TOWARDS A MORE COMPETITIVE, INCLUSIVE, AND RESILIENT AGRIFOOD SECTOR IN ARGENTINA

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Argentina is a global leader in agrifood production and exports. Through an improved policy environment, its agrifood sector can play a larger role in the country's economic recovery, generating jobs, incomes, food security, and resilience and benefitting all its citizens and the environment.

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Acknowledgements and Preface

The "Towards a More Competitive, Inclusive and Resilient Agrifood Sector in Argentina" is a World Bank assessment prepared for the Government of the Argentine Republic (GoA) to support public policy and program formulation in the agrifood sector. This Review addresses the sector's past performance and trends and options for policies to support the future development of the sector, while bearing in mind local and international experiences. The Review is based on analyses of agrifood sector data and case studies and benefited from fruitful dialogue through in-person interviews and consultations with various sector stakeholders, institutions and experts from Argentina and abroad.

The Review was produced by a team comprising Eli Weiss (Task Team Leader), Joanne Gaskell (Co-Task Team Leader), Ezequiel Barbenza, McDonald Benjamin, Julian Folgar, Pablo Herrera, Wilhelmus Janssen, Jeremias Lachman, José Miguel Lizzi, Alejandra Marin Gomez, John Nash, Marcelo Regúnaga, Agustín Tejeda, Mercedes Vassallo, and Irene Wasilevsky. Romina Campi and Andrea Patton provided administrative support. Yanina Budkin and Carolina Marcela Crerar provided important inputs related to publication and communication. The Review was prepared under the overall guidance of Diego Arias Carballo, Benoit Bosquet, Marianne Fay, Frank Fragano, Paul Procee, and Anna Wellenstein.

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Acronyms and Abbreviations

FOB	Free on Board
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GHG	Greenhouse Gas
ICT	Information and Communications Technology
INAI	*Instituto Nacional de Asuntos Indígenas* (National Institute for Indigenous Affairs)
INAL	*Instituto Nacional de Alimentos* (National Food Institute)
INDEC	*Instituto Nacional de Estadísticas y Censos* (National Statistics and Census Institute)
INTA	*Instituto Nacional de Tecnología Agrícola* (National Institute of Agricultural Technology)
MAGyP	*Ministerio de Agricultura, Ganadería y Pesca de la Nación* (National Ministry of Agriculture, Livestock and Fisheries)
MECON	*Ministerio de Economía de la Nación* (National Ministry of Economy)
MERCOSUR	*Mercado Común del Sur* (The Southern Common Market)
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development
ReNAF	*Registro Nacional de la Agricultura Familiar* (National Registry of Family Agriculture)
SAGyP	*Secretaría de Agricultura, Ganadería y Pesca* (Agriculture, Livestock and Fisheries Secretariat)
SENASA	*Servicio Nacional de Sanidad y Calidad Agroalimentaria (*National Service for Health and Agrifood Quality)
tCO_2e	Tons of carbon dioxide equivalent
TFP	Total factor productivity

Key Messages

The agrifood sector is central to Argentina's prosperity, poverty reduction and sustainable development. In 2021, primary agriculture and agrifood value chains accounted for 15.7 percent of overall Gross Domestic Product (GDP), 10.6 percent of tax revenues, 17-24 percent of private sector employment and 61 percent of exports, making Argentina the world's third largest net food exporter. Total factor productivity (TFP) growth in the agrifood sector has outpaced overall GDP growth, increasing 3.7 percent per year since 1973, thanks to technology adoption, even as greenhouse gas (GHG) emissions per unit of production have fallen, notably via the widespread adoption of no-till practices in grains production.

A resilient agrifood sector is critical to Argentina's macro-fiscal performance. Shocks to agrifood production have ripple effects for the larger economy. For example, the 2023 drought exacerbated the country's dollar shortage and contributed to inflation through higher food prices. Lower rainfall caused a 45 percent drop in production of the country's 3 major crops, a 40 percent decline in export income from soy, and total losses equivalent to $20 billion, or 3 percent of GDP. Drought events in 2018 and 2009 were similarly associated with peso depreciation and GDP contractions.

However, policy-related constraints, development patterns, and unsustainable production practices, are creating inequalities and impeding sector growth. Over the last decade, agrifood exports have fallen by 1.3 percent annually, with Argentina's share of international agrifood markets declining from 2.7 percent in 2011 to 2.2 percent in 2021. Argentina has by far the most negative producer supports among global competitors, at around 20 percent of gross farm receipts in 2019-21. Some of these negative supports - such as export restrictions, export bans, heavy and volatile export taxes - specifically affect the agrifood sector. Other policies - such as differentiated exchange rates, import restrictions, and turnover taxes - affect all sectors of the economy. Meanwhile, the sector suffers from under-investment in public goods and services such as research, capacity building, water management and rural infrastructure.

Agrifood's current development patterns have impacted deforestation, GHG emissions, water availability, soil health, regional development, and income inequality, calling into question the environmental and social sustainability of current approaches. Distortionary policies have especially affected smaller producers in more remote areas with lower margins and less access to services. With Argentina's iconic livestock sector taxed at rates of 49-57 percent, the profits of (mainly small-scale) beef producers have been hit hard, affecting their capacity and incentives to improve production practices. Between 2001 and 2014, Argentina also lost more than 12 percent of its forest area, while producers and the public sector have underinvested in water management. Without adaptation, flood damages could reduce GDP by 0.5 percent annually by 2060, while persistent droughts could reduce GDP by 4 percent annually by 2050. Rural poverty remains high, especially among indigenous communities.

A new vision and an improved policy environment for the agrifood sector can enhance its role in generating incomes, jobs, food security, and resilience. Historically, public policies have treated the agrifood sector as a source of fiscal revenues and affordable food for the population, based on a false dichotomy between promoting exports and ensuring domestic food security. A new approach could address three priority areas, namely: (a) agrifood competitiveness and economic returns (b) socioeconomic inclusion; and (c) environmental resilience and sustainability. Progress on these three fronts would require reforms that: (a) address distortionary and negative supports to the sector; (b) offer safety nets for domestic food consumers and poor agricultural producers; and (c) improve access to financing for medium- to long-term investment in the sector, with an emphasis on public goods.

TOWARDS A MORE COMPETITIVE, INCLUSIVE, AND RESILIENT AGRIFOOD SECTOR IN ARGENTINA

1. Argentina's agrifood sector drives both prosperity and crisis. While agrifood generates essential foreign currency earnings, tax revenue and employment, the sector's vulnerability to external shocks can wreak havoc on the larger economy. Many of Argentina's recent economic crises have been triggered by a bad crop year: droughts in 2009, 2018 and most recently in 2023 coincided with drops in agricultural output of over 30 percent, associated export declines, and falling GDP. Unfavorable policies have made the agrifood system more fragile and vulnerable to shocks. However, with improved policies and relatively modest investments, Argentina's agrifood sector can be a much needed and dynamic source of growth for the country.

2. This Agriculture Sector Review addresses the economic, social, and environmental dimensions of Argentina's agrifood sector. The economic dimension is vital, due to the influence of agrifood productivity and its growth on Argentina's macroeconomy. The social, or inclusion, dimension highlights the potential to improve the livelihoods of the rural poor as well as access to affordable food for the urban poor. Finally, the environmental dimension examines the urgent need to increase the resilience of agricultural production systems and support their adaptation to climate change, as well as the agrifood sector's potential to mitigate climate change and other externalities. This summary report is based on a series of more detailed sectoral background papers and is aimed at public sector policymakers and other key stakeholders, with the goal of identifying potential reforms in public policies and programs and contributing to the development of a new shared vision for the Argentine agrifood sector. [1]

I. ARGENTINA'S AGRIFOOD SECTOR IS AT THE HEART OF THE COUNTRY'S PROSPERITY AND IS KEY TO THE COUNTRY'S RECOVERY

3. Argentina's agrifood sector has shown strong overall growth, but policy shifts are necessary to retain global competitiveness and reduce the impact of external shocks. Agrifood productivity growth has outpaced GDP growth since 1973, helping the country become the world's third largest agrifood exporter. However, among its export competitors, Argentina has the most 'negative support' for agriculture due to a set of policies that is causing worrying declines in export growth and exacerbating fragility in the sector. Physical deterioration in soils, for example, increases vulnerability to droughts that are increasing in frequency and that have had devastating impacts, via the agrifood sector, on Argentina's larger economy. More supportive agricultural policies can help to bring stability to the sector and the country.

[1] These include: I. The performance of Argentina's agrifood sector and the role of public institutions, policies and investments; II. Towards a more socially inclusive rural economy; III. Increasing environmental sustainability and promoting bio-solutions; IV - A case study: achieving sustainable growth in the livestock sector; V - Innovating for a sustainable future.

A. Argentina's agrifood sector underpins the country's economic growth and food security.

4. The agrifood sector plays a critically important role in Argentina's sustainable economic development, more so than for most middle-income countries. Agrifood value chains contribute to overall economic activity, job creation, regional development, and trade. Agrifood accounted for 15.7 percent of overall Gross Domestic Product (GDP), 10.6 percent of tax revenues and 17-24 percent of the private sector workforce in 2021. Due to the agrifood sector's large share of the economy, and particularly the export market, developments in this sector have ramifications for the entire national economy.[2]

5. Significant climate-related events are affecting the sector every three to four years, putting at risk the sector and the national economy. Droughts in 2008-2009, 2011-12, 2017-18, 2021-22 and 2023-4 have caused significant production losses, up to 45 percent during the most recent drought. These production losses translate into GDP shocks: the 2018 drought caused GDP to contract by 2.5 percent and the most recent drought caused GDP to contract by 3 percent. At the provincial level, the effects can be greater. In Santiago del Estero, Buenos Aires, Entre Ríos, Santa Fe and Córdoba, a 10 percent fall in agrifood production implies a 0.7 percentage point drop in GDP growth. Failing to adapt to climate related events will reduce overall economic growth and fiscal revenues.[3]

6. Argentina's agrifood production is concentrated in terms of crops, geography, and export markets. The soy value chain is by far the most important product group, accounting for over 20 percent of the agrifood sector's value added (47 percent of its exports) followed by wheat, beef, corn and milk. Growth in agricultural production has been mostly in grains and oilseeds, which accounted for 78 percent of the growth in agrifood chains during 2001-20, and which are mainly located in the Pampas region. At least eight provinces generate more than a fifth of their provincial GDP from agri-food production: Entre Ríos (36.7 percent), Santiago del Estero (29.8 percent), Santa Fe (29.4 percent), Misiones (27.6 percent), Río Negro (27.5 percent), La Rioja (24 percent), Salta (22.7 percent) and La Pampa (22.6 percent). Agrifood exports are largely destined to China (soybeans) and India (soybean oil). Together these two countries account for 22 percent of exports, by value.[4]

7. Led by soy, the agrifood sector increasingly dominates Argentine exports: agrifood's share in all exports rose from 42 percent in 2001 to 61 percent in 2021 (representing US$45 billion annually), even as Argentina's global market share fell from 2.7 percent in 2011 to 2.2 percent in 2021[5]. Globally, Argentina is the third largest net food exporter (Figure 1) and is among the world's top exporters of soybean products, corn, wheat, wheat flour, bovine meat and leather. Argentina is also a major supplier of bioenergy and other bio-based products.

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[2] Ministerio de Economía (2022) and Fundación Agropecuaria para el Desarrollo de Argentina (2022). Total Agricultural Value Added excludes the activities of the federal public administration. If other related value chains are included, such as agricultural machinery, the agrochemical industry, and agriculture-related transportation and logistics, the share of the agri-food sector in GDP increases to 20.2 percent.

[3] https://www.fao.org/3/cb3673en/cb3673en.pdf; https://news.un.org/en/story/2021/09/1098662; Impactos de las crisis climáticas en la pobreza y la macroeconomía en la Argentina (World Bank, 2021)

[4] FAOSTAT global database, 2024.

[5] According to data from the National Statistics and Census Institute (INDEC) and COMTRADE (a United Nations database that provides detailed global trade statistics by product, see: https://comtradeplus.un.org).

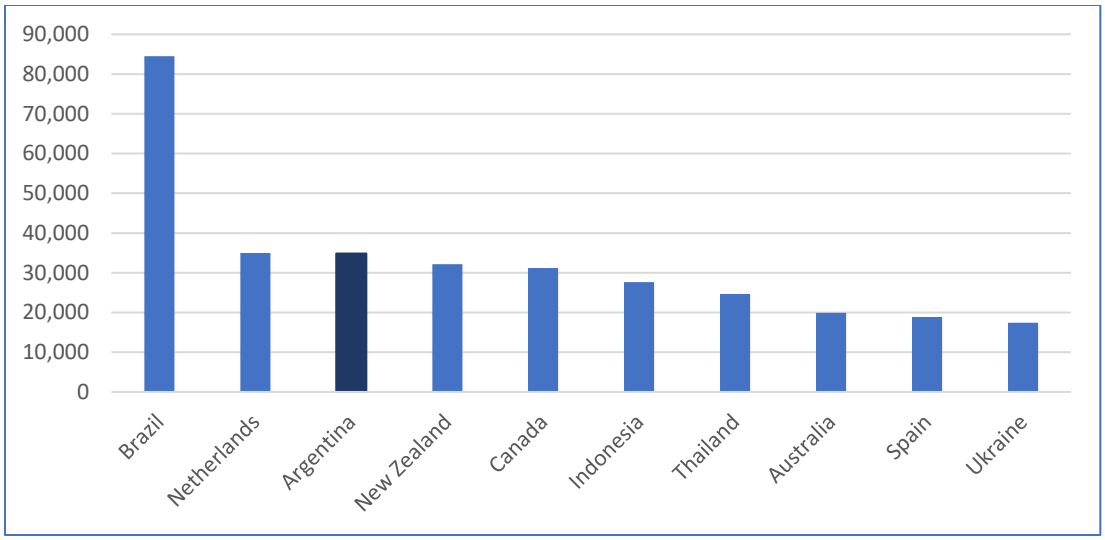

Figure 1. Argentina is the world's third largest net food exporter.

(Average 2019-21 food exports in US$ millions)

Source: Own compilation, based on data from the World Trade Organization statistical database (2022)

8. While it helps to feeds the world, Argentina's agrifood system is also crucial to domestic food security. On average, 70 percent of the gross value of agrifood production goes to domestic food consumption, albeit with considerable variation across value chains. Approximately one-half of food consumed in Argentina comes from domestic family farms.[6] Argentina is practically self-sufficient in most food groups. In 2021, food imports totaled just US$4.8 billion (equivalent to 7.3 percent of total imports and less than 1 percent of GDP), with one-half of this value accounted for by soybean purchases under the temporary admission scheme to be processed in Argentina and then exported as oil and meal.

9. Upstream and downstream activities off the farm are an important source of revenue and economic diversification. Argentina produces fertilizers, agricultural machinery, and an array of innovative biotechnologies such as the world's first drought-resistant, genetically-modified wheat variety. Processing industries for some agricultural products, such as soy, are among the world's most competitive.

B. Argentina's formerly prosperous agrifood sector is losing competitiveness in ways that threaten long-term growth, poverty reduction, and environmental sustainability.

10. Argentina has lost market share in international markets. Over the last decade, Argentine agrifood exports have had a negative annual growth rate of -1.3 percent (Figure 2), with Argentina's participation in international markets of agrifood products dropping from 2.7 percent in 2011 to 2.2 percent in 2021. Brazil began to surpass Argentina in exported volumes of grains and by-products during the 2011-2012 cropping season, and in 2022 exported 70 percent more than Argentina (Bisang et.al. 2022). Even with international prices at record levels, the volume of grains and by-products that Argentina produces and exports has declined since 2019.

[6] In line with The National Institute for Peasant and Indigenous Family Farming (INAFCI), we define small-scale producers to be family farming units with majority participation in the productive work by family members living on or near the farm and with up to two permanent employees.

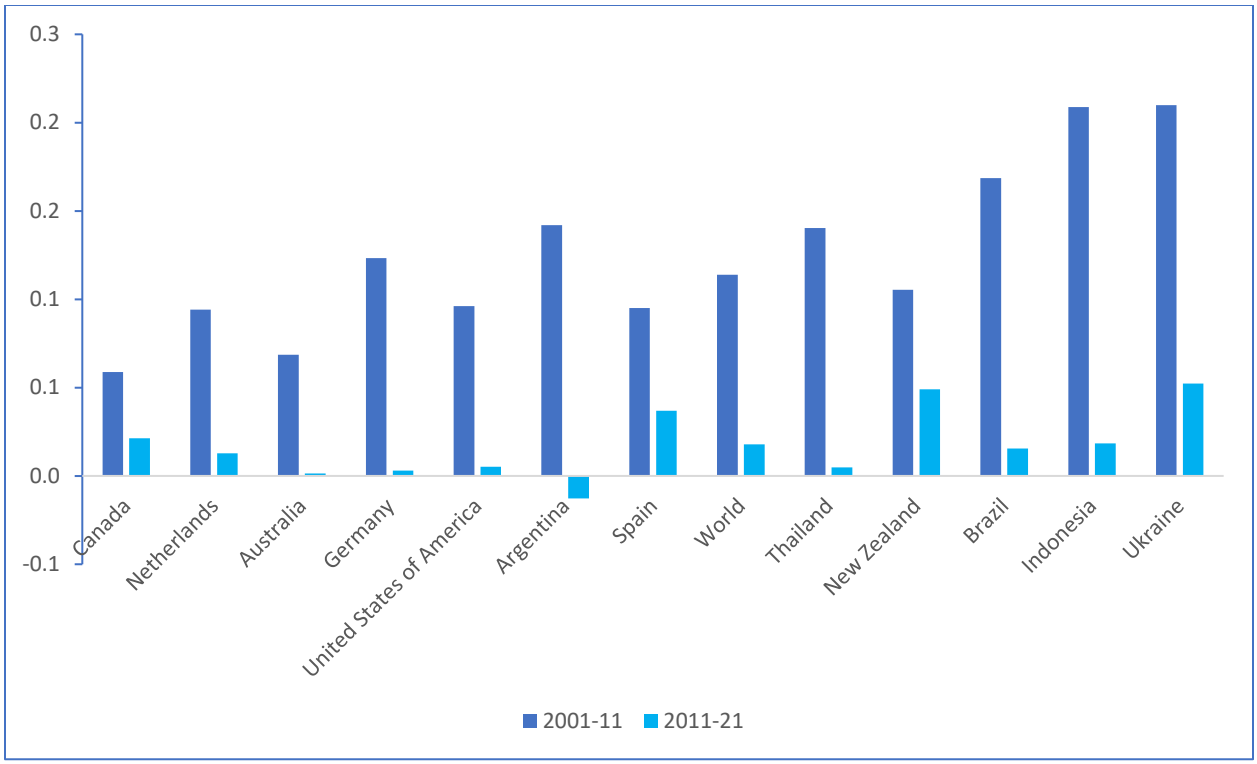

Figure 2. Argentina is the only major agricultural exporting country with shrinking exports.

(Average annual growth rate for agribusiness exports by country (%))

Source: Prepared by the authors based on World Trade Organization statistics.

11. Grains and oilseeds accounted for three quarters of Argentina's agrifood growth over the last 20 years. These value chains have demonstrated strong comparative advantage, and are characterized by relatively lower investment needs, lower transportation costs, higher capital turnover, and lower barriers to international trade, and have benefitted from technological innovation that greatly reduced production costs and increased yields. Grains and oilseeds were also able to develop a competitive and flexible production system that has allowed them to overcome the country's frequent periods of economic instability as well as the adverse policies to which they have been subjected, although recent climate shocks have been devastating.

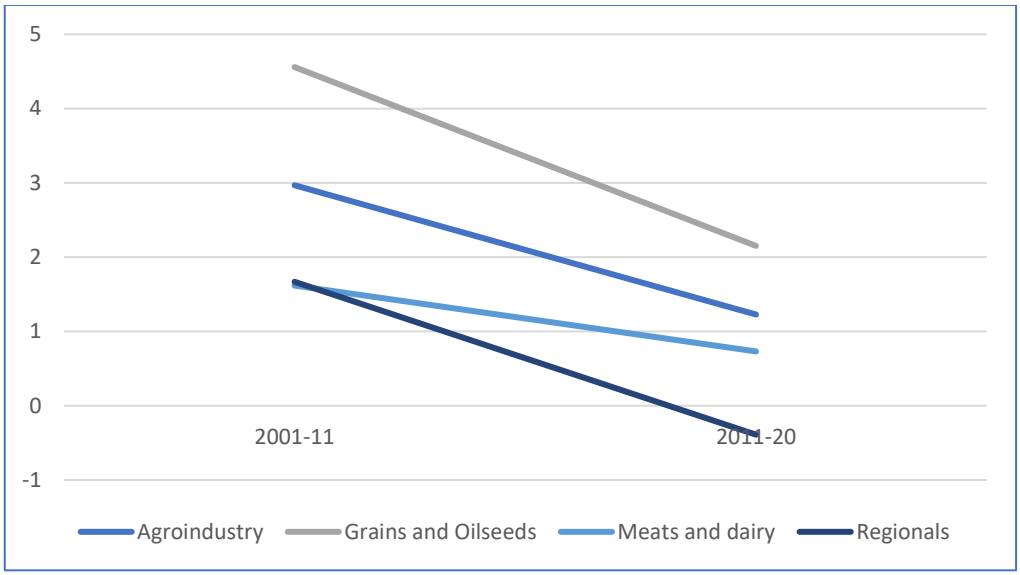

Figure 3. Agrifood value-added grew more slowly in 2011-20 than in 2001-11.

(Annual growth rates (%))

Source: *Own compilation, based on Lodola and Picón (2021)*
Note: Regional value chains refer to those that are concentrated outside of the 'Pampa' growing region, such as yerba mate, lemons, peanuts and apples.

12. Lower investments and lack of price incentives for farmers to increase production have resulted in domestic supply shortages, which have made prices more volatile for Argentinean consumers. In the livestock sector, Argentina's grass-fed farms are experiencing severe pasture degradation due to underinvestment that is, in turn, resulting in reduced feed conversion and productivity and increased GHG emissions. Rural livestock producers, most of whom have relatively small cattle herds, have precarious production systems that translate into variable market supply.

13. Little value is added in the transformation of agricultural products other than soy, and even here, Argentina is losing market share.[7] Agrifood value-added growth has been slowing and is now negative for regional value chains (Figure 3). The production and export of products with second-stage industrial processing remains limited. For example, Argentina exports more than 70 percent of its corn production as grain (rather than processing it into flour or bioethanol).[8] The soybean value chain represents an important exception. Argentina has developed one of the largest and most competitive soy crushing hubs in the world, which has allowed it to become the world's leading exporter of soybean meal and soybean oil. However, due to multiple factors (including high macroeconomic volatility, recurrent crises, strong climatic shocks, a high tax burden on the sector, and recurrent quantitative controls), during the last decade Argentina has had the lowest growth rate among the world's soybean producers and has lost global market share. As a further consequence, the soy crushing industry is working at only 60 percent of capacity.[9]

14. Although export destinations have become less concentrated during the last decade, one country (China) remains a very important importer (Bisang et al., 2022). An export structure with few

[7] Lodola and Picón (2021).
[8] Bolsa de Cereales (2022).
[9] Bolsa de Comercio de Rosario (2022a).

value chains whose production is geographically concentrated, and with few destinations, makes Argentina's agrifood exports vulnerable to climate risk, international price volatility, and the trade policy decisions of some of the country's larger trading partners. In order to mitigate these risks, it will be important to significantly improve the policy environment for the agrifood sector, increase investment in post-primary stages of value chains and diversify export markets further.

C. Policy reforms are urgently needed to ensure the sector contributes its full potential as a driver of Argentina's growth.

15. Argentina's agrifood sector has significant potential to help drive Argentina's recovery. The country's main value chains remain internationally competitive and are part of a dynamic global market that is large in relation to Argentina's production. As to smaller value chains, these are poised to draw on Argentina's vast wealth of natural and human resources. By relying on production systems that can achieve high productivity with relatively efficient natural resource use, Argentine production can continue to grow in a sustainable manner.

16. A broad national vision focused on the agrifood sector could lay the foundation for a stable, long-term strategic policy framework. Currently, there is no shared national vision on the development of the agrifood sector or any form of national agreement on strategic lines of action and public policies regarding the sector. The development of a vision for the sector could address three key priority areas of interest to all the relevant stakeholders, namely: (a) agrifood competitiveness and economic returns; (b) socioeconomic inclusion; and (c) environmental resilience and sustainability. Progress on these three fronts would require that the macro, social, and regulatory reforms currently being envisaged: (a) address the distortionary and negative support to the Argentine agrifood sector; (b) offer safety nets for domestic food consumers and poor agricultural producers; and (c) improve access to financing for medium- to long-term investment in the sector.

17. Global experience shows that the agrifood sector can contribute to national food security objectives while being competitive and supplying international markets. Historically, public agrifood policies in Argentina have been based on a false dichotomy between ensuring domestic food security and promoting international agrifood trade and competitiveness. This false dichotomy has been used to justify the range of restrictions and export taxes on agrifood exports that have been imposed over the past 20 years with the explicit aim of ensuring low domestic food prices and raising fiscal revenues. Countries in the region (such as Mexico and Brazil) and further afield (e.g., New Zealand and Australia) have shown that food security objectives need not come at the expense of sector competitiveness and trade. Moreover, these countries succeed in raising sufficient tax revenues with much lower rates of agricultural taxation. With a new shared vision and an improved policy environment, Argentina's globally competitive agrifood sector could grow faster, be more inclusive and sustainable, and enhance food security**.**

II. REBUILDING ECONOMIC COMPETITIVENESS WILL REQUIRE A SIGNIFICANT SHIFT IN PUBLIC POLICIES

18. Agrifood policy reform can help the sector contribute to rebuilding economic growth and stability. The current economic crisis in Argentina demands careful sequencing and prioritization of any reforms, however realigning agricultural incentives with market opportunities can help to reduce

economic vulnerability in the longer term. Strategic investments, such as in climate resilience and infrastructure, can also help to put the sector back on a path to competitiveness.

A. A policy and macro fiscal context biased against the sector.

Argentina's under-performance in terms of agrifood production and exports relative to its potential is largely attributable to policies that have heavily taxed and constrained the sector, exacerbated by macroeconomic instability and climatic events. The sector's tax burden has been particularly high by global standards. Export duties and the turnover tax, in particular, have had detrimental effects on growth and exports. Under-investment in public goods, such as infrastructure, also makes the sector more fragile.

i. Export taxes and restrictions are the major source of policy-driven transfers away from the agrifood sector.

19. Argentina's recent under-performance in terms of agrifood production and exports relative to its potential is largely attributable to macroeconomic, fiscal and trade policies that have held back the sector's development. The tax burden on the agrifood sector has been both high and volatile. In addition to traditional taxes such as the Value-Added Tax (VAT), corporate income tax, payroll taxes, and property taxes, the agrifood sector bears an exceptionally high burden of other taxes, notably export duties and the turnover tax, which have had, and continue to have, detrimental effects on the sector's growth, exports, and inclusiveness. Thus, unlike in numerous other countries, including such key competitors as the United States and Brazil, total 8support to Argentina's farmers has been highly negative.

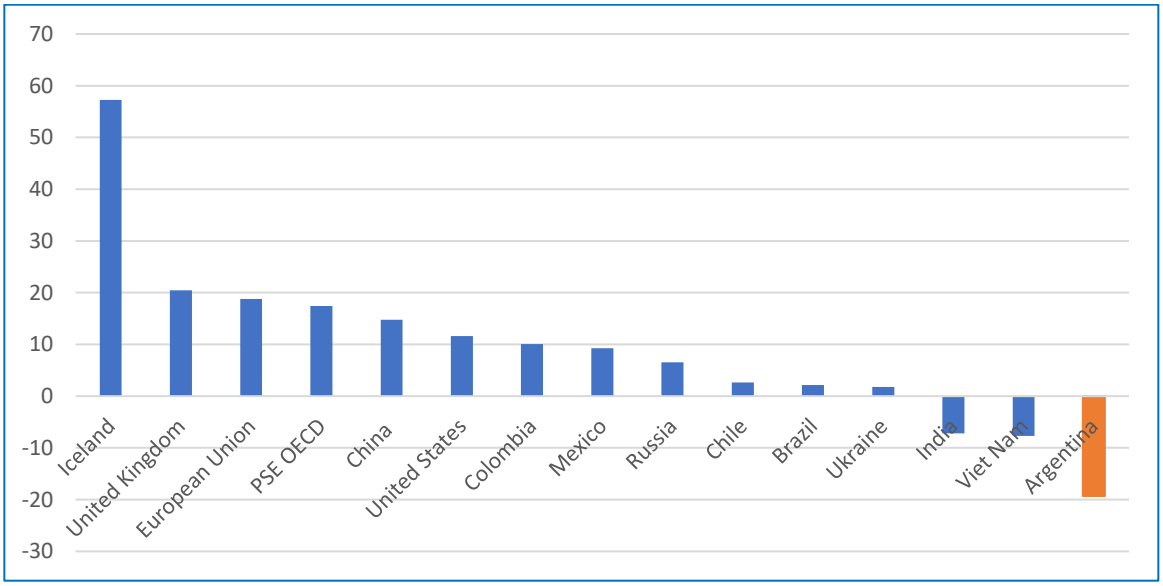

Figure 1. Argentina's support to farmers is negative.

(Average Producer Support Estimate as a share of gross farm receipts (%), 2019 - 2021)

Source: OECD (2022).

20. Argentina's high agrifood export taxes distinguish it from most other countries. Of the 84 countries with available data, only 19 report a specific tax on exports.[10] Argentina's rate of tax collection from export duties (2.1 percent of GDP) ranked second globally in 2021. Among 13 low- and middle-

[10] According to the OECD Global Tax Database.

income countries whose agricultural policies are monitored by the OECD, only three have a "negative support" mechanism (i.e., net taxation, including effects of fiscal and other policies) for the agrifood sector, with Argentina showing minus 20 percent of farm receipts in 2019-21 (Figure 4 and Box 1).[11] Export taxes are among the most distortionary measures for raising fiscal revenue because of their highly adverse impact on production and trade, which is why they are used in so few countries.

21. Further complicating matters, export taxes and the regulations surrounding them have been changing constantly, creating uncertainty for producers and exporters. Since they were (re)introduced during the 2001-02 crisis, export taxes have evolved from their traditional role of temporary emergency fiscal measures to become a permanent source of tax revenue. But while permanent**,** they have been volatile and unpredictable both in the definition of the tax base (changes in targeted commodities) and the applied tax rates (Figure 5). During 2002-22 there were on average five changes per year in the export tax regulations, increasing to seven changes annually since 2018, further aggravating the already high level of instability. The recurrent changes in export tax rates and in the products included in the export tax base are a major cause of under-investment by agricultural producers.

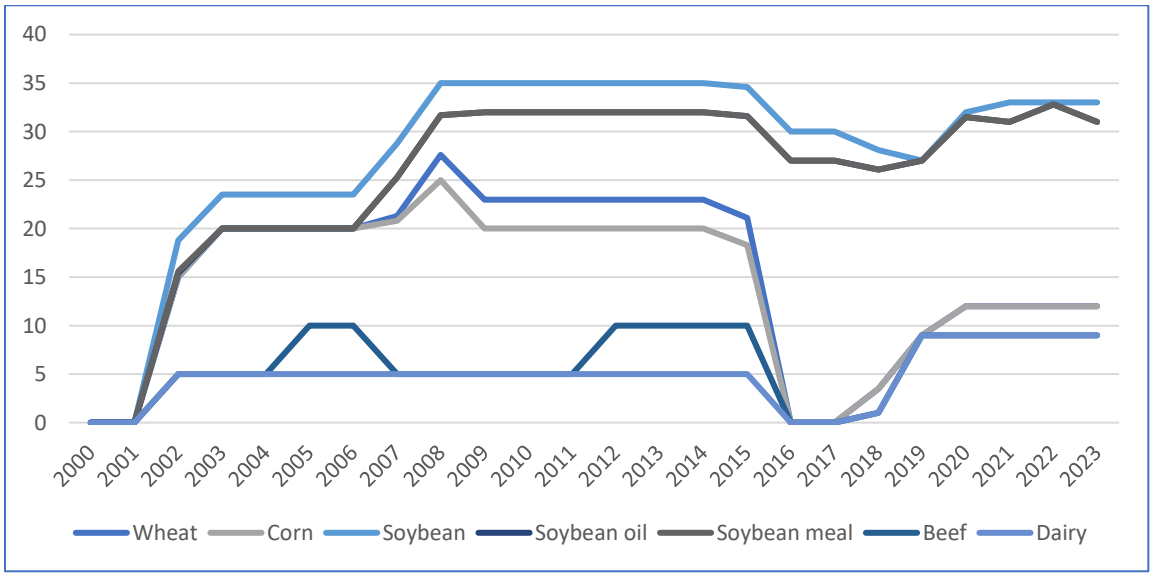

Figure 5. Export taxes on Argentina's key agrifood exports are high and volatile.

(Tax rate (%))

Source: Own compilation, based on CIARA-CE (2022) and Official Resolutions.

Note: This does not include the indirect taxation from effects of export restrictions, bans and multiple exchange rates, nor the special "contribution" requiring exporters to finance the trust fund to subsidize retail food. Source: Own compilation based on Official Resolutions and on data from the Chamber of the Oils Industry of the Argentine Republic and the Cereal Export Center.[12]

22. In addition to the export taxes, Argentina's provinces apply a turnover tax that is highly detrimental for tradables in the agrifood sector. The turnover tax is levied on gross income at all stages of the production chain, without deduction for taxes paid in the earlier stages, nor refunds in the case of exports (unlike other taxes, such as VAT). Thus, it hampers competitiveness *vis-à-vis* foreign competitors. The turnover tax, which accounts for around 75 percent of provincial governments' tax revenues, is rarely used in other countries because it is distortionary; indeed, at times it acts as an interprovincial tariff barrier, since provinces can apply different rates and withholding schemes, discriminating against out-of-

[11] OECD (2021).

[12] See: http://www.ciaracec.com.ar/cec/Estad%C3%ADsticas/Evolución%20de%20los%20Aranceles%20de%20Exportación.

province products. Additionally, the nature of the turnover tax makes it challenging to track and measure across the value chain, reducing transparency.

23. Even more deleterious from a policy perspective, a range of quantitative restrictions have been applied to agrifood value chain products. From the early 2000s until 2032, the central government relied on this type of intervention to reduce domestic food prices. More recently, quantitative export restrictions were implemented on corn, wheat and beef exports. In May 2021, beef exports were suspended entirely for 30 days, with a view to limiting domestic price increases. Between 2021 and 2023, the central government banned the export of 12 categories of beef mostly destined for domestic consumption. In December, 2021, the MAGyP established a framework to regulate agrifood exports based on a "volume of equilibrium of exports" (VEE) that limited export permits. Quantitative export restrictions are more distortionary than export taxes and decrease fiscal revenues. Additionally, they generate considerable uncertainty, result in hidden transaction costs, negatively affect international relations, reduce confidence in the country as a food provider, and increase the risk of losing market share in export markets. The absence of legislation regarding the application of export restrictions adds to the lack of transparency and predictability of these policies.[58]

ii. Import restrictions prevent farmers from accessing necessary inputs.

24. In recent years, import restriction measures in Argentina have affected the availability of fertilizers and phytosanitary products for agrifood producers. This has led to price increases, deteriorating input-output ratios, reduced investment, and delayed technology adoption. According to data from Fertilizar, 75 percent of fertilizers applied by Argentina's agrifood sector in 2021 were imported, for a total of US$2.3 billion. Restrictions in accessing foreign currency for imports, applied in 2022, resulted in further distortions in a fertilizer market that was already adversely affected by the impact of the Russian invasion of Ukraine and by fertilizer export restrictions in China.

25. The agrifood sector needs to import inputs and capital goods to be efficient and competitive. High import tariff protection for the domestic manufacturing sector and former restrictions on imports due to non-automatic import licensing and delays in granting licenses deepened the trade and agricultural impacts of Argentinian policies by increasing domestic prices for agricultural machinery, trucks and other inputs, including phytosanitary products.[73] Consequently, Argentine agrifood producers faced more adverse relative prices than did farmers in other competing countries. Recent reversals to these policies will help to encourage the adoption of technologies that could foster improved agricultural practices.

iii. Exchange rate policies make agrifood exports less competitive.

26. Exchange rate policies have been another factor inhibiting the performance of agrifood chains in Argentina. Exchange-rate controls in place between 2011 and 2015, and re-introduced late in 2019, resulted in a widening gap between the official and the alternative exchange rates. Considering that the official exchange rate was on average 50 percent below the free-market exchange rate in 2023, together with export duties at 33 percent, Argentine soybean producers received barely 35 percent of FOB prices in US dollars at market exchange rates.

27. In addition to overvalued exchange rates, which have constrained the competitiveness of agri-food exports, multiple exchange rates have also been used as a tool to tax exports, i.e., agrifood exporters have been required to surrender their foreign exchange earnings at various government-determined exchange rates at a substantial discount below free-market exchange rates for the Argentine peso. The multiple exchange rates, which vary across different agrifood value chains, could be even more

damaging than explicit taxes, since they are less transparent and, in some ways, more distortionary and ad-hoc.

28. Moreover, the unpredictability of exchange rates impedes medium-term private sector investment. More recently, since the end of 2022, amidst a significant appreciation of the official exchange rate and historically low international reserves, the Government has implemented temporary measures to adjust the effective exchange rate for agrifood exports through various mechanisms. Specifically, the central bank has offered agri-exporters a more advantageous exchange rate, compared to the official rate, to encourage them to sell their stocks and thereby bolster central bank reserves. Following an official devaluation of the peso in December 2023, the new administration has persisted in permitting agri-exporters to sell a portion (20 percent) of their exports through the alternative FX market, resulting in a preferential exchange rate. The uncertainty associated with these preferential rates can hamper investment decision making.

iv. Public investment in the Argentine agrifood sector has lagged that of key competitors.

29. Public investments in agricultural public goods and services in Argentina have declined in the last decade from US$629.5 million in 2011 to US$229.6 million in 2021.[13] Key agricultural public goods and services include agricultural innovation (agricultural research and development, extension programs and education), irrigation and water management, and rural infrastructure, including electricity, information and communications technology, and transport infrastructure.

30. Argentina lags significantly against its competitors in the logistics services that are essential for keeping food prices lower in domestic markets and for competing in export markets. Argentina's public investment in transport infrastructure as a share of GDP (0.5 percent) is one of the lowest in Latin America, amounting to about one-quarter of that of Chile. In 2019, Argentina ranked 78th out of 141 countries in transport infrastructure in the Global Competitiveness Index developed by the World Economic Forum. In the World Bank's Logistics Performance index, Argentina ranked 70th, below other Latin American benchmark countries such as Chile, Panama, Mexico, Brazil and Colombia. According to the Argentine Ministry of Transport, 93 percent of cargo transport in Argentina is by truck, compared to the United States of America (73 percent) or Brazil (65 percent), where the share of freight transported by rail and barges (waterways) is much higher. A recent study estimated the potential for expanded use of rail transportation of grains at an additional 14 million tons annually, and the potential for expanded river barge transportation of grains at an additional 3.5 million tons annually.[14] Achieving this potential would require agreement between various jurisdictions on an overall long-term strategy involving transport of cargo via rail, the national highway network, rural roads, and water, notably via the Paraná-Paraguay Waterway.[15]

31. Current investment levels in irrigation and water management are not sufficient to create resilience. Only 5 percent (around 2.1 million hectares) of cultivated land in Argentina is irrigated, yet it generates around 13 percent of the value of the country's agricultural production. There is significant potential to increase productivity and resilience through investments in irrigation and drinking water for livestock, primarily in regions outside of the Pampas. The World Bank's *Argentina Water Security Diagnostic* has identified US$96.9 billion in priority investments for water security by 2030, covering water

[13] OECD (2023), "Agricultural support" (indicator), https://doi.org/10.1787/6ea85c58-en (accessed on 16 September 2023).
[14] Lucas et al. (2022).
[15] The domestic logistics challenges are aggravated by Argentina's distance from the main importing countries in Asia and Europe -- for example, shipping soybeans from Argentina to China is between 35 to 260 percent more expensive than shipping the product from the United States -- which makes addressing domestic logistics challenges even more important to remain competitive. Gauthier et al. (2016).

storage, irrigation, drainage, terracing in erosion-prone areas, and deepening of waterways, which if undertaken could increase GDP by 2.7 percent by 2030.[16]

BOX 1: Public support to the agrifood sector is highly negative.

Public investment is a core element of General Services Support to the agrifood sector, but at current levels it is insufficient to offset the highly negative producer support (in the form of heavy taxation), so that overall total public support to the agrifood sector in Argentina is negative. Support to the agrifood sector can take the form of producer support (i.e., direct transfers such as subsidies, or negative transfers such as direct and indirect taxes); consumer support (e.g., public subsidies to food prices, or alternatively price ceilings that favor consumers but hurt producers); and general services support (i.e., investments of a public goods nature such as research and development, education, infrastructure, and marketing and promotion programs).[17]

Investing in agricultural public goods and services (general support) yields higher economic returns on investment than investing in farmer (producer) support, in part because these benefits are shared widely throughout the economy.[18] However, with the producer estimate reaching a negative 19.3 percent of gross farm receipts on average for the period 2019-2021, (i.e., of the US$46.8 billion in annual production valued at the farm-gate during 2019-21, US$9 billion reverted to the government in taxes), and with relatively low general service support, averaging US$262 million per year during 2019-2021 (i.e. one-sixth of the levels invested, for example, in Brazil), the overall total support estimate to the agrifood sector has been highly negative, equivalent to negative US$8.7 billion or 2.12 percent of GDP.[19]

B. The current macro-policy environment leads to a productive structure that does not respond to international price signals, soil and climate conditions, and available technology.

32. Evidence shows that removing fiscal, trade and market interventions would boost economic growth, jobs and exports. Argentina's MERCOSUR partners, which have not applied the distortionary policies described above, have outperformed Argentina's agrifood sector in recent years. Simulation exercises also indicate that Argentina would benefit from removing distortions.[20] One study showed that a gradual reduction in policy distortions affecting the agrifood sector, including via a progressive elimination of export taxes, would double the increase in production expected in the baseline scenario over a 10-year period (+46 percent vs. +22 percent), with increasing yields driving the growth in overall production.[21] A second study projected similar numbers for a scenario without export taxes, with the value of agrifood exports increasing by between US$12 billion and US$18.8 billion.[22]

i. Certain regions and value chains are particularly disadvantaged.

33. Since the export taxes and restrictions do not affect all agrifood value chains equally, they not only influenced the decision of how much to produce, but also the choice of what to produce and where. By distorting relative prices, agrifood policies have affected the allocation of resources, the productive

[16] World Bank (2021a).
[17] The OECD developed this methodology for measuring public support for agriculture. https://data.oecd.org/agrpolicy/agricultural-support.htm
[18] See, for example, evidence on the high returns to public agricultural research as reported by Heisey and Fuglie (2007).
[19] The level of the PSE has fluctuated significantly as a result of changes in export taxes and the continuing unstable macroeconomic conditions, including the steep depreciation of the Argentine peso since 2018.
[20] MERCOSUR is the Common Market of the South, comprising Argentina, Brazil, Paraguay and Uruguay, with Venezuela as a memberin a suspended status.
[21] The baseline scenario is given by the World and Argentine Agro-industrial Reference Scenario, ERAMA. Fundación INAI & Bolsa de Cereales (2022).
[22] Fundación INAI & Bolsa de Cereales (2022).

structure and the geographic location of economic activity. For example, between 2002 and 2015, growth in planted area was led by soybeans, but since 2015 the changes in export taxes and export restrictions have contributed to a decrease in the planted area of soybeans, while the area planted with cereals has experienced significant growth.[66]

34. The export taxes not only hamper rural development but also increase spatial inequality. Since export taxes are applied as a percentage of Free on Board (FOB) prices at the port, they reduce farmgate prices in all the agrifood production areas of the country, but the negative impact on farmgate prices is much higher in regions that are more distant from the ports and thus face higher transport costs. The more remote rural regions tend to have more family farmers and poorer households, increasing income inequality within the farming sector.

ii. Current policies are limiting technology adoption.

35. A further, critical dimension of the impact of distortionary agrifood policies has been on technology adoption and thus on Argentine yields and resilience relative to those of international competitors. During the period when export taxes were higher, Argentina's use of improved production technologies dropped (Figure 6). In particular, the percentage of producers using improved technological packages in extensive crops declined until 2015, when the brief elimination of export restrictions and the reduction of export taxes encouraged the use of better technological packages. Agricultural use of nitrogen, phosphorus and potassium fertilizers in Argentina rose from 53 thousand tons in 2015 to 99 thousand tons in 2017, suggesting rapid responses to an improved policy environment.[23] By reducing gross margins and negatively affecting technological adoption, the distortionary policies have also affected yields per hectare. Thus, there has been a notable increase in the yield gap between Argentina and its main international competitors for the main crops during the past decade.[24] This negative trend has been intensified by regulatory limitations on royalties for seeds sold, which reduces investment in R&D by seeds companies and limits the development of new seed varieties.

[23] Data from FAOSTAT fertilizer database, 2024. www.fao.org/faostat.

[24] Bisang et al. (2022).

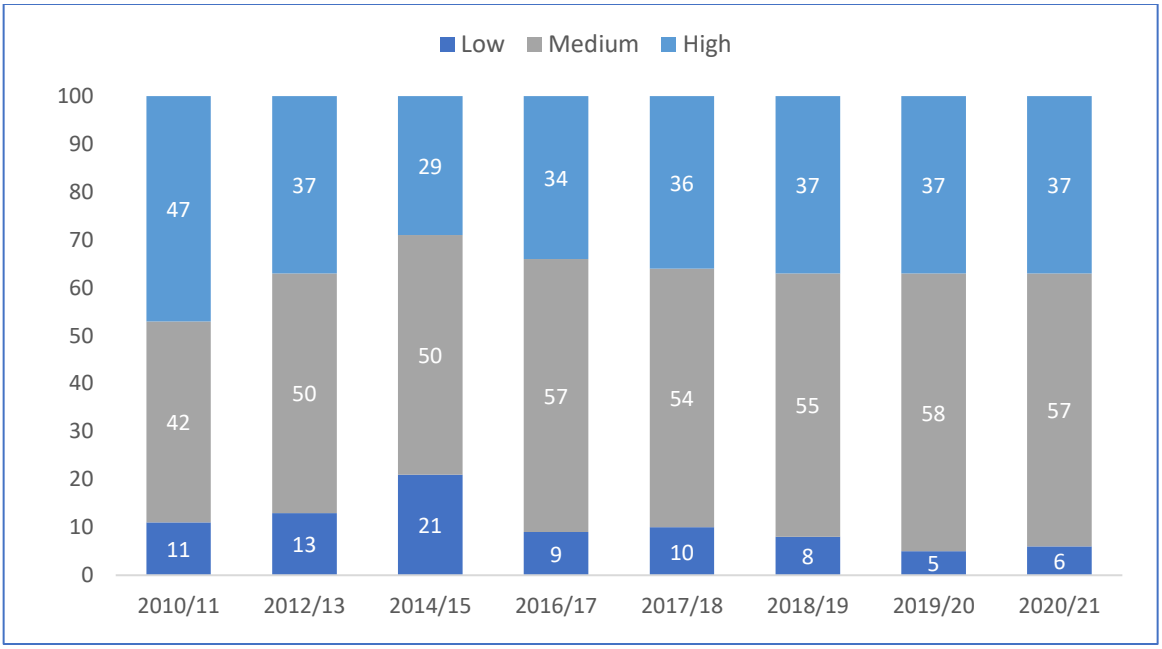

Figure 6. Technology adoption levels in crop production improved after the temporary elimination of export restrictions and the reduction of export taxes in 2015.

(Technology adoption levels in extensive crop production (%))

Source: Bolsa de Cereales (2022b)

36. In addition to the yield gaps with international competitors, domestic yield gaps have increased within Argentina between different profiles of producers, and especially beyond the Pampas region.[25] Closing those gaps would yield significant increases in productivity and more efficient and sustainable use of natural resources. Various studies indicate that agricultural productivity could grow substantially via the adoption of technologies that are already available in Argentina and those that are currently under development. The technological gaps are particularly wide in certain livestock farming activities (Annex B). This suggests that, with an improved policy environment, both at the agrifood sector and at the macroeconomic level, production responses via the adoption of available technologies could prove substantial, not just for beef, grains, and oilseeds, but also for regional agrifood value chains.[26]

C. The way forward: Eliminating distortions while prioritizing fiscal equilibrium.

37. A new strategy for sustainable agrifood development can only succeed if implemented in a macroeconomically and fiscally sustainable manner. While reducing taxes on the agrifood sector is crucial to the sector's sustainable development, restoring overall fiscal sustainability takes precedence in Argentina's current priorities to achieve sustained growth for the entire economy. The fiscal gap demands careful sequencing of policy reforms, along the lines of the principles presented below. Moreover, the relatively limited public support for the agrifood sector could be refocused on public goods and services such as R&D, food safety, mechanisms to promote exports with differentiated value for their environmental attributes (deforestation-free, for example), and social inclusion.

[25] The Pampas region refers to the productive, rainfed grasslands covering the provinces of Buenos Aires, La Pampa, Santa Fe, Entre Ríos, and Córdoba.

[26] Merlos et al. (2015), Bolsa de Cereales (2019), and Fundación INAI (2022).

38. Argentina's recent removal of quantitative export restrictions is a positive step towards restoring sector competitiveness and could be complemented by well-targeted cash transfer programs to protect the purchasing power of low-income households. The domestic price impact of removing quantitative export restrictions will generally be small, since primary inputs are a minor part of the price of consumer goods, and should not impact inflation, since any effect would be a one-off impact on prices (rather than continual upward pressure). Nevertheless, Argentina can leverage its strong social protection system to cushion the social effects of higher food prices due to the removal of the restrictions and other factors.

39. Second, in parallel with the reduction of the fiscal deficit, a gradual removal of export taxes is warranted. Given the need to simultaneously revitalize the economy and close the fiscal gap, a feasible initial step might involve maintaining a stable export tax only for the main profitable agricultural activities, particularly soy and its derivatives, which contribute nearly 70 percent of export tax collection, while liberating a significant portion of the agrifood industry at a manageable fiscal cost that can be covered by alternative sources of revenue in the short term. The sectors still affected by the export tax would benefit from the removal of non-tax measures and enhanced regulatory predictability.[27]

40. Third, progressing towards a unified exchange rate would incentivize producers to invest in more advanced, environmentally sustainable technologies. As noted above, exchange rate controls combined with export taxes can result in producers receiving barely 35 percent of FOB prices. Exchange controls and differential exchange rates, as well as their unexpected recurrent changes, are particularly harmful in depressing returns for smaller producers in remote areas, due to the intervening transport and logistics costs.

41. A fourth priority could be to embark on a medium-to-long-term agenda that includes the reduction (or elimination) of the turnover tax on primary activities and its replacement with less distortionary taxes at the sub-national level. Given the complexity of the federal system in Argentina, reforming the turnover tax across the country necessitates consensus among different levels of government, as it falls under the purview of the provinces. Therefore, it would be beneficial to lay the groundwork and build consensus around the need to reshape the turnover tax, to minimize its adverse effects while recognizing its significance for provincial budgets. Drawing on previous attempts, such as the Fiscal Pact of 2017, it would be advantageous to transition towards a sales tax model. This entails gradually reducing (and eventually eliminating) the tax burden on primary activities while focusing it on later stages of the production chain. Similarly, work could usefully be started on a tax reform agenda that places greater emphasis on other less distortionary taxes, both at the central and sub-national level, such as property taxation and personal income tax.[28]

42. In addition to the above reforms, other measures, such as increased public-private coordination and trade facilitation, can also increase opportunities for Argentina's agrifood sector. Better and more established mechanisms are needed to improve coordination between public agencies and key stakeholders in the private agrifood sector. Another fundamental element of a medium-term pro-export policy would be to invest in essential infrastructure and logistics, and in trade facilitation and promotion. While "hard" infrastructure can be expensive, there are opportunities for public-private partnerships that can minimize government expenditure on essential infrastructure to reduce the high costs of logistics. In addition, investment in trade facilitation can be effective without being costly and can build on the important advances made via the *Single Window System* for foreign trade operations by further simplifying a range of time and costs procedures. Similarly, trade promotion (which is currently barely one

[27] Following the European Union-MERCOSUR Free Trade Agreement, once the fiscal space is created, export duties could gradually be removed or bounds established for certain products.

[28] the World Bank's Public Expenditure Review III for Argentina, World Bank (2021c).

tenth of what it is Australia or New Zealand, relative to GDP) could be substantially ramped up with minimal budgetary expenditure, especially if leveraged by public-private partnerships.

43. Another core area for public policies is to continue to promote R&D focused on sustainable agrifood development and to build on the success of the Argentine innovation ecosystem. Public R&D institutions can transform their role from direct providers of a broad range of R&D to focus on public goods and services, natural resources management and climate change; and engage in more public-private R&D partnerships. Increased coordination between national and local public institutions and between public and private R&D institutions would serve to optimize investment in innovation. It will also be important to update and implement the regulatory framework to support new developments; improve intellectual property rights management; enhance knowledge and extension services, including via digital technologies, better disseminate information about sustainable practices and technologies in the agrifood sector; and to address the emerging challenges afforded by the new production technologies. This would require organizing upskilling education programs for agronomic technical staff. These actions can generally be carried out in the short term with limited fiscal implications, while actions involving more extensive funding commitments can be considered in the context of an overall budget review as part of the country's macroeconomic stabilization program.

III. POLICIES TO FOSTER INCLUSION CAN REDUCE RURAL POVERTY AND ARE CRITICAL FOR DOMESTIC FOOD SECURITY

44. Argentina has a diverse range of agrifood system actors, not all of whom have equal access to productive opportunities. The agrifood system encompasses subsistence family farms, commercial family farms, SMEs, and large agribusiness enterprises. Policies and programs to support the agrifood sector will be most effective when they address the unique needs of different types of producers.

A. Family farms receive little attention despite their social and food security importance.

45. National registries in Argentina fail to capture the full picture of family farms' scope and scale, but available data suggest that family farms are critical to domestic food security and that they warrant further policy attention. Due to the informality of many family farmers and fishers, their economic weight is likely to be under-represented and policies are poorly targeted. Including smallholder farmers more fully in agrifood policy would entail better integrating family farms with commercial potential into the formal economy, for example through productive alliances, as well as greater provision of basic services and enhanced coverage via social safety nets for subsistence farmers.

i. Official registries for family farms are incomplete and poorly coordinated, which clouds decision making.

46. Little data is collected or reported on small-scale family farms[29], making family farmers nearly invisible to the eyes of policymakers. In particular, the Permanent Household Survey (EPH), the basis for most data on poverty and social conditions in Argentina, does not collect data on rural populations.

[29] In line with The National Institute for Peasant and Indigenous Family Farming (INAFCI), we define small-scale producers to be family farming units with majority participation in the productive work by family members living on or near the farm and with up to two permanent employees

Argentina's vast distances, low rural density, and the very remote location of many subsistence family farmers means they are most likely to be undercounted and thus least likely to be reached by public services.

47. Although various registries and agencies do collect information on family farms, this data is scattered and partial. SAGyP's National Registry of Family Agriculture (ReNAF) collects information on "family farming nuclei" (NAFs) throughout the country, with more than 206,000 currently registered, although ReNAF's coverage is estimated to have reached only between 20 percent and 50 percent of the total universe of family farming nuclei.[30] The national tax agency (AFIP) recorded 66,555 micro-, small- and medium-scale enterprises (MSMEs), cooperatives, self-employed and single payer contributors who carried out agricultural production activities in 2021[31], while MSMEs and cooperatives also play a fundamental role in upstream and downstream linkages in agrifood value chains. SENASA ended 2022 with 76,869 family farming productive units across the country registered in its National Health Registry for Agricultural Producers (RENSPA).[97] Finally, the Institute of Associativism and Social Economy (INAES) has registered 1,617 agricultural cooperatives in the country, the largest of which has over 36,000 members.[32] In other words, while family farms are clearly numerous and known to be important for domestic food security and the rural economy, there is no reliable data source with which to estimate their size or identify their strategic needs.

48. Insufficient data on family farmers leads to policies that fail to distinguish adequately between subsistence farmers and transition farmers. Current policies geared at family farmers tend to emphasize vulnerability (which is appropriate for subsistence farmers), to the detriment of productive, labor and/or commercial policies that could boost productive capacity for the large number of transition farming family holdings that, via the sales of their surpluses, account for a large share of domestic food production. In addition, while a large number of more modestly scaled programs have been adopted by the state, their coordination could be strengthened to achieve greater impact for small-scale agrifood producers.

ii. Family farms probably produce half of domestically consumed food, but service gaps limit these farmers' access to markets and their resilience to climate shocks.

49. There is considerable heterogeneity across provinces in terms of the numbers, relative shares and average sizes of family farms. Agriculture census data from 2002 showed that while family farms accounted for more than 90 percent of agricultural holdings (EAPs) in the northern provinces of Jujuy and Misiones, they account for less than 30 percent in the Patagonian provinces of Tierra del Fuego and Santa Cruz. Moreover, while average family farms were over 1,000 hectares in these Patagonian provinces, they averaged less than 20 hectares in provinces such as Mendoza and San Juan. Buenos Aires province had the largest number of family farms (33,700) and the largest area (over 5.7 million hectares) of family farms.

50. Family farms are important contributors to Argentina's agrifood sector, producing more than one-quarter of agricultural production by value. Although they occupy only 18 percent of cultivated land, they produce 27 percent of total agricultural output measured in production volume. Factors that may explain their higher average land productivity include more intensive use of agricultural lands by family

[30] Barbenza et al. (2022), and MAGyP (2023g).

[31] AFIP distinguishes between micro, small and medium-scale enterprises based on the declared value of sales and declared number of employees.

[32] The *Agricultores Federados Argentinos Sociedad Cooperativa Limitada (AFA S.C.L.)* is the largest first-level agricultural cooperative in Argentina and one of the largest in Latin America, according to the International Cooperative Alliance and Cooperativas de las Américas (2020).

farms (i.e. less fallow lands or forested lands) and higher unit prices for certain crops in regional value chains than the per-unit prices for exported grains.

51. Family farms are especially important contributors to national food security, producing 50 percent of domestically consumed food. Whereas commercial farmers predominate in the production of grains such as corn and soybeans that are converted into animal feed or biofuels, family farms play a larger role in regional value chains that produce for domestic consumption. Direct and fresh local sales reduce intermediation costs and enable family farmers to sell better quality products at more affordable prices, especially to customers with less purchasing power. Thus, family farms are important for the country's food security, in terms of not only the availability of food but also access in economic and physical terms, diversity of nutritious foods, and stability over time.[33]

52. While most of the agrifood production by family farms contributes to the local food supply, family farms also export produce, with exports by family farms reaching US$10.8 billion in 2021.[34] In addition, exports by farmer cooperatives reached US$3.9 billion in 2021, increasing their share of total exports by 110 percent compared to 2020. Cooperatives can help family farms to meet quantity, quality, and safety standards that are required for participation in many value chains, although currently 70 percent of family farmers do not belong to such associations.[35]

53. Poverty, as measured in terms of unmet basic needs, is deeply entrenched among family farmers. Around one-third of the rural population suffers unmet basic needs, notably in more dispersed settlements.[36] For example, 58 percent of heads of family farm households (and 38 percent of their family members) only have a primary education, with 51 percent reporting difficulties in accessing school during the rainy season. Fifteen percent of family farmers live more than 15 kilometers away from the nearest health center. Two-thirds do not have access to a computer or internet, and almost one-third do not have access to telephones. Only 30 percent were found to have access to a public water network. Similarly, informal rural workers frequently lack access to public health facilities, quality education, pensions, other public services, and to benefits that are available to other workers in Argentina.[37]

54. Weak registration procedures complicate access to services. A large share of family farms and small-scale fishermen remain informal, as do informal farm laborers. Informality complicates activities requiring state approvals, engaging in contracts, meeting standards or requirements set by the state (e.g. with regard to phytosanitary requirements or tax payments) and accessing benefits, including from the broad range of public agricultural, health and other programs for rural areas. This can be particularly challenging for rural workers, who struggle to gain access to basic labor rights that formal laborers enjoy, such as an occupational risk insurance scheme, pension schemes or unemployment schemes associated with the risks of loss of production, although at times their rights have exceeded those of family farmers.

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[33] FAO (2014).

[34] Overall, most Argentine agrifood production is destined for the domestic market, with 30 percent of the gross value of agrifood production earmarked to exports, although there is considerable variation across value chains. Argentina is practically self-sufficient in most food groups. In 2021, food imports totaled just US$4.8 billion, equivalent to 7.3 percent of total imports, around one-tenth of the value of food exports, and less than 1 percent of GDP.

[35] Working Paper 3: Towards a More Socially Inclusive Rural Economy (World Bank, 2024).

[36] INDEC (2010) defines the dispersed rural population as people who live in the open countryside without forming population centers. This population is mainly engaged in peasant and indigenous family farming, and accounts for 27 percent of the rural population. The Needs Based Index measures poverty in relation to satisfaction of basic needs such as shelter, sanitation, education, and minimum income.

[37] INTA, 2021 (based on a 311 rural and peri-urban areas survey in 21 of Argentina's 24 provinces, 72% with population less than 1000 almost exclusively family farmers), INDEC, National Agricultural and Livestock Census 2018 and World Bank (2022).

Thus, coordinated formalization and registration efforts across public agencies, together with a consistent policy framework that extends benefits to this population, are important.

55. Family farmers are particularly vulnerable to the effects of climate change due to their dependency on rainfed agriculture for food production, nutrition security, and income generation. They typically have limited capacity to adapt to, cope with natural disasters or transfer the risks associated with the loss or degradation of agricultural assets and output. This is particularly concerning since productivity losses associated with climate change could reduce agricultural GDP between 3 percent and 17 percent in some countries in LAC and Argentina is no exception.[38]

iii. Female producers and indigenous groups face lower wages and more vulnerable employment.

56. Within family farming, women face unique challenges related to visibility and access to agrifood resources. Although 45 percent of registered family farmers in Argentina are women, only 10 percent of family farming units self-identify as headed by women.[39] Survey and other data fail to reflect women's contributions as farmers, characterizing them as housewives even though they are the main practitioners responsible for rearing small animals (e.g., goats, pigs, sheep, poultry), managing orchards, making handicrafts, harvesting forest fruits, and producing cheese. Women farmers overall face limited access to assets and services such as land, financing, technical support, and technology, and have limited space for joining associations and demonstrating leadership. Available data suggests that less than 30 percent of women have had access to communal property and only 16 percent have benefited from the allocation of public lands, all of which impedes their access to financing and undermines their important role in the agrifood system.[40]

57. As a result, women's potential economic contributions are not being realized. The lack of employment opportunities for rural women in highly mechanized production systems has led to most women farmers being steered towards peasant and indigenous family farming; these activities are also seen as more compatible with home-based care responsibilities that women bear disproportionately. Women receive only a very small share of monetary benefits as they are rarely linked to marketable products or processes, and there is a perception that their salaries are "supplementary" to the salaries of men. In terms of employment income, a 25 percent wage gap persists between women and men farmers. Raising the productivity and employment levels of female farmers would raise the output and profitability of the whole sector.

58. Indigenous people, one of the largest and most vulnerable groups of rural poor in Argentina, often depend on agriculture for their livelihoods. The lowest estimates of the number of indigenous people suggest that there are over 600,000 indigenous people in the country, approximately a quarter of whom live in rural areas.[41] They are present in all provinces of Argentina but more so in the northern provinces, Mendoza, and Patagonia. Indigenous communities and dispersed rural populations in certain parts of the Chaco, Pampas and northwest regions also have the highest rates of exposure to unsafe surface water and groundwater: these rural populations invest up to six hours a day, (mainly by women or young girls) in carrying water from unsafe sources, at the expense of education and productivity. More broadly, the incidence of poverty among indigenous households in regions with a high density of indigenous people is often double – or more – the incidence of poverty among non-indigenous households.

[38] World Bank Group (2022) and FAO & Programa de Servicios Agrícolas Provinciales (PROSAP) (2015).
[39] According to ReNAF data, cited in World Bank (2021b).
[40] World Bank (2021b).
[41] INDEC (2010).

iv. Agrifood micro-, small- and medium-scale enterprises face many similar challenges.

59. Agrifood Micro-, Small- and Medium-Scale Enterprises (MSMEs) share many of the development challenges of family farmers, as well as those of larger companies operating beyond the farmgate in the country's agrifood value chains. Tens of thousands of MSMEs across Argentina participate actively in the traditional grain and livestock sectors, and they are key service providers for agrifood value chains, e.g., in retailing inputs, facilitating local transport and providing veterinary services. They are also important leaders in agrifood production in the rural value chains, i.e., in agrifood production outside the core grains producing regions (notably in producing honey, fruit, vegetables, small livestock, aquaculture, and legumes). Agrifood MSMEs have a high potential demand for improved technologies and can play a major role in their adoption and dissemination. They are core, albeit neglected, actors in the generation of post-farmgate added value, and in the creation of local jobs. They also play a major role in facilitating links between family farmers and large agro-processing and marketing companies. In common with agrifood producers, the MSMEs face the same macroeconomic distortions, heavy regulatory burdens, and difficulties to access financing due to their lack of adequate collateral.

B. The way forward: Programs targeting family farms can increase economic participation while improving nutritional and environmental outcomes in the agrifood system.

60. To ensure that agrifood reforms are socially inclusive, some proactive policies may be needed to provide additional assistance to rural workers and farmers with small and medium-sized holdings. Supporting rural producers begins with coordinating the multiple registries and databases managed by agencies in this space to ensure full recognition and coverage of small producers. Existing programs for small and medium producers could then be assessed as part of a comprehensive strategy, identifying overlaps and gaps. The following are some priority actions that are likely to emerge from such an assessment.

61. A first priority would be to develop differentiated support strategies for family farmers based on their needs and, in the case of subsistence farmers, with a focus on addressing their vulnerability. This can be done via social assistance programs, community-driven development approaches, improved health, education and training services, and alternative work opportunities for subsistence farmers and rural workers. Additional actions would include the elimination of barriers that keep small farmers and rural workers from gaining access to rights, government services, and benefits enjoyed by others, and to enact laws and regulations to support them, for example by improving implementing rules and regulations for the Law for Family Farming that was approved in 2014.[42]

62. A second priority would be to promote greater horizontal and vertical integration in the value chains of family farmers who have the capacity to transition to commercial production. For many of these farmers, the most important obstacle is their limited integration into input and product markets. Their integration with buyers, input suppliers, technical assistance providers and financial markets can be promoted via "Productive Alliances", "anchor companies", cooperative associations and similar approaches.[43] In addition, increased investment in rural roads would reduce transportation costs for agrifood production and facilitate access to job opportunities, while access to finance for family farmers and MSMEs could be strengthened, for example, by ending restrictions on pre-financing of exports and

[42] This law (Reparación Histórica de la Agricultura Familiar para la Construcción de una Nueva Ruralidad) declares family farming of public interest and seeks to strengthen producers' rights to access land, water, seeds, local markets, and credit. Subsequent regulations were passed in 2023 that oblige family farmers to register with RENAF, create a Family Farming Council, permit public lands to be allocated to family farmers, and establish a native seed production center.

[43] World Bank Group (2016).

on using grain stocks as collateral for loans, as well as by eliminating double taxation on barter transactions.

63. A third priority would be to promote women's labor force participation in the sector through better data collection, recognition, and encouragement of the role of women in the sector and support for their technical capabilities in production, management, and marketing. Women producers face social expectations, such as those related to care responsibilities, that may limit their employment opportunities. Targeted technical assistance and dedicated programs, for example around access to finance, rural childcare frameworks, and technical assistance, can help to unlock women's productive potential in the sector.

64. To support indigenous communities, it is important to strengthen communal property rights and access to basic services and infrastructure, respecting their cultural practices and worldview, as well as to increase support for indigenous communities regarding voice, agency, and access to technical and financial resources. Some successful programs have focused on registering indigenous communities, efforts to demarcate indigenous territories and affirm their property rights, intercultural education programs, and initiatives conserve the existing natural ecosystems on indigenous properties and the ability to take advantage of natural resources in a sustainable manner. Initiatives such as these can help to reduce the social and economic exclusion faced by many indigenous communities.

65. Increasing investment in rural public infrastructure, improving opportunities for income generation and employment in impoverished rural communities, especially via agrifood value chains, and increasing the provision of basic services is critical for building pathways out of poverty and achieving a more inclusive rural economy in Argentina. Moreover, since the distortionary agrifood policy environment, described previously, is particularly deleterious for smaller producers and those remote from the main ports, removing the policy distortions will have an especially positive impact in terms of reducing poverty among small-scale producers and boosting regional development.

IV. IMPROVING RESILIENCE IN THE AGRIFOOD SECTOR WILL SMOOTH THE PATH TO ECONOMIC RECOVERY

66. While, a resilient agrifood sector is critical to Argentina's macro-fiscal performance, current development patterns in the sector are creating vulnerabilities related to water availability, soil health, deforestation, and the innovative technologies required to sustain future growth. Resilience to climate shocks, in particular, is an urgent concern due to the magnitude of the associated damages and the lack of risk financing instruments. Preserving the natural resource endowment and investing in innovation to promote the efficient, sustainable use of natural resources in the agriculture sector can help to ensure a stable, long-run growth trajectory for the sector.

A. Argentina's agrifood sector, hence its overall economy, is vulnerable to climate-related shocks and damages.

67. Argentina is vulnerable to climate-related damages, including floods and droughts, that have already begun to impose significant costs on the agrifood sector and the broader economy. Deforestation, soil degradation, and melting glaciers are worsening the impacts of floods and water shortages. Average annual asset losses due to flooding amount to around US$1.4 billion, and without

adaptation to climate change, the estimated impact of annual flood damage on GDP will be around 0.5 percent by 2060. The Northeastern and Pampas regions have been hardest hit by flooding, while socioeconomic resilience, understood as the capacity of the population to bear climate-related losses with the assets they possess, is lowest in the poorer Northwestern regions of the country (Figure 7). Provinces with both high poverty incidence and exposure to floods face the challenge that flooding can cancel out the impact of social spending on poverty mitigation in those provinces and add pressure on both provincial and federal budgets.

68. Droughts represent an additional major source of climate-related damage, with devastating events recorded in 2006, 2009 and 2011, when losses of more than US$4 billion were reported and more than one million people were directly or indirectly affected. Droughts accounted for over half the decline in economic activity in Argentina in 2018, while the 2021-22 drought cost Argentina around US$1.4 billion in fiscal revenues, US$2.7 billion in export revenues, and 1 percent of GDP. Consecutive droughts could reduce GDP by up to 4 percent per year by 2050.[44]

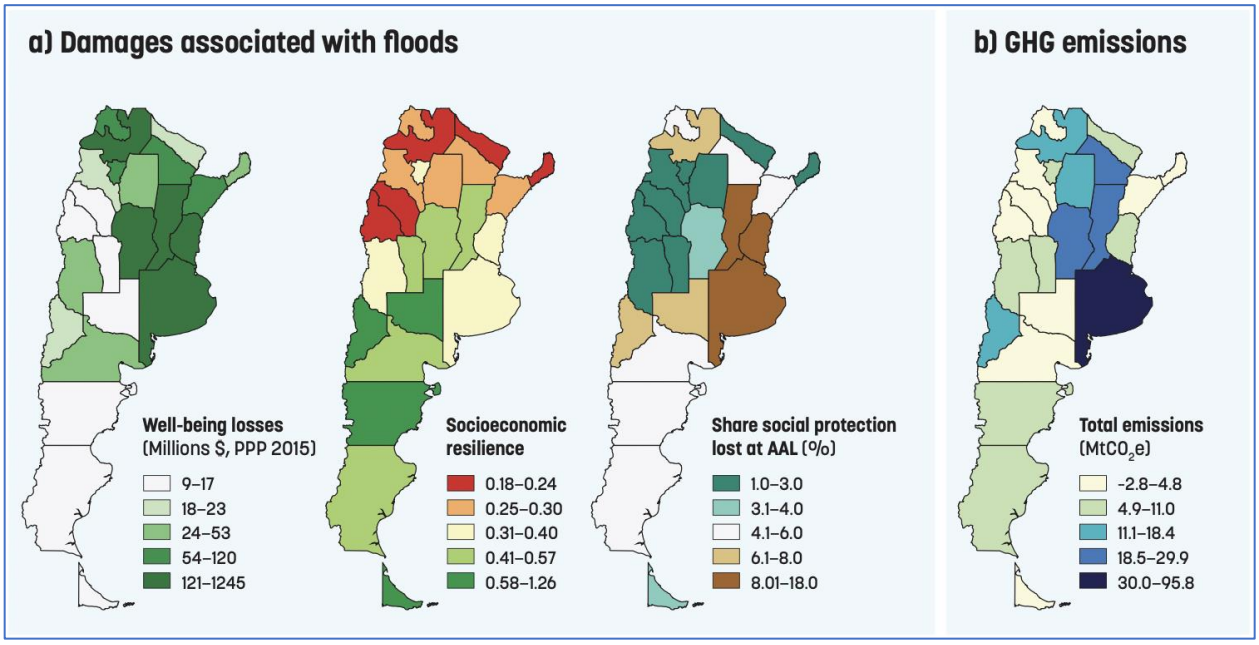

Figure 7. Climate resilience is lowest In Argentina's northwestern region, while GHG emissions are highest in the Province of Buenos Aires.

Source: World Bank staff calculations based on Rozenberg et al. (2021) and on the Government of Argentina (2018).

Note: Panel a) is calculated using present annual averages, based on the 2018 household expenditure survey (INDEC, 2020). ***Well-being losses*** *account for socioeconomic characteristics of populations (for example, poverty) as well as the physical impacts of flooding (due to hazard, exposure, and vulnerability).* ***Socioeconomic resilience*** *is the ratio of asset-to-well-being losses and describes households' capacity to cope with and recover from shocks.* ***Share social protection lost at AAL*** *refers to the share of social payments that is lost at annual average losses to compensate for consumption losses due to fluvial flooding in each province. The national average is 8 percent. Panel b) shows GHG emissions by province.*

69. Only 5 percent of Argentina's cultivated area is irrigated, which exacerbates drought risk. Moreover, the average efficiency of this irrigation is only 34 percent.[45] This irrigated area, despite its low relative efficiency, generates around 13 percent of the value of the country's agricultural production. An analysis by the Food and Agriculture Organization of the United Nations (FAO) suggests that investing to

[44] The World Bank Group (2022) and Rozenberg et al. (2021).

[45] Irrigation efficiency is the ratio between the amount of water that the crop requires, and the amount of water diverted by the irrigation system. A low ratio implies that the system uses more water than it needs to.

raise national irrigation efficiency from 34 percent to 58 percent would be cost effective.[46] Using efficient methods, Argentina could cost effectively triple the irrigated area to 6.2 million hectares in agricultural areas with favorable agroecological conditions and available water resources. Attracting private investment in irrigation and drainage could promote modernization, expansion, and adaptation of the irrigated area to climate change. [47]

70. Existing risk financing instruments are insufficient to protect farmers against severe losses. During the 2022-23 cropping season, Argentina had a severe drought throughout the country that resulted in significant losses for thousands of producers and other actors in the agrifood value chains, with crop production down by an estimated 45 percent and export losses estimated at US$20 billion. The supporting framework provided by the Agricultural Emergency Law was insufficient to protect family farmers against these losses. As agrifood activities face increasing climate (and market) risks, Argentine farmers rely increasingly on risk financing instruments and other risk management tools. The insufficient availability of these tools affects investment decisions and the sustainability of farmers and agrifood companies, with negative macro and microeconomic consequences.

71. Crop insurance, while widespread, does not protect sufficiently against the biggest climate risks. The crop insurance market is highly concentrated in hail insurance, which represented around 77 percent of the area covered and premiums in 2021.[48] Hail plus additional coverage (strong winds, frost, and fire) accounted for another 22 percent of the area. There are very few insurance policies covering drought and/or flood (the most catastrophic risks to the sector in the country). Multi-risk agriculture insurance (including drought/flood) accounted for barely 1.4 percent.[49] Additional coverage for such catastrophic production risks is limited by farmer knowledge and the high associated operation and administration costs of insurance companies willing to offer coverage.

72. As the frequency of droughts and floods increases, adaptation to improve the agrifood sector's resilience to climate change will be essential for stable and sustained growth of the sector, hence of the country. Its vulnerability to climate change can be reduced through the widespread adoption of good agricultural practices that are climate-smart, improve soil management, improve water management and storage, enhance natural resource management of forest cover. In addition to these measures, data systems and financial instruments can also improve risk management. These measures can be complemented by well-targeted social protection systems. In particular, cash transfers can be efficient solutions for reducing the welfare impacts of droughts and floods, especially in the case of large, infrequent events.

B. Declining natural resource endowments threaten long-term sustainability.

73. Part of Argentina's competitiveness in agrifood production and exports is based on the country's rich endowment of natural resources, which is declining. Deforestation and increasingly degraded soils call into question the sustainability of current production models. In turn, conservation of the country's natural resources depends largely on the activities carried out by the agrifood sector. A structural shift from traditional grazing agriculture to high intensity crop production by large-scale agribusinesses since 2001 has triggered large-scale environmental externalities, notably deforestation in northern Argentina.

74. Between 2001 and 2014, Argentina lost more than 12 percent of its forest area, compared to 7.4 percent in Brazil and 6.3 percent worldwide. The most important causes of forest loss are associated

[46] World Bank (2021a).
[47] Ministerio de Ambiente y Desarrollo Sostenible (2020).
[48] Centro de Agronegocios y Alimentos, Universidad Austral (2022).
[49] Agricultural Risks Office of the Agriculture , Livestock and Fisheries Secretariat (SAGyP)

with developing extensive agricultural and livestock activities, forest fires, and silvopastoral livestock activities that fail to preserve the minimum structure of the forest. Argentina's rate of deforestation fell significantly after the adoption of the 2007 National Forest Law, but after 2014 it began to fluctuate year on year (due in part to forest fires, notably in 2020) without continuing the downward trend.

75. Argentina's current spending level on natural resource management is only slightly below that of other Latin American countries with strong environmental management (e.g., Costa Rica and Chile) suggesting more could be achieved with current resources. National government spending for environmental management accounts for about 1.7 percent of total public spending, and about 0.4 percent of GDP. By way of comparison, one estimate puts the cost of land degradation alone at 16 percent of GDP.[50] Strengthening investment in natural resource management can enhance climate change adaptation and resilience while securing future endowments.

C. Technological innovation has made Argentina a leader in sustainable intensification, but declining public funding is threatening the public good innovations critical for competitiveness.

76. Argentina has achieved remarkable improvements in terms of mitigation in the agrifood sector, reducing GHG emissions per unit of product by one-third since 1990. The country has been a leader in adopting sustainable intensification practices, especially in grains and oilseeds production. A key element has been the massive incorporation of no-tillage practices – with direct sowing currently covering 90 percent of areas cultivated with grains, compared to 14 percent in 1993. This method has reduced soil erosion, increased carbon sequestration, improved rainwater storage in the soil and maximized productivity, while reducing oil consumption and GHG emissions. Other key elements have also improved, e.g., nitrogen fertilization; crop rotation; the use of cover crops; soil nutrition; integrated biological pest and brush control; fewer toxic herbicides and insecticides; the adoption of genetic innovations; less use of chemical fertilizers, and large reductions in fuel consumption, while improving yields.[51]

77. Argentina's innovation ecosystem has played a key role in supporting the technology-driven agrifood sector productivity growth that has increased resource use efficiency. The *Argentina Productiva 2030* report identified a universe of 584 firms engaged in agricultural technology (Ag-tech) and in agricultural biotechnology (Ag-biotech) in 2021, with 135 firms engaged in providing digital services and specialized equipment (Ag-tech), and the remainder engaged in developing bio-inputs for agriculture and livestock, animal and plant breeding services, and in producing additives and ingredients with technological functions of biological origin (Ag-biotech).[52] These companies are part of an innovation ecosystem that also comprises science and technology institutions (such as the National Institute of Agricultural Technology, INTA, and universities), incubators, accelerators, extension services (such as those provided by INTA and by the privately-led Regional Consortiums for Agricultural Experimentation, CREA), and investors, including venture capitalists. Thus, Argentina is emerging as a regional leader in agrifood technology development.

[50] Bouza, M.E. et al. (2016).

[51] Regúnaga (2013), Piñeiro and Elverdín (2017), Regúnaga and Elverdín (2017), Viglizzo and Piñeiro (2017), and Elverdín (2018).

[52] the *Argentina Productiva 2030* report, Ministerio de Economía de la Nación (2023). The role of digital solutions in the agrifood sector has increased in recent years, thanks in part to the enabling environment fostered by the 2017 Law on Support for Entrepreneurship Capital. Agtech startups are involved in farm management and data analytics, agri-finance, tracking and tracing logistics, sensing and the Internet of Things (IoT), marketplace platforms, biotechnology, climate information services, irrigation systems and water management, novel farming systems, robotics, and image processing, among others.

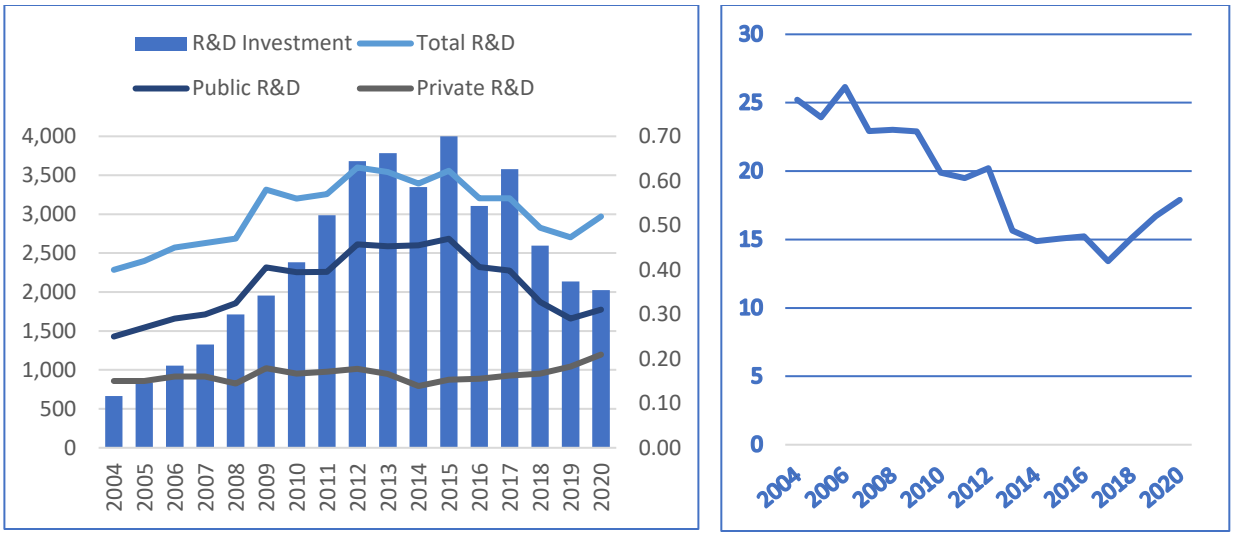

Figure 8. Total public R&D investment (US$ millions) and agrifood's share of R&D remain low.

(Panel A: R&D investment (USD, left axis and % GDP, right axis); Panel B: Share of agriculture in public R&D spending (%))

Source: Own compilation, based on data from the Dirección Nacional de Información Científica[53]

78. At the same time, the public sector's role in technology innovation has declined, limiting the sector's ability to address public goods that private innovation cannot solve. Total public investment in R&D has declined in recent years (2015-20) and represented only 0.52 percent of GDP by 2020, a proportion which is not only well below the average for OECD countries (2.95 percent), but also below the average for Latin American economies (0.67 percent).[54] This trend has been partly compensated by an increase in private R&D investment. Following a period of significant decreases, the share of the agrifood sector in public R&D investment began to increase in 2017 and reached 18 percent in 2020. Although the share of agrifood in public R&D investments has recently increased, overall public investment in R&D for the agrifood sector remains under 0.5 percent of GDP (Figure 8). Moreover, accessing Ag-tech also requires improved digital connectivity in rural areas, facilitating better access to technologies, and ensuring that farmers have sufficient resources to benefit from technical assistance (TA) to adopt technologies that improve sector performance and resilience.

79. The scope for public-private partnerships in technology development can be enhanced through strategic planning. INTA's Research and Development (R&D) still focuses heavily on developing seeding or fertilizer models for specific local regions that could instead be developed via partnerships with private firms. This would free INTA to focus on public goods such as research on natural resources management and conservation, which is otherwise underfunded by the private sector. Public science and technology institutions struggle to co-develop or support more advanced stages of the innovation processes with private partners, due to challenges for researchers at INTA and public universities in obtaining intellectual property rights based on their research, and bureaucratic processes for private firms to draw on public

[53] https://www.argentina.gob.ar/ciencia/indicadorescti/inversion.
[54] https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.

institutes to conduct laboratory tests. Addressing these limitations can make public research and development funding more efficient.

80. Regulatory barriers are holding back private innovation investments. Argentina's regulatory system does not permit many biotechnological products, such as bio-inputs or new crop varieties, to be patented. This, despite the fact that commercial access to biological organisms pre-existing in nature has been regulated internationally since 2015 by the Nagoya Protocol. According to this protocol, modified biological and genetic material and living matter, and modified substances (substances that do not pre-exist in nature), can be protected by patents. In the same vein, while electronic equipment for agriculture can be patented in Argentina, the software cannot be patented. Thus, Argentina's regulatory framework discourages investment in key areas for future agriculture growth.

81. Challenges to the coordination of R&D exist not only at the national level, but also between national and provincial authorities (e.g., via a varied implementation of the Nagoya Protocol). The weak coordination of innovation policies among the provinces and at the federal level creates an uneven landscape in which activities endorsed in one province may not be allowed in another. Moreover, there are limited spaces for public-private dialogue to address and consult on priorities, policy approaches and other urgent issues. Thus, improving national-provincial and public-private coordination on innovation technologies can help to optimize investments in, and returns on, agrifood technology development.

82. One successful example of partnerships with provinces is the Good Agricultural Practices (GAPs) initiative. Through this initiative, INTA has worked to apply its research and innovation for sustainability by partnering with a range of public and private partners. On the private sector side, Biotech and Agtech companies have helped implement "precision" agriculture to promote the more efficient use of soils, water and inputs, and reduce production losses. Provincial governments, as stewards of Argentina's natural resources, have promoted the GAPs approach.[55] Collective efforts to promote Good Agricultural Practices have resulted in a remarkable drop in the emissions from agrifood production (Figure 9).[56]

[55] The provinces of Cordoba, and more recently Buenos Aires and Santa Fe, have launched their respective GAP programs, while a program for the province of Entre Ríos is currently under development.

[56] INTA has a portfolio of research projects related to climate change mitigation and adaptation and designed to promote high-productivity systems that use low intensity energy in cultivation work and in agrochemicals, while contributing to soil conservation, efficient use of the available rainwater in the soil and less GHG emissions.

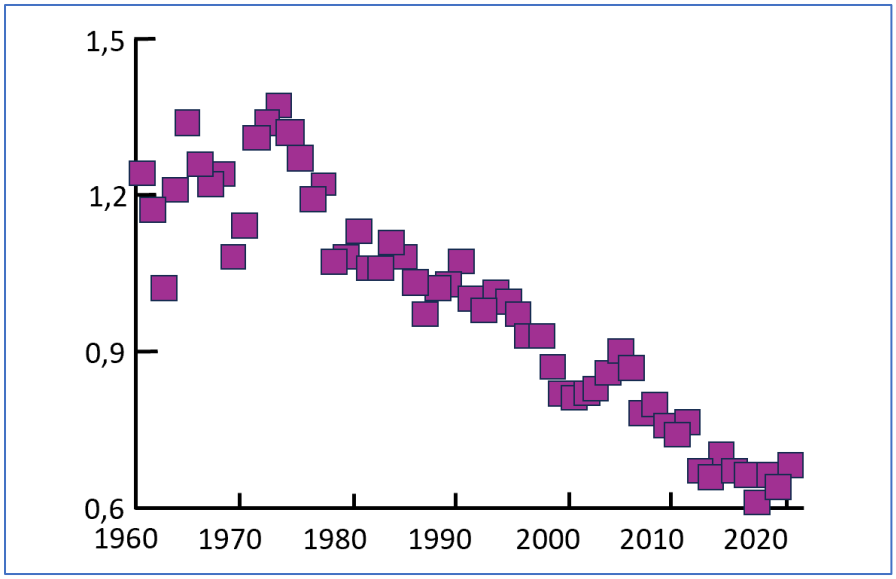

Figure 9. Carbon emissions per unit of Gross Agricultural Product have declined significantly over time.

(Tons of carbon per US$'000s of agricultural GDP)

Source: Viglizzo (2021)

D. The way forward: a revitalized public innovation system to address the public goods that private innovation cannot solve and an updated regulatory system to unleash private innovation to its full potential.

83. Argentina has been in the global vanguard in developing and adopting sustainable production technologies and enhancing environmental sustainability, but continuous effort is needed to meet future challenges, including the effects of climate change. In particular, the rapid growth of innovation activities around a privately funded, startup-based model challenges the traditional ways of working of Argentina's overall agriculture and food innovation system. As mentioned in Section II, Argentina's innovation system is fundamental to competitiveness; it is also fundamental to sustainability.

84. With the growing role of private funding for innovation activities, public funding in the innovation system may be focused more squarely on public goods, of which three stand out: First, the continued generation of public information and public knowledge that cannot be appropriated by specific actors. This can concern investments in basic research on agricultural products of importance in Argentina, or in the production of data and information that is publicly available, such as weather and climate data and soil maps. Second, the effective regulation of innovation activities, to avoid health and environmental hazards, but also to enable the introduction of new products (such as bioinputs). And third, innovations for smallholders who do not benefit from privately developed innovation. This may concern research programs on specific smallholder concerns, but it may also include activities to reduce the transaction costs of accessing new technologies (through the internet, or through extension services).

85. Public knowledge can help the sector grow sustainably. For example, a lack of measurement information means Argentina is missing out on carbon markets. Recent research suggests that most grazing lands may be gaining more carbon than they lose, thereby more than compensating for

Argentina's accumulated carbon extraction due to extensive crops production.[57] However, to measure carbon balances in national inventories, the most common method is the United Nations Intergovernmental Panel on Climate Change (IPCC) Tier 1 method, which applies default carbon sequestration values only on forest lands.[58] This IPCC approach does not consider the potential for carbon sequestration on grazing lands, which are predominant in livestock systems in Argentina. Further research and field evidence that studies landscape management practices comprehensively (including pastures, livestock, and forest cover) could support Argentina's role in global climate mitigation.

86. Biomass research is another area where the public sector can catalyze green development. Argentina has plentiful biomass resources that can be transformed into diverse products as part of the transition to more sustainable agrifood production. Examples including transforming industrial and urban waste into strategic inputs, further developing conventional biofuels (ethanol and biodiesel), and creating new bio-based inputs to replace chemical fertilizers and pesticides. These bio-industries would not only promote sustainable job creation throughout the country, but also help to build resilience against natural risks and establish a consistent energy and export strategy in the context of the global low-carbon transition.[59]

87. Data linked to public traceability systems can bring value to sustainable practices. Food safety monitoring systems implemented by SENASA show the critical role of the government in ensuring that exported products meet the changing and increasing health and safety requirements of importing countries. This demands close collaboration with international organizations and other countries' regulatory agencies and negotiating and maintaining agreements and certifications with importing countries. These same capacities can be extended to environmental certifications that support differentiated, higher value production. For example, the proposed EU ban on products that are not deforestation-free could affect up to 4 percent of Argentina's exports, with impacts concentrated in the soybean and beef value chains. Traceability schemes would help to ensure market access and could also support payments for carbon offsets, if Argentina continues to control deforestation.

88. With better data, Argentina can take advantage of options to tap into global carbon finance markets to pay for global public goods such as GHG reduction. For example, a report about Opportunities for Climate Finance in the Livestock Sector proposes specific measures to transform the livestock sector with climate related finance.[60] In the light of increasingly demanding standards in international markets, it will be appropriate to provide policy, technical and financial support to promote the development and use of certification schemes. These can include eco-labeling, country seals, denominations of origin or geographical indications, carbon footprint certifications, and sustainable forestry labelling, to reflect environmental performances, in accordance with international standards and regulations.

89. Public regulation can support innovation and protect the resource base. Examples include protecting intellectual property rights for genetic material and software, creating carbon markets, and controlling deforestation. The public sector has implementation responsibility for the Law of Minimum Budgets for the Environmental Protection of Native Forests (*Ley de Presupuestos Mínimos para la*

[57] Viglizzo (2021).

[58] IPCC (1996), IPCC (2006), and IPCC (2019).

[59] A bio-economy approach emphasizes the use of biological resources and of innovation-intensive processes that underpin them to transform solar energy into other forms of energy, goods, and services; boost the environmental performance of production, distribution, and consumption activities; and promote more efficient, sustainable use of natural resources. Trigo et al. (2015).

[60] The measures identified in the report are: (i) Condition credit lines to climate mitigation actions; (ii) Encourage value-chain finance for native ecosystem protection; (iii) Drive clean investment through Emissions Trading Schemes; (iv) Verify sustainable sourcing of livestock feed; (v) Reward innovation in livestock climate finance through prize-based programs; and (vi) Reward proactive policy commitments through Official Development Assistance. World Bank (2021d).

Protección Ambiental de los Bosques Nativos Ley 26.331.). To continue monitoring the effectiveness of this law in reducing deforestation, monitoring activities would need to be adequately funded.

90. Carbon pricing via a carbon tax is another means of creating domestic market incentives for mitigation. Argentina is one of 46 countries around the world that apply carbon pricing; however, the approved price was set at only US$10 per ton of carbon dioxide equivalent (tCO2e) in 2017, and in 2022, considering the depreciation of the Argentine peso, the carbon tax was around US$5/tCO2e. In addition, the tax covers only around 20 percent of total emissions, since direct emissions from natural gas, agriculture, land use, and industrial processes are exempt. Moreover, the tax coexists with energy subsidies, which operate in the opposite direction and impose a burden on the fiscal accounts. The further development of carbon markets in Argentina is worth pursuing. There are currently 58 registered carbon reduction projects in Argentina. Most of these (46) are in compliance markets, i.e., markets created as the result of national, regional and/or international policy or regulatory requirements, notably the Clean Development Mechanism (CDM), the Verified Carbon Standard (VCS) Program, and Gold Standard certification. The other 12 projects are registered in the voluntary markets which are still under development in Argentina. Regulation can spur innovation toward environmental public goods.

91. Investments in rural connectivity and irrigation can reduce the costs and risks of sustainable technology adoption. Rural connectivity infrastructure enhances the effectiveness of digital agriculture tools while efficient irrigation and water infrastructure, when accompanied by appropriate technical assistance, can reduce the drought risk associated with climate change.

92. Knowledge sharing and extension services can also incentivize broader adoption of Good Agricultural Practices that conserve resources and promote resilience. While production based on GAP principles is widespread in Argentina, broader adoption can be encouraged further to promote practices and technologies, for example in the beef sector, that have been proven to reduce GHG emissions and sequester carbon. The beef industry in Argentina (and elsewhere) has the potential to significantly reduce emissions through increased carbon sequestration on grazing lands and reduced enteric emissions, including via greater use of nutritional supplements and improved pasture management with the support of R&D as public goods.

93. Finally, coordinating initiatives across federal, provincial and private sector actors will reduce duplication and enhance effectiveness. Agtech and agro-biotech innovations are based on fields of science that are not specific to agriculture, so innovation policies can benefit from links with cross-sectoral policies through the Ministry of Science, Technology and Innovation and CONICET. SAGyP and its dependencies (such as INTA, INAL, and SENASA) can enhance research, extension, control and inspection capacities in their respective areas through better coordination. The Gabinete Nacional de Cambio Climático, which brings together national government, provincial government and private sector actors on issues of climate change, provides an example in Argentina of what a tripartite coordinating entity can look like for coordinating agrifood policies. INTA's regional innovation hubs are another example of coordinating public and private sector research efforts, together with producers, to scale up innovations that have a strong public goods element.

V. IN SUM: FISCALLY-SOUND SUPPORT FOR ARGENTINA'S AGRIFOOD SYSTEM CAN PROMOTE ECONOMIC GROWTH, INCLUSION, AND SUSTAINABILITY.

94. Fiscal sustainability and affordable diets in Argentina do not have to come at the expense of sector competitiveness and trade. Countries in the region (such as Mexico and Brazil) and further afield (e.g., New Zealand and Australia) have shown that domestic food security is compatible with supplying

international markets. Maintaining the global competitiveness of Argentina's agrifood sector is an investment in the economic sustainability of the country. Moreover, reducing non-tariff trade restrictions would raise revenues that can be reinvested in targeted transfers to consumers. Value chains, especially beyond the Pampas, have the potential to produce much more income and food for the domestic market than they currently do.

95. In addition, fostering agrifood competitiveness can promote social inclusion and sustainability. Good agricultural practices are those that are profitable and can scale, while also supporting resilience and the natural resource base. No-till soy is an example of this type of technical innovation that supports productivity and environmental outcomes. Family farms also combine productive potential and environmental stewardship. For example, many family farms favor the conservation of agro-biodiversity and a bio-economic approach. Sixty percent of the energy used in family farming production comes from local sources (e.g., biomass, animal traction, human labor, biodigesters, etc.) making these farms relatively energy efficient. [61] Family farms also generate a lower carbon footprint by marketing a larger share of their production locally to consumers. Thus, supporting these smaller producers can simultaneously promote sustainability.

96. With an appropriate policy environment, the sector could be a major engine of growth and shared prosperity both for enhanced regional development and for the Argentine economy as a whole. This would require actions on a number of levels and over different time scales, but the most critical elements fall broadly into the following taxonomy: (i) Reducing policy constraints on the agrifood sector in a fiscally responsible way, especially export taxes; (ii) Ensuring that benefits of reforms are widely shared and that policies for the agrifood sector are socially inclusive (iii) Maximizing the agrifood sector's resilience and its contributions to national and global sustainability goals. Annex A provides a list of indicative policies in each of these areas.

97. Perhaps the most critical action of all is to develop a national vision for Argentina's agrifood sector that provides stability and a clear path forward. With a more predictable, consensual policy environment, the agrifood sector can produce shared benefits across provinces, consumers, producers, and the environment. New discussion mechanisms and input from a wider set of stakeholders can help to develop this vision.

[61] Altieri (2016).

ANNEX A: MATRIX OF POLICY OPTIONS TO DEVELOP THE AGRIFOOD SECTOR

Challