultivated new land through family farms, large estates, or often large plantations.

Although this growth was mainly extensive, technological innovation had already played a relevant role. There were four principal lines of technological progress before 1914: mechanization of animal-drawn or steam-powered machinery; the selection and adaptation of seeds; chemical fertilization and pesticide use; and the control of cattle diseases. All this was reflected in an appreciable, although not yet decisive way, contribution of the increase in total factor productivity (TFP) to the growth in production.

During the interwar period, decisive steps were taken in the initial adoption or diffusion of new technologies which played a fundamental role after 1945.

First, self-propelled machines formed an essential part of this technological transition. During the interwar period, tractors were used extensively in North America, highly unevenly in Europe and European settlements, and only incipiently in other regions. Alongside the tractor was the self-propelled harvester, the first prototypes of which were designed between 1910 and 1929. Its industrial production took off after the end of the Second World War. The self-propelled machinery constituted a significant revolution as it replaced draft animals that drew the old harvesters or plows. The decline in the number of working animals led to a drop in demand for animal feed, which freed up land for the emerging intensive livestock farming or other crops. As a result, there was a substantial reduction in demand for workers in the sector.

A second relevant innovation that paved the way for the post-WWII Green Revolution was the hybridization of seeds, which gave rise to a strong increase in crop yields. The first steps were taken in the United States with the hybridization of corn in

the 1930s (Griliches 1957, Harwood 2012). After the Second World War, high-yielding varieties of wheat and other crops were developed in Mexico that would later spread across the world and have an enormous impact on agricultural production growth.

Third, other technologies developed before 1914 improved considerably, including chemical fertilization and the use of pesticides, which grew in use during the interwar period.

Finally, certain cattle diseases were eradicated in countries such as the United States, but still without the use of pharmaceutical products. In this country, government intervention was crucial, exercised through the Bureau of Animal Industry within the U.S. Department of Agriculture, which had the authority to impose quarantines, to advance scientific knowledge and to conduct eradication campaigns (Olmstead and Rhode, 2015). Moreover, the use of pharmaceutical products for livestock enabled animals to overcome disease when closely packed together allowing the development of intensive livestock farming.

The interwar period, therefore, marked the transition from extensive to intensive growth. Although during these years, the contribution of TFP to the growth of production did not significantly change compared to the nineteenth century. It was important due to the incipient use of technologies that would greatly improve efficiency and productivity in the 1950s. Even so, regional differences were substantial. In Europe, increased production was pivotal from the 1950s in north-western countries, from the mid-1960s in the Mediterranean countries and only after the collapse of Communism in the 1990s in the eastern European countries (Martín-Retortillo and Pinilla 2015). In Latin America, the contribution of TFP did not predominate over the increased use of inputs in production growth until the 1990s (Martín-Retortillo et al. 2019).

5.- State Intervention in Agriculture

The second major transition in the interwar period was public intervention in the agricultural sector. In the nineteenth century, public intervention mostly focused on trade policies and early attempts to promote innovation in agriculture (Vivier 2008, Moser and Varley 2013). Thus, agriculture was basically a free-market activity with only modest state intervention due to the agricultural recession at the end of the nineteenth century (Koning 1994).

Food markets were strictly regulated in belligerent nations during the First World War, but the watershed moment for public intervention in agriculture was undoubtedly the 1929 crisis and the ensuing Great Depression. The passing of the 1933 Agricultural Adjustment Act by the Roosevelt administration in the United States marked the beginning of the end for laissez-faire agriculture (Libecap 1998, Federico 2012). The principal objective was to raise purchasing power of most agricultural products to their 1909-14 parity ratio (Olmstead and Rhode 2000). But the intervention to sustain farmers'

revenues faced a problem that was more profound than the reduction in prices caused by the crisis. The agricultural technological innovations had increased productivity and production that tended to generate price reductions and supply excess which dominated the farm income problem. Roosevelt's policy sought to raise and stabilize agricultural income, which required production limits and price guarantees for farmers (González et al. 2016). But the problem outlived the temporary nature of the Depression and this policy remained in place. The underlying problem was that gains in agricultural efficiency were not usually matched by a comparable advance in farm revenues. This was due to the tendency for agricultural productivity to grow more slowly than in other sectors (Tracy 1964, González 2021). The problem arose first in the United States in the 1930s, which had the most advanced agriculture and higher labor productivity due to its higher technological level. After the war, the problem extended across other developed countries. From the perspective of the interwar period, the most important point is that these innovative policies subsequently remained in place and were extended, as the magnitude of the problem did not reduce, but increased.

The growth of intervention in Europe was much more limited in the interwar period than in the United States. Two reasons explain this. First, the increase in agricultural productivity was lower than in the United States, as the technological innovations were incorporated to a lesser degree. Therefore, the emergence of the so-called farm problem was delayed until after WWII. Second, European governments remained closer to the orthodoxy of classical liberalism, while the policies of the North American New Deal moved away from this ideology. Thus, the primary examples of intervention in Europe were when excess supply of a product caused serious problems (wheat, wine) or new political forces came into power and implemented new policies (fascism, social democracy or Soviet communism).

Wheat was the product that most often inspired market intervention. The excess supply, which was apparent from the mid-1920s, gave rise to widespread implementation of protectionist measures. It went beyond simply raising tariffs and led to the practical prohibition of imports in some countries (Aparicio and Pinilla 2019). More importantly, Italy and Germany sought to achieve self-sufficiency and increased domestic production (Grando and Volpi 2014, Gerhard 2014). In France, the Popular Front government sought to regulate production and prices by creating the Office National Interprofessionnel du Blé (National Wheat Office) (Chatriot 2016). France attempted to regulate wine production also. With an excess domestic supply due to large imports from Algeria, the Statut de la Viticulture was passed in 1931. It regulated supply by limiting production per hectare and surface area, and establishing obligatory distillations. These measures were extended from 1934 with the grubbing up of vines to reduce production, which later became compulsory in certain departments, or the prohibition of planting French-American hybrid rootstock (Chevet et al. 2008).

Besides, new political forces implemented measures that broke away from the liberal orthodoxy. For example, in Sweden, the 1933 political crisis between the Social Democratic Party and the Agrarian Party led to the Pact of 1933 (Bodeförbundet). This

agreement, based in regulating agriculture, constituted a turning point in Swedish politics, as it is considered to be a decisive action for the construction of the welfare state in the country. The agricultural interests succeeded in obtaining a guaranteed minimum price for milk, at which the government was willing to purchase, irrespective of the international price levels. Market intervention increased in the following years, leading to a profound intervention in the post-war period.

Meanwhile, fascist or authoritarian governments easily abandoned orthodoxy when developing their policies (Fernández-Prieto et al. 2014). Their policies sought food self-sufficiency, particularly in grain, as was the case of Germany, Italy, Spain and Portugal. Given that these governments failed to consider agrarian reform yet found considerable support among the large landowners and farmers opposed to it. Reclamation policies in order to extend irrigation were significant in the southern countries, such as Italy or Spain (Grando and Volpi 2014). The intervention in the markets varied. In some countries, such as Portugal or Spain, guaranteed prices were established for wheat. Black markets emerged in both countries when the guaranteed prices were lower than those in the free market (Clar and Pinilla 2009, Lanero 2014). The intervention was more profound when corporate structures were created and directed by the State to control agriculture, such as the case of Germany and the RNS (Reich Nutritional Estate). There, prices and production were also established by the State. The RNS ended the free market for agricultural products (Gerhard 2014).

The Second World War merely prepared the ground further. All countries had no option but to intervene in agriculture to ensure food supplies for their hard-pressed populations (Short, Watkins and Martin, 2007). In this way, during the interwar period, the first instruments were designed to conduct a profound intervention in agricultural markets, regulate production and/or offer guaranteed minimum prices to farmers.

Another prominent type of intervention was the implementation of agricultural reforms that generally involved changing property rights of rural land, which meant changes in land ownership, tenure, fragmentation of land holdings, and land reclamation programs. The situation created by the First World War, with the mass mobilization of young people, boom in nationalism in Eastern Europe with the dissolution of the Russian and Austro-Hungarian empires, the impact of the Russian Revolution, a renewed negative perception of rural inequality and changes in relative prices and profits of farms explain the coincidence of so many agricultural reforms during this short period of time. Many countries in Europe were affected by these types of measures between 1918 and 1939, particularly in the east. It is estimated the reformed area, excluding the Soviet Union, was 29.4 million hectares, accounting for 9.9% of the total area (Brassley 2010). This was a central element of social conflicts in the European rural environment, generating a significant political polarization. In the most extreme cases, these conflicts over the ownership of the land played a central role in some of the continent's bloodiest civil wars such as in Russia or Spain (Figes 1996, Simpson and Carmona 2020). Undoubtedly, the most radical reform took place in Soviet Russia. Although Communist policies might be considered as constituting radical agrarian reform that involved the redistribution of land

to the peasants, the forced collectivization policy during the Stalinist terror abolished private land ownership and shaped a model of collective farms that lasted until the end of the twentieth century.

Public interventionism in agriculture initiated in the 1930s intensified during the war as a result of problems related to supply and feeding the population. Restoring food normality took several years. The experience of the war had motivated developed countries to maintain or implement policies that guaranteed food security.

After the war, the farm problem was perceived as structural rather than temporary. Many industrialized countries were facing a similar agricultural situation to that of the United States in the 1930s. The continuing disparity between farm incomes and those of other sectors inevitably became a major concern for governments, and therefore a major determinant of their agricultural policies (González et al. 2016). The most common political response was directed towards the demand side, including price supports, export subsidies and a wide range of protectionist measures for agriculture, causing the so-called major “disarray” in world agriculture (Johnson 1973). Postwar interventionism placed European agriculture on the road to self-sufficiency and reversed the trend that made the continent the world’s main importer of agricultural produce. Additionally, the market was no longer the lodestone for farmers’ decisions, as official policy regarding guaranteed minimum prices, production quotas, payments, subsidies, and protection came to exert a similar influence.

6.- From Inter-industry to Intra-industry Trade

Agricultural trade had grown between 1850 and 1902 at an average annual rate of over 3% and continued to do so until 1914. However, it shrank brutally as a consequence of the First World War, recovered rapidly until 1929, and shrank once again in the 1930s (Aparicio et al. 2009). During the interwar period, the rapid growth of agricultural trade which had taken place until 1914, also facilitated by favorable terms of trade compared to those of manufactured goods (Williamson, 2006), not only slowed down but became highly unstable. The anemic growth of the interwar period contrasts with the rapid expansion of the nineteenth century and that of the second half of the twentieth century. In Latin America, this instability and low level of growth was one of the key elements explaining the distrust of the export-led model to achieve economic development and the shift in the 1950s towards import substituting industrialization models.

During the interwar period, the increase in demand of the industrialized countries slowed down, which, together with a substantial increase in the protection of domestic production, called into question the growth model led by the exports of primary products that had stimulated the expansion of agricultural production in the periphery countries. Furthermore, an abrupt worsening of the trade terms (Ocampo and Parra-Lancourt 2011) also weakened the export capacity of agricultural products to maintain a high pace of economic growth in the respective countries.

Thus, the interwar years constituted a transitional phase between a period in which primary products had accounted for a significant share of world trade (Lewis 1952) to one in which their relative weight fell brutally, due to lower growth in the volume of agricultural trade with respect to total trade and significant changes in the terms of trade that negatively affected it (Serrano and Pinilla 2012). Inter-industrial trade, characterized by the exchange of primary products for manufactured products between countries with very pronounced respective specializations, was gradually replaced by intra-industrial trade, based on the exchange of similar manufactured products between countries with specializations that tended to converge.

7.- Final remarks

The interwar era was a period of transition in agriculture. The “Age of Dislocation” was an era of massive economic fluctuations, disruptions and volatility in the world economy, causing abrupt changes to many important economic trends of the previous “Golden Age” of Resource-Based Development of the world periphery. In some cases, previous long-term trends were reversed. Others were not affected or even boosted. These years constituted a long period that prepared the post-WWII era, when the Green Revolution seemed to open the prospect of a famine-free world.

The Age of Dislocation became an era of anti-globalization forces, that combined extended policies of trade protectionism, stagnant long distance transport costs and the definitive abandonment of the gold standard. The outbreak of the First World War ended global trade expansion and, with it, the boom in the exploitation of natural resources and new economic opportunities.

Despite transitory peaks during both World Wars, all primary-producing economies experienced a long-term decline in their terms of trade compared to the late nineteenth century. This trend was worsened by increasing tariff rates and other trade barriers implemented in the primary products markets of Western Europe and the United States. The periphery responded by imposing and increasing its own tariffs and restrictions on imports of manufactured goods. The economic disruptions of the Age of Dislocation also reduced global capital investment, and international migration also abated significantly from 1914 to 1950.

Widespread limitations on trade, significant increases in tariffs, the establishment of quotas and other mechanisms to control exchanges and the support of domestic agriculture were the most noteworthy features of those years. Within this context, the interwar period was crucial for agriculture because it represented a transitional stage in three main aspects.

During the interwar period, decisive steps were taken in the initial adoption or diffusion of new technologies which played a fundamental role in the agricultural expansion after 1945. First, self-propelled machines formed an essential part of this

technological transition. During the interwar period, tractors were used extensively in North America, highly unevenly in Europe and settler economies, and only incipiently in other parts of the world. Other relevant innovations which allowed the development of intensive crops and livestock farming were the hybridization of seeds, the use of pharmaceutical products for livestock (antibiotics), chemical fertilization, seed selection and the eradication of certain cattle diseases (but still without the use of pharmaceutical products). This progressive introduction of new technologies marked the transition from extensive to intensive agriculture growth.

The second major transition in the interwar period was public intervention in the agricultural sector. In this respect, one of the most important changes in the 1930s involved the switch from self-regulating economic policies to policy instruments that had to be manipulated by the authorities. In the nineteenth century, the intervention of the state mostly focused on trade policies and early attempts to promote innovation in agriculture. Thus, agriculture had been basically a free-market activity with only modest state interference. Food markets were strictly regulated in belligerent nations during the First World War and this marked a transcendental change with respect to the past, but the watershed moment for public intervention in agriculture was the Great Depression. The experience of the war had motivated developed countries to maintain or implement policies that guaranteed food security. In this way, during the interwar period, the first instruments were designed to conduct a profound intervention in agricultural markets, regulating production and/or offering guaranteed minimum prices to farmers. Direct intervention in agriculture and agreements with (local or external) producers and agricultural marketing boards were widespread practices throughout the world.

The creation of a broad institutional structure to support and promote agriculture was another feature of this process. Marketing boards were established through government action and had a wide range of responsibilities and powers of enforcement over producers and handlers of certain commodities. They played an increasingly important role in the developing countries during the period. They differed from direct government services mainly because of stronger autonomy in management and procedure, and included representatives of the commodity concerned (producers and managers). Unlike cooperatives they had an official status which allowed them to enforce their rules on other agents.

The final trend during the interwar years constituted a transitional phase between a period in which primary products had accounted for a significant share of global trade to one in which their relative weight decreased considerably. Inter-industrial trade, characterized by the exchange of primary products for manufactured products between countries with production specializations, was gradually replaced by intra-industrial trade, based on the exchange of similar products (from manufacturing) and countries with specializations that tended to converge. This process reinforced the gap between core and peripheral countries that prevailed in the second half of the twentieth century.

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TRANSITION AND CHANGE IN WORLD AGRICULTURE DURING THE INTERWAR YEARS*

1.- Introduction

There is no doubt that the turbulent years between the two World Wars affected the development of agriculture on a global level. During the first wave of globalization, global production grew significantly. This was achieved thanks to the improvement in productivity in Europe and the clearing of new lands in other continents. The territorial expansion of the United States and of the settler countries (Argentina, Australia, Canada, New Zealand and Uruguay), and the agricultural frontier in Latin America and in the territories in which the Europeans established colonies in Africa and Asia, was enormous. Logically, the exports of agricultural and food products played a fundamental role in the huge increase in trade in the first wave of globalization.

However, the interwar years were not crucial simply because of the economic impact that events such as the two World Wars or the depression of the 1930s had on global agriculture or the trade of its products, but because the interwar period was a pivot, laying the groundwork for certain post-war trends. From 1914, developed countries began to use technologies that would decisively change agriculture in the post-World War II era throughout the world, although at different paces in the different regions. In those countries that had not yet implemented large-scale industrialization processes, these years were also decisive as they lost confidence in their role as suppliers of primary products to the developed world and the objective of imitating their industrialization processes spread. Moreover, the weight of agricultural products in world trade began to decline. Finally, in the interwar years, public intervention in agriculture acquired great importance and would subsequently become highly relevant. Agriculture would no longer be an activity just influenced by market forces and only distorted by protectionist trade policies.

Within this context, the objective of this study is to explain first, the most prominent features of the evolution of agriculture in the world throughout the first wave of globalization. Next, we will discuss how and why the events of the interwar period called into question the preceding trajectory of agriculture. Subsequently, we will

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successively analyze three features of agriculture that would become fundamental aspects after the Second World War and which began to take shape during the interwar period. The first was the adoption of new mechanical and biological technologies that would pave the way from extensive agricultural growth, based on the use of more productive factors to a predominantly intensive agriculture fostered by the adoption of innovations. The second feature was the intervention of governments in agriculture to modulate production and subsidize the income of farmers. Finally, international trade experienced a transition from the exchange of manufactured products for primary products depending on the comparative advantage of each country to a new trading system in which agricultural trade played a smaller role, as trade came to be principally based on manufactured products or components and the establishment of global value chains. We will finish by presenting conclusions that seek to highlight the legacy of these years for agriculture after the second post-war period.

2.- The end of an era: What came before?

The First World War represented the end of an era characterized by a long period of global frontier expansion.¹ We can identify four key regions of global economic development (Barbier 2011): the core of the world economy represented, mainly, by Western Europe; an extensive and heterogeneous periphery composed of a “Great Frontier” comprising temperate North and South America, Australia, New Zealand and South Africa (often referred to as settler economies: Denoon 1983, Lloyd et al. 2013)²; a “Tropical Frontier” which includes tropical Latin America and the Caribbean, Asia and Africa; and the “Land-Based Empires” consisting of the Ottoman Empire in West Asia and the Middle East, the Russian Empire, the successive dynasties of China and the Mughal Empire in India.

Prior to the twentieth century, Europe had become a central player in the global agro-food trade. Before the First World War, it represented three-quarters of global imports of agricultural and food products. Its weight of exports, while relevant, was lower, accounting for around one-third (Aparicio et al. 2019).

Growing internal and external demand and market integration drove European agricultural transformations throughout the nineteenth century, particularly from 1870 onwards (Van Zanden 1991, O’Brien and Prados de la Escosura 1992, Federico 2005,

¹ Frontier expansion is an old concept that has been systematically used and redefined by a long series of scholars from the pioneer article of Frederick Turner (1897) to recent contributions, such as Beckert et al. (2021, 467) where “The commodity frontier [...] is not simply a place. It is a relational concept that grasps the flows of materials and energy between nature and society, between different societies and within them. These flows connect regions of extraction with the sites of production that organize capitalist modernity on a world scale.”

² The world’s average annual growth rate of cropland was 0.52% in 1700-1800, 0.46% in 1800-1870 and 0.69% in 1870-1910. Those regions characterized by open frontier in the end of the nineteenth century experienced the highest rates in the last period: Australia and New Zealand (2.28%), Latin America (2.14%) and North America (2.16%) (Barbier 2011, 380).

Lains and Pinilla 2009, Dennison and Simpson 2010). The very uneven economic growth in the different regions of the continent and the ensuing demographic transition, comprising a substantial reduction in the death rate coupled with a fertility rate which initially remained at high levels, implied an increase in the demand for food and agricultural raw materials, due to the increase in the population or income per inhabitant. Furthermore, the growing specialization in manufactured goods in the most advanced nations, particularly the United Kingdom, meant that these countries had to meet some needs through imports. The international division of labor that expanded as globalization advanced (The Great Specialization) led to a considerable growth in international trade (Federico and Tena 2016). Trade liberalization and falling transportation costs (Jacks 2006, Jacks et al. 2011, O'Rourke and Williamson 2000) facilitated integration in global markets. In addition to economic growth, improvements in internal transport and the abolition of internal tariffs led to a high level of integration of domestic markets.

The resulting market integration and a more efficient allocation of resources led to growth in production (Broadberry et al. 2010, Kopsidis and Wolf 2012). Technological innovation also played a fundamental role. Given that the European continent had very little scope to increase production through further land clearing, as there was only a small amount of land that could be used for agriculture, the more intensive use of the land, an increase in capital and workers, and certain innovations were the principal driving forces. During much of the century and in those European regions that were ecologically suited to it, innovations were adapted from areas such as England or the Netherlands. These included new crop rotations with the introduction of pulses and other fodder crops which allowed the elimination of the fallow systems, more intensive fertilization, and new fertilizers such as guano originating from the Pacific coast of South America (Chorley 1981, Allen 1994, Cushman 2013).

In the second half of the nineteenth century, animal-powered harvesters, steam threshers, chemical and inorganic fertilizers and concentrated feed for cattle increased productivity and production. This started the fundamental industrialization of agriculture, leading to fairly widespread growth in agricultural production and structural changes (Federico 2005). Grains tended to lose weight in production, while products with a higher elasticity of demand increased with respect to income, such as livestock products, including meat and dairy products or fresh fruit and vegetables. Not only was a larger population demanding more food but the nutritional transition also implied that European diets were changing.

Different European regions followed different paths of agricultural transformation. Some specialized in producing and exporting products for which they had comparative advantages. Western Mediterranean countries, and to a lesser extent those in the eastern Mediterranean, focused on products characteristic of these regions, such as wine, oil or fresh fruit and vegetables (Pinilla 2021, Petmetzas 2009, Federico, 2009). Russia became a large exporter of grain to the rest of the continent and the Scandinavian countries developed the production and export of butter or bacon in Denmark or forestry products in Sweden and Norway (Lampe and Sharp 2019).

The United Kingdom became the world's leading importer of agricultural raw materials, opening up its markets to the exports of other countries, although this implied a significant step backwards in its agricultural sector. Other large continental countries, such as France or Germany, also industrialized and increased their production in an attempt to supply their domestic markets although they had to import certain products (Vivier 2009, Grant 2009).

The world economic boom from 1830 to 1913 profoundly transformed economies outside of Europe too. Buoyant global demand for raw materials and food boosted growth in various primary-producing countries in both temperate and tropical regions. This era is usually identified with a golden age of resource-based development or an export-led growth models (Findlay and Lundahl 1999, Findlay and O'Rourke 2007, O'Brien 1997, 2006, O'Rourke and Williamson 1999, Schedvin 1990, Williamson 2006).

The rapid industrialization of European economies increased their need to exploit cheap natural resources from the new frontiers. Many core countries obtained an immense range of natural wealth, not only through new lands that constituted an outlet for poor emigrants searching for better economic opportunities but also through new sources of fishing, plantation, mining and other resource frontiers (Barbier 2015). Four main global "frontiers" provided "vast, varied, and cheap" supplies of "extra-European resources": ocean fisheries, including whale and seal fisheries; boreal forests around the Baltic region, Scandinavia and Russia; tropical land for plantation and smallholder commercial crops (sugar, tobacco, cotton, rice, indigo); and temperate arable land for grains (Jones 1987, 80-82).

As the periphery economies improved their conditions to offer resource-based exports, they needed more foreign capital and labor. Steamships and railways radically reduced the cost and time of transporting commodities and people across water and land (Mohammed and Williamson 2004). This accelerated the flow of primary-product exports to Europe, and the corresponding movements of capital³ and labor⁴ to the developing world, especially in the last third of the nineteenth century. Falling transport costs also meant that the expanding European demand for food and raw materials increased prices in frontier regions for these commodities. In this sense, agricultural development, specialized in the production of goods for export, drove frontier-based development in many temperate and tropical regions of the world (Barbier 2011).

The expansion of the long-distance transportation and trade boom of the late nineteenth century translated into an export boom of primary-products, mainly from frontier regions and the European periphery to industrialized Western Europe, the world's

³ In around 1914, UK, France and Germany accounted for three-quarters of global foreign investment, but Europe represented only 27% as a host region. The main recipients were: North America (24%), Latin America (19%) and Asia (16%) (Cameron and Neal 2014, 343).

⁴ In 1870-1913, world population recorded an annual average growth of 0.77%. The ratio of Western Europe (0.18%) contrasted significantly with those of the periphery: Western Offshoots (2.07%) and Latin America 1.63%). However, Asia (0.55%) and Africa (0.75%) showed lower records (Maddison, 2003).

leading market (Aparicio et al. 2009, 2018). The worldwide export boom in primary products was shared equally by temperate and tropical regions. Exported foodstuffs consisted of tropical groceries, such as coffee, sugar, tea, tobacco, vegetable oils, rice, spices, nuts, and fruit (O'Brien 1997). Large volumes of food and raw material exports from temperate "frontier" regions to Europe, such as South America (especially Argentina, Uruguay and Chile), Oceania (Australia, New Zealand), North America (United States, Canada) and Africa (South Africa), included raw cotton, wheat, corn, hides and skins, wool and meat products (Hanson 1980, Pinilla and Aparicio 2015).

The primary-product trade boom generated an extraordinary expansion of cropland across the global frontiers. In all regions, this expansion between 1700 and 1910 occurred mostly at the expense of forest land, savannah and grassland. Although global cropland area increased by over 50 percent in the eighteenth century, this rate doubled in the nineteenth century and clearly accelerated from 1870 to 1913, with the majority of this expansion occurring in those regions with abundant land for conversion to agriculture (typically the settler economies; Barbier 2011).⁵ Likewise, by 1870, the three largest and most populated Asian countries – China, Java (Indonesia) and India – had limited territory on which to expand the frontier for new cultivation, despite significant population pressures. Instead, cropland expansion occurred in small tropical countries of Asia where land was available, such as Burma (Myanmar), Ceylon (Sri Lanka), Malaya (Malaysia) and Thailand. Finally, in Africa, cropland expansion increased modestly and mainly in a few countries with abundant land, such as Egypt, South Africa, and the Gold Coast (Ghana). The colonization by the Europeans of a large part of these territories was, undoubtedly, a key factor explaining this territorial expansion.

3.- The Age of Dislocation (from 1914 to 1950)

The years between 1914 and 1950 saw huge disruptions in the world economy, described as the "Age of Dislocation" by some scholars (Lewis 1949, Barbier 2011). The Age of Dislocation became an era of anti-globalization forces, that combined trade protectionism (Williamson 2006, Findlay and O'Rourke 2007), stagnant transport costs (Findlay and O'Rourke 2007) and the abandonment of the international gold standard (Bulmer-Thomas 2003). The outbreak of the First World War ended global trade expansion and, with it, the boom in the exploitation of natural resources and new economic opportunities. After the First World War, the United States became the predominant economic and political power on a global scale, surpassing the United Kingdom and other Western European economies (Bulmer-Thomas, 2018). The other country of the Great Frontier club that showed signs of successful industrialization was Canada. Other countries, notably the southern settler economies like Argentina, Chile,

⁵ As Findlay (2017, 262) explains: conquest "opened up a new 'frontier' where land could be extended indefinitely but only at a rising marginal cost in terms of other real resource". This economic criterion worked in regions with low population densities and relatively weak indigenous populations whom industrialized (and militarized) settlers and colonists overran.

Uruguay, South Africa, Australia and New Zealand, showed more diverse results.⁶ The four Land-Based Empires (Ottoman, Russian, Chinese and the Mughal Empire in India) had dissolved. Although the successor of the Russian Empire, the Soviet Union, pursued a sustained process of industrialization, the countries that evolved from the other three former empires –China, India (as well as Pakistan), and Turkey– began a trajectory of persistent backwardness. On the other hand, in Asia, Japan had become fully industrialized and had achieved high levels of economic welfare on the eve of the Second World War.

The widening gap in economic development between a few rich industrial countries and primary-producing countries (underdeveloped periphery) continued more or less relentlessly throughout the first half of the twentieth century. Only a handful of peripheral countries improved their positions to draw closer to the leaders.⁷ The long-term trend in “unequal development” since 1800 was manifest by absolute factor price divergence between core and periphery, a rate of divergence between 1800-1940 greater than at any other time in the history of the world economy (Williamson 2006).

Despite transitory peaks during both world wars, all primary-producing economies experienced a long-term decline in their terms of trade⁸ compared to the late nineteenth century (Clemens and Williamson 2004). Between 1924 and 1932, the terms of trade of agri-food exports, with respect to manufactured products, deteriorated by 20-45% depending on the weight of the different products in the various regions of the world. In 1934-38, they were still 15-40% lower; Asia was the most affected, South America and Oceania less so (Pinilla and Aparicio 2015). This trend was worsened by increasing tariff rates and other trade barriers implemented in the primary products markets of Western Europe and the United States. The periphery responded by imposing and increasing its own tariffs and restrictions on imports of manufactured goods.

Latin American countries provide an example of these dynamics. The Great Depression played a decisive role in Latin America’s economic development during the first half of the twentieth century. The main change was a clear disruption of the export-led strategy based on exploiting natural resources which was replaced by an import

⁶ Of this group of countries, only Australia experienced a progressive –but modest– industrialization process from the beginning of the twentieth century. Such a high share was possible despite Australia’s strong comparative advantage in primary products only because the manufacturing sector was protected more highly than all other advanced economies, except New Zealand and almost as much as Argentina (Anderson, 2018)

⁷ Comparing the GDP per capita of large regions of the world in 1900 and 1950 with that of Western Europe shows that the level of the ratio did not change for Eastern Europe, Asia, Middle East and Sub-Saharan Africa, hardly improved for Latin America (from 0.4 to 0.5) and the only exception was the Western Offshoots. In this case the ratio increased from 1.6 to 2, illustrating the success of the world’s periphery (Maddison Project Database-MPD 2020).

⁸ The terms of trade of each country refer to the ratio between an export price index and an import price index as a proxy of the domestic impact of the international evolution of good prices. Usually, considering the different productive specialization of core and periphery countries, the indicator is calculated as the ratio between prices of agri-food exports and manufactured products (with the adequate shares in the national trade baskets).

substituting industrialization (Bulmer-Thomas 2003, Thorp 1998, Bértola and Ocampo 2013). Inward-looking development based on import substitution and state-led industrialization defined much of Latin America's economic development from the 1930s to the 1980s. These countries depended on a handful of primary-product exports, which meant that they were exposed to the international price volatility of the two world wars and the Great Depression. Despite the 1929 crash and the impact of the depression on trade, the region's exports increased even more, especially tropical products, which performed somewhat better than those from temperate areas. Both wars increased demand for Latin America's products, as this region had the advantage of being far from the theatres of the war, although the difficulties of maritime transport and its high cost limited the possibilities of the region. The international depression of the 1930s produced a demand-side shock reducing global prices and imports. Consequently, the deterioration in the terms of trade was very significant (between 20-25% over the decade). As a result, the purchasing power of South American agricultural exporters reduced considerably, since the slight increase in export volume far from compensated for the deterioration in the terms of trade (Pinilla and Aparicio 2015).

The growth of exports of tropical countries was high compared to the pre-war level in the 1920s, but much slower in the 1930s. However, the deterioration of their relative prices was enormous, so that purchasing power deteriorated significantly in all regions, except in Africa, where the strong increase in the volume exported, due to the privileged access of the colonies to metropolitan markets, compensated on the whole for the fall in prices (Pinilla and Aparicio 2015).

The economic disruptions of the Age of Dislocation also reduced global capital investment. The two world wars and the Great Depression were obviously explanatory factors of this decreasing trend, but long-term foreign investments, mainly from Europe, but also the United States, were also affected by protracted currency instability and increased limitations to movements of financial resources (O'Brien 1997).

International migration also reduced significantly from 1914 to 1950. Migration to North and South America and the major "settler" economies of Oceania, was subject to ever more restrictive immigration policies that began in the 1890s but were firmly imposed in the early 1920s.

Although the global cropland expansion at the expense of forest, savannah and grassland continued, this process occurred at a slower rate than in the previous era. However, there were noticeable differences between regions. Cropland expansion slowed notably in North America, Australia, New Zealand, and in Latin America and the Caribbean, but frontier expansion continued to increase quickly in Africa and Asia. In comparison, Tropical Frontier countries and the former Land-Based Empires of China, Russia and Turkey all showed remarkable increases in cropland area, despite economic instabilities. During these years, frontier expansion was not a response to increasing demand for primary products from the periphery but an outlet for absorbing the growing numbers of the rural poor (Barbier 2011).

Both the world war and its immediate aftermath meant that agriculture was extraordinarily turbulent in Europe even before the Great Depression. Federico (2004) estimates a fall of 40.7% in agricultural production in Eastern Europe, 19.6% in North-Western Europe and 7.1% in Southern Europe during the First World War, largely because much of the rural population mobilized to the front or urban industrial production. Furthermore, agricultural trade shrank between 1913 and 1918 at an annual rate of 10.9% (Aparicio et al. 2009) due to the Allies' attempt to blockade Germany and Austria-Hungary and the mobilization of resources for the war effort. Another important factor was the Bolshevik Revolution and the food provision problems which ended Russian grain exports.

The end of the war marked the end of wartime distortions and a rapid recovery of agricultural trade, with the exception of Russian exports. The recovery of production in Europe and the increase of some large exporters during the conflict generated growing tension in international markets, with excess supply, stock increases of certain products and resulting reductions in price, which was particularly noteworthy in the case of wheat, which increased their production significantly in the Americas and Australia (by 46%) between 1914 and 1925.

Turbulence continued into the second half of the 1920s when protectionism increased in response to demand-supply imbalances. Demand slowed in importing countries, particularly the United Kingdom, due to the lower growth of its population and a strong increase in supply. Supply increased for two reasons. First, technological innovations like fertilizers or selected seeds were introduced into Europe. Second, large agricultural export countries, particularly on the American continent, had massively expanded production. This excess supply was most prominent in grains, but tropical commodities experienced similar growth (Aparicio and Pinilla 2019). The increase in protectionism, with appreciable tariff increases from 1926 in countries such as France or Germany, and the support of domestic production, particularly of cereals, intensified the problem.

Within this context, the crash of 1929 and the Depression of the 1930s aggravated the situation. Widespread attacks on international trade, strong increases in tariffs, the establishment of quotas and other mechanisms to control exchanges and the support of domestic agriculture were the most noteworthy features of those years. The prices of agricultural products fell dramatically and their volume of international trade diminished by 13% in absolute terms between 1929 and 1934. The United Kingdom implemented the imperial preference system at the Ottawa conference in 1932. This system not only launched a new attack on trade by the world's principal importer of agricultural products. These agreements implied, first, the protecting of the British market but also facilitated, where possible, the maintenance of trade with its territories, putting an end to the traditional liberal trade policy.

In the United States, agricultural production increased at a very fast pace from 1910 until the beginning of the crisis in 1929. American agriculture faced challenges from

the early 1920s, because purchase prices worsened for farmers relative to prices paid for the necessary inputs. During the whole decade, attempts were made, and usually failed, to increase the prices paid to the farmers. The farmers formed cooperatives of basic commodities in order to improve their situation, while the state established public intervention mechanisms with the same objective. The real turning point was the beginning of the crisis in 1929. Between 1929 and 1932, agricultural prices fell significantly. The collapse in farm income, foreclosures, and distressed rural banks and farm suppliers eventually convinced Democratic politicians to act. The most important measure, the Agricultural Adjustment Act (AAA) in 1933, aimed to increase the real income of the farmers, restricting production, guaranteeing minimum prices and retiring cultivated land in exchange for compensation. A high percentage of farmers (over 25% of corn growers, 60% of hog producers and 40% of wheat growers) signed contracts with the government to adopt these programs. The result was an increase in prices and income for the farmers, although the overall impact is still unclear for the different authors (Olmstead and Rhode 2000).

The remaining “southern cone” economies of the Great Frontier (temperate Latin America, South Africa, Australia and New Zealand) did not perform as well as the United States or the other industrial core economies. In the century before the First World War, settler economies took full advantage of the new technological and market opportunities created by the Industrial Revolution, to reach levels of prosperity which had been unimaginable a century before (Denoon 1983, Lloyd et al. 2013). However, these new capacities did not generally lead to diversified productive structures and a varied export portfolio (Willebald 2007). Even Australia –with a federated political composition, a significant variety of export staples and a solid tradition of state intervention– moved timidly towards a modest diversification. In other places the limits were even narrower.

The southern cone economies were highly vulnerable to economic disruptions and external shocks due to the low diversification of production, dependence on a few resource-based primary-product exports, and reduced domestic markets. However, economic policy responses to the shocks diverged considerably.

Australia’s initial reaction to the Great Depression was to strengthen its capacity to produce and export natural resource-based commodities, especially wheat (Rothermund 1996). The government designed and launched the “Grow More Wheat” campaign to spur the expansion of cereal production and maintain export revenues as international wheat prices fell. In the 1920s, farmers cleared 3 million hectares of new land. During the Depression, a further 1.5 million hectares were added to make a total of 9 million hectares under cultivation (an area larger than the entire wheat-producing area of France, Germany and the United Kingdom together at that time). But the decline in wheat prices was so significant that farmers had to sell cereal below the cost of production. The government addressed the difficulties by devaluing the Australian pound in January 1931, programming official purchases of grain at stable domestic prices, and “dumping” wheat on world markets. As a result, Australia may have managed the adverse conditions better than most economies, including those of the southern cone, but

diversification away from a few staple exports (wheat, wool, minerals) was deferred until the post-1945 period.

In New Zealand, two issues were strongly debated in the 1920s: the instability of farm incomes and the need for government provision of finance to the agricultural sector. The predominant response was institutional. The creation of the Meat Producers Board (1922),⁹ the Dairy Produce Export Control Act (1923) and the Rural Intermediate Credit Act (1927) empowered the government to set up local finance boards (Fleming 1999). The increasing strength of trade union, farming, and manufacturing groups was a major feature of New Zealand politics during the 1920s and continued into the 1930s. Sectional interest groups pressed strongly and effectively for specific support from the government in the face of increasing levels of disruption in world trade.

In the case of Latin America, the interwar period laid the groundwork for trends that would dominate post-war economies. In the 1920s and 1930s the organizations created to support specific economic sectors multiplied in Argentina and Uruguay (Rapoport 2018, Frega et al. 1982) (*juntas reguladoras*). But, in general, instead of promoting better productive, technological and labor conditions, these agricultural boards channeled sectoral interests. The expansion of agribusiness mostly went hand in hand with a backward *campesino* sector or, more generally, a rural society that lagged behind the rest of the country. Trade policy discriminated against agriculture but this mainly resulted from explicit or implicit taxes (e.g., via differential exchange rates) on traditional export products (coffee, sugar, etc.). The other side of this discrimination was the protection of agricultural production that competed with imports (Bértola and Ocampo 2013). These broader factors contributed to increasing dualism in the agriculture sector between large agribusiness and smaller rural producers.

South Africa was one southern settler economy that did extraordinarily well during the Great Depression and the following decade. The successful expansion of mines and commercial agriculture (known as the maize and gold alliance, Greyling et al. 2018) led to substantial exports of diamonds, gold, wheat, wool and rice. Economic growth attracted workers from all over southern Africa, and, in turn, led to increased food production even in the peasant sector. Initially, the crisis caused a significant reduction in commodity exports, in particular, a collapse in grain prices due to global overproduction. However, after 1932, economic performance improved, boosted by the revival of world demand for ores (Feinstein 2005). In the 1930s, South Africa continued to diversify and industrialize, while encouraging its primary product exports, domestic food production capacity and official programs for controlling soil erosion and conserving land.

The populations of Africa and Latin America almost doubled between 1913 and 1950, and rose by almost 50% in Asia. But economic opportunities for absorbing the growing population were drastically diminished in the formal markets. Plantations, mines

⁹ The Meat Producers' Board was the earliest export monopoly board in the world (Capie, 1978).

and export-oriented peasant agriculture suffered severely from the slowdown in world demand for primary commodities. The vicious cycle of deteriorating terms of trade, falling agricultural and mining returns, expanding debt and increased land abandonment in the peasant and plantation export sectors dominated the 1930s. Given these economic difficulties, the absorption of labor in tropical regions occurred mostly in the non-traded agricultural and small-scale manufacturing sectors. In agriculture, production was either oriented towards subsistence or to local and regional markets as a version of the “dualism” scenarios described in Lewis (1954).¹⁰ Or, in a similar way, assuming that only the most successful and prosperous farmers, encouraged by their previous success, would decide to devote more of their time and efforts to specialized cash-crop export production, these were likely to become bigger while at the other end of the spectrum the number of dependent small farmers would increase. Inequality would therefore surge (see the case of Ghana in Gunnarsson 2018).

Cropland expansion in the immense majority of Tropical Frontier economies advanced at a faster pace between 1910 and 1950 than in the preceding four decades. For some countries, especially in the 1930s and 1940s, increased cropland area for food production was a major factor (Peru, Thailand, Philippines, Assam-India, Morocco). This occurred through applying traditional agricultural techniques (Barbier 2011) and reproducing traditional varieties over more land (Booth 2007, for Southeast Asia). Particularly important in the Southeast Asian context was the effect of the expansion of estate agriculture on the land available for smallholder producers (Booth 2007). Meanwhile, in the 1950s, independent governments gave more support to smallholders, in the form of research, extension, marketing support, land reform, and formula pricing, depending on the country and commodity (Byerlee and Viswanathan 2018).

Although it may seem that land was abundant in many tropical regions, most of the frontier cropland expansion carried out in the 1930s and 1940s to absorb the rural poor occurred on marginal rather than good quality land (sub-Saharan Africa was a clear example; see Austin 2008). A transcendent institutional factor constraining the availability of good quality land in many countries of the Tropical periphery was colonial land use policies. The agricultural economy of the colonies operated on two levels with Europeans benefitting from preferential treatment. Europeans principally owned and managed the commercial export enclaves, and much of the good quality land allocated to these productive establishments (Northern Rhodesia, Algeria, the Congo, Kenya, Morocco, Nigeria and Southern Rhodesia) (Griffin et al. 2002). In Asia, this pattern was extensively repeated in the case of jute, sugar, tea and other plantation estates in Ceylon, Malaya, India, Indochina and the Dutch East Indies, with the European establishments receiving the best quality arable land and the expansion of food crops by peasant farmers confined to converted forest, steep hillsides and other marginal lands (Barbier 2011,

¹⁰ The classical theoretical model of economic development of Lewis (1954) is premised on two assumptions that there was an unlimited supply of labor in the traditional agricultural sector of the less developed countries and that, as the modern industrial urban sector in these countries grew, this vast pool of surplus labor would be absorbed. Therefore, the mentioned non-traded agricultural and small-scale manufacturing sectors were able to act.

Reynolds 1985). In the case of tropical Latin America, an inherited colonial legacy led to the best quality land being concentrated in the hands of rural elites descended from European settlers. This not only skewed the distribution of land holdings (with a clear production gap between *latifundistas* (owners of large-scale farms) and *minifundistas* (owners of very small farms); Bértola and Ocampo 2012) but ensured that the wealthy elite retained the best quality land (Griffin et al. 2002).¹¹

Public investment and economic policy significantly affected agricultural trade in the 1930s and 1940s. There was a lack of “complementary” public investments in large-scale infrastructure projects, such as railways, ports and shipping, telecommunications and public utilities (Barbier 2011). Economic policy also distorted markets. The British colonial authorities of Zambia, under pressure from settlers, distorted the market against local producers (indigenous Africans) who were paid lower prices (Hillbom and Jenkin 2018). In Botswana, the colonial state made investments in veterinary services and agriculture, a strategy that promoted the development of a mono-product economy based on beef exports (Hillbom 2015). As in the case of Latin America, the creation of agricultural marketing boards was a widespread practice in tropical Africa (Jones 1987).

With the Great Depression (and later WWII), colonial governments saw their principal sources of revenue severely reduced and both European and African populations faced serious financial difficulties. Marketing boards originated in the United Kingdom, but similar efforts were made in French and Belgian Africa. The first marketing boards were authorized partly in response to the widespread belief that they would raise prices, farm incomes, and export proceeds. It was also believed that governmental control would reduce marketing costs to the benefit of producers. The resulting experiences were varied, and the debate is still open as to their effects.

The interwar period was crucial for agriculture because it represented a transitional moment in three main ways. First the move from extensive to intensive growth began. Second, major state intervention began in agriculture, kicked off by the First World War. Third, primary goods started to decrease as a share of world trade. The following sections discuss these structural transformations.

4.- The Move from Extensive to Intensive Growth

The move from extensive to intensive growth occurred in the most developed countries during the interwar period, though much later in other regions.¹² Over the last two centuries, global agriculture was able to feed a rapidly growing population. Although the data prior to 1870 are precarious, in most parts of the world, production probably grew at a parallel rate to population growth and in some, even faster (Federico 2005). From

¹¹ The high Gini indexes of landownership is another clear expression of this issue.

¹² This movement meant the transformation of an agriculture growth based on the accumulation of factors of production (labor, capital) to another based on efficiency gains and technological change.

1870, production growth accelerated, but it slowed down considerably in the interwar period and resumed once again at an even faster pace after the Second World War (Federico 2004). Malnutrition or extreme famines were not due to insufficient supply but to problems of accessing food given low incomes or an inadequate distribution of production.

Myriad causes explain the increase in agricultural production, which occurred unequally in different regions of the world throughout the nineteenth century. The growth in production was based on the use of more productive factors as workforce, infrastructure and livestock. Rising demand for food and agricultural raw materials for industry increased production partly based on cultivating new land and colonizing indigenous people's territories. The expansion of the agricultural frontier was an important phenomenon in the Americas, Africa, Asia and Oceania. Only Europe, with some exceptions, remained outside of this movement.

More cultivated land required more labor. The active agricultural population continued to grow in absolute terms throughout the world, with few exceptions, such as the United Kingdom. European settlers expanded the frontier in North and South America towards the west, and in Australia, from the south-east onwards. In other regions, the local population cultivated new land through family farms, large estates, or often large plantations.

Although this growth was mainly extensive, technological innovation had already played a relevant role. There were four principal lines of technological progress before 1914: mechanization of animal-drawn or steam-powered machinery; the selection and adaptation of seeds; chemical fertilization and pesticide use; and the control of cattle diseases. All this was reflected in an appreciable, although not yet decisive way, contribution of the increase in total factor productivity (TFP) to the growth in production.

During the interwar period, decisive steps were taken in the initial adoption or diffusion of new technologies which played a fundamental role after 1945.

First, self-propelled machines formed an essential part of this technological transition. During the interwar period, tractors were used extensively in North America, highly unevenly in Europe and European settlements, and only incipiently in other regions. Alongside the tractor was the self-propelled harvester, the first prototypes of which were designed between 1910 and 1929. Its industrial production took off after the end of the Second World War. The self-propelled machinery constituted a significant revolution as it replaced draft animals that drew the old harvesters or plows. The decline in the number of working animals led to a drop in demand for animal feed, which freed up land for the emerging intensive livestock farming or other crops. As a result, there was a substantial reduction in demand for workers in the sector.

A second relevant innovation that paved the way for the post-WWII Green Revolution was the hybridization of seeds, which gave rise to a strong increase in crop yields. The first steps were taken in the United States with the hybridization of corn in

the 1930s (Griliches 1957, Harwood 2012). After the Second World War, high-yielding varieties of wheat and other crops were developed in Mexico that would later spread across the world and have an enormous impact on agricultural production growth.

Third, other technologies developed before 1914 improved considerably, including chemical fertilization and the use of pesticides, which grew in use during the interwar period.

Finally, certain cattle diseases were eradicated in countries such as the United States, but still without the use of pharmaceutical products. In this country, government intervention was crucial, exercised through the Bureau of Animal Industry within the U.S. Department of Agriculture, which had the authority to impose quarantines, to advance scientific knowledge and to conduct eradication campaigns (Olmstead and Rhode, 2015). Moreover, the use of pharmaceutical products for livestock enabled animals to overcome disease when closely packed together allowing the development of intensive livestock farming.

The interwar period, therefore, marked the transition from extensive to intensive growth. Although during these years, the contribution of TFP to the growth of production did not significantly change compared to the nineteenth century. It was important due to the incipient use of technologies that would greatly improve efficiency and productivity in the 1950s. Even so, regional differences were substantial. In Europe, increased production was pivotal from the 1950s in north-western countries, from the mid-1960s in the Mediterranean countries and only after the collapse of Communism in the 1990s in the eastern European countries (Martín-Retortillo and Pinilla 2015). In Latin America, the contribution of TFP did not predominate over the increased use of inputs in production growth until the 1990s (Martín-Retortillo et al. 2019).

5.- State Intervention in Agriculture

The second major transition in the interwar period was public intervention in the agricultural sector. In the nineteenth century, public intervention mostly focused on trade policies and early attempts to promote innovation in agriculture (Vivier 2008, Moser and Varley 2013). Thus, agriculture was basically a free-market activity with only modest state intervention due to the agricultural recession at the end of the nineteenth century (Koning 1994).

Food markets were strictly regulated in belligerent nations during the First World War, but the watershed moment for public intervention in agriculture was undoubtedly the 1929 crisis and the ensuing Great Depression. The passing of the 1933 Agricultural Adjustment Act by the Roosevelt administration in the United States marked the beginning of the end for laissez-faire agriculture (Libecap 1998, Federico 2012). The principal objective was to raise purchasing power of most agricultural products to their 1909-14 parity ratio (Olmstead and Rhode 2000). But the intervention to sustain farmers'

revenues faced a problem that was more profound than the reduction in prices caused by the crisis. The agricultural technological innovations had increased productivity and production that tended to generate price reductions and supply excess which dominated the farm income problem. Roosevelt's policy sought to raise and stabilize agricultural income, which required production limits and price guarantees for farmers (González et al. 2016). But the problem outlived the temporary nature of the Depression and this policy remained in place. The underlying problem was that gains in agricultural efficiency were not usually matched by a comparable advance in farm revenues. This was due to the tendency for agricultural productivity to grow more slowly than in other sectors (Tracy 1964, González 2021). The problem arose first in the United States in the 1930s, which had the most advanced agriculture and higher labor productivity due to its higher technological level. After the war, the problem extended across other developed countries. From the perspective of the interwar period, the most important point is that these innovative policies subsequently remained in place and were extended, as the magnitude of the problem did not reduce, but increased.

The growth of intervention in Europe was much more limited in the interwar period than in the United States. Two reasons explain this. First, the increase in agricultural productivity was lower than in the United States, as the technological innovations were incorporated to a lesser degree. Therefore, the emergence of the so-called farm problem was delayed until after WWII. Second, European governments remained closer to the orthodoxy of classical liberalism, while the policies of the North American New Deal moved away from this ideology. Thus, the primary examples of intervention in Europe were when excess supply of a product caused serious problems (wheat, wine) or new political forces came into power and implemented new policies (fascism, social democracy or Soviet communism).

Wheat was the product that most often inspired market intervention. The excess supply, which was apparent from the mid-1920s, gave rise to widespread implementation of protectionist measures. It went beyond simply raising tariffs and led to the practical prohibition of imports in some countries (Aparicio and Pinilla 2019). More importantly, Italy and Germany sought to achieve self-sufficiency and increased domestic production (Grando and Volpi 2014, Gerhard 2014). In France, the Popular Front government sought to regulate production and prices by creating the Office National Interprofessionnel du Blé (National Wheat Office) (Chatriot 2016). France attempted to regulate wine production also. With an excess domestic supply due to large imports from Algeria, the Statut de la Viticulture was passed in 1931. It regulated supply by limiting production per hectare and surface area, and establishing obligatory distillations. These measures were extended from 1934 with the grubbing up of vines to reduce production, which later became compulsory in certain departments, or the prohibition of planting French-American hybrid rootstock (Chevet et al. 2008).

Besides, new political forces implemented measures that broke away from the liberal orthodoxy. For example, in Sweden, the 1933 political crisis between the Social Democratic Party and the Agrarian Party led to the Pact of 1933 (Bodeförbundet). This

agreement, based in regulating agriculture, constituted a turning point in Swedish politics, as it is considered to be a decisive action for the construction of the welfare state in the country. The agricultural interests succeeded in obtaining a guaranteed minimum price for milk, at which the government was willing to purchase, irrespective of the international price levels. Market intervention increased in the following years, leading to a profound intervention in the post-war period.

Meanwhile, fascist or authoritarian governments easily abandoned orthodoxy when developing their policies (Fernández-Prieto et al. 2014). Their policies sought food self-sufficiency, particularly in grain, as was the case of Germany, Italy, Spain and Portugal. Given that these governments failed to consider agrarian reform yet found considerable support among the large landowners and farmers opposed to it. Reclamation policies in order to extend irrigation were significant in the southern countries, such as Italy or Spain (Grando and Volpi 2014). The intervention in the markets varied. In some countries, such as Portugal or Spain, guaranteed prices were established for wheat. Black markets emerged in both countries when the guaranteed prices were lower than those in the free market (Clar and Pinilla 2009, Lanero 2014). The intervention was more profound when corporate structures were created and directed by the State to control agriculture, such as the case of Germany and the RNS (Reich Nutritional Estate). There, prices and production were also established by the State. The RNS ended the free market for agricultural products (Gerhard 2014).

The Second World War merely prepared the ground further. All countries had no option but to intervene in agriculture to ensure food supplies for their hard-pressed populations (Short, Watkins and Martin, 2007). In this way, during the interwar period, the first instruments were designed to conduct a profound intervention in agricultural markets, regulate production and/or offer guaranteed minimum prices to farmers.

Another prominent type of intervention was the implementation of agricultural reforms that generally involved changing property rights of rural land, which meant changes in land ownership, tenure, fragmentation of land holdings, and land reclamation programs. The situation created by the First World War, with the mass mobilization of young people, boom in nationalism in Eastern Europe with the dissolution of the Russian and Austro-Hungarian empires, the impact of the Russian Revolution, a renewed negative perception of rural inequality and changes in relative prices and profits of farms explain the coincidence of so many agricultural reforms during this short period of time. Many countries in Europe were affected by these types of measures between 1918 and 1939, particularly in the east. It is estimated the reformed area, excluding the Soviet Union, was 29.4 million hectares, accounting for 9.9% of the total area (Brassley 2010). This was a central element of social conflicts in the European rural environment, generating a significant political polarization. In the most extreme cases, these conflicts over the ownership of the land played a central role in some of the continent's bloodiest civil wars such as in Russia or Spain (Figes 1996, Simpson and Carmona 2020). Undoubtedly, the most radical reform took place in Soviet Russia. Although Communist policies might be considered as constituting radical agrarian reform that involved the redistribution of land

to the peasants, the forced collectivization policy during the Stalinist terror abolished private land ownership and shaped a model of collective farms that lasted until the end of the twentieth century.

Public interventionism in agriculture initiated in the 1930s intensified during the war as a result of problems related to supply and feeding the population. Restoring food normality took several years. The experience of the war had motivated developed countries to maintain or implement policies that guaranteed food security.

After the war, the farm problem was perceived as structural rather than temporary. Many industrialized countries were facing a similar agricultural situation to that of the United States in the 1930s. The continuing disparity between farm incomes and those of other sectors inevitably became a major concern for governments, and therefore a major determinant of their agricultural policies (González et al. 2016). The most common political response was directed towards the demand side, including price supports, export subsidies and a wide range of protectionist measures for agriculture, causing the so-called major “disarray” in world agriculture (Johnson 1973). Postwar interventionism placed European agriculture on the road to self-sufficiency and reversed the trend that made the continent the world’s main importer of agricultural produce. Additionally, the market was no longer the lodestone for farmers’ decisions, as official policy regarding guaranteed minimum prices, production quotas, payments, subsidies, and protection came to exert a similar influence.

6.- From Inter-industry to Intra-industry Trade

Agricultural trade had grown between 1850 and 1902 at an average annual rate of over 3% and continued to do so until 1914. However, it shrank brutally as a consequence of the First World War, recovered rapidly until 1929, and shrank once again in the 1930s (Aparicio et al. 2009). During the interwar period, the rapid growth of agricultural trade which had taken place until 1914, also facilitated by favorable terms of trade compared to those of manufactured goods (Williamson, 2006), not only slowed down but became highly unstable. The anemic growth of the interwar period contrasts with the rapid expansion of the nineteenth century and that of the second half of the twentieth century. In Latin America, this instability and low level of growth was one of the key elements explaining the distrust of the export-led model to achieve economic development and the shift in the 1950s towards import substituting industrialization models.

During the interwar period, the increase in demand of the industrialized countries slowed down, which, together with a substantial increase in the protection of domestic production, called into question the growth model led by the exports of primary products that had stimulated the expansion of agricultural production in the periphery countries. Furthermore, an abrupt worsening of the trade terms (Ocampo and Parra-Lancourt 2011) also weakened the export capacity of agricultural products to maintain a high pace of economic growth in the respective countries.

Thus, the interwar years constituted a transitional phase between a period in which primary products had accounted for a significant share of world trade (Lewis 1952) to one in which their relative weight fell brutally, due to lower growth in the volume of agricultural trade with respect to total trade and significant changes in the terms of trade that negatively affected it (Serrano and Pinilla 2012). Inter-industrial trade, characterized by the exchange of primary products for manufactured products between countries with very pronounced respective specializations, was gradually replaced by intra-industrial trade, based on the exchange of similar manufactured products between countries with specializations that tended to converge.

7.- Final remarks

The interwar era was a period of transition in agriculture. The “Age of Dislocation” was an era of massive economic fluctuations, disruptions and volatility in the world economy, causing abrupt changes to many important economic trends of the previous “Golden Age” of Resource-Based Development of the world periphery. In some cases, previous long-term trends were reversed. Others were not affected or even boosted. These years constituted a long period that prepared the post-WWII era, when the Green Revolution seemed to open the prospect of a famine-free world.

The Age of Dislocation became an era of anti-globalization forces, that combined extended policies of trade protectionism, stagnant long distance transport costs and the definitive abandonment of the gold standard. The outbreak of the First World War ended global trade expansion and, with it, the boom in the exploitation of natural resources and new economic opportunities.

Despite transitory peaks during both World Wars, all primary-producing economies experienced a long-term decline in their terms of trade compared to the late nineteenth century. This trend was worsened by increasing tariff rates and other trade barriers implemented in the primary products markets of Western Europe and the United States. The periphery responded by imposing and increasing its own tariffs and restrictions on imports of manufactured goods. The economic disruptions of the Age of Dislocation also reduced global capital investment, and international migration also abated significantly from 1914 to 1950.

Widespread limitations on trade, significant increases in tariffs, the establishment of quotas and other mechanisms to control exchanges and the support of domestic agriculture were the most noteworthy features of those years. Within this context, the interwar period was crucial for agriculture because it represented a transitional stage in three main aspects.

During the interwar period, decisive steps were taken in the initial adoption or diffusion of new technologies which played a fundamental role in the agricultural expansion after 1945. First, self-propelled machines formed an essential part of this

technological transition. During the interwar period, tractors were used extensively in North America, highly unevenly in Europe and settler economies, and only incipiently in other parts of the world. Other relevant innovations which allowed the development of intensive crops and livestock farming were the hybridization of seeds, the use of pharmaceutical products for livestock (antibiotics), chemical fertilization, seed selection and the eradication of certain cattle diseases (but still without the use of pharmaceutical products). This progressive introduction of new technologies marked the transition from extensive to intensive agriculture growth.

The second major transition in the interwar period was public intervention in the agricultural sector. In this respect, one of the most important changes in the 1930s involved the switch from self-regulating economic policies to policy instruments that had to be manipulated by the authorities. In the nineteenth century, the intervention of the state mostly focused on trade policies and early attempts to promote innovation in agriculture. Thus, agriculture had been basically a free-market activity with only modest state interference. Food markets were strictly regulated in belligerent nations during the First World War and this marked a transcendental change with respect to the past, but the watershed moment for public intervention in agriculture was the Great Depression. The experience of the war had motivated developed countries to maintain or implement policies that guaranteed food security. In this way, during the interwar period, the first instruments were designed to conduct a profound intervention in agricultural markets, regulating production and/or offering guaranteed minimum prices to farmers. Direct intervention in agriculture and agreements with (local or external) producers and agricultural marketing boards were widespread practices throughout the world.

The creation of a broad institutional structure to support and promote agriculture was another feature of this process. Marketing boards were established through government action and had a wide range of responsibilities and powers of enforcement over producers and handlers of certain commodities. They played an increasingly important role in the developing countries during the period. They differed from direct government services mainly because of stronger autonomy in management and procedure, and included representatives of the commodity concerned (producers and managers). Unlike cooperatives they had an official status which allowed them to enforce their rules on other agents.

The final trend during the interwar years constituted a transitional phase between a period in which primary products had accounted for a significant share of global trade to one in which their relative weight decreased considerably. Inter-industrial trade, characterized by the exchange of primary products for manufactured products between countries with production specializations, was gradually replaced by intra-industrial trade, based on the exchange of similar products (from manufacturing) and countries with specializations that tended to converge. This process reinforced the gap between core and peripheral countries that prevailed in the second half of the twentieth century.

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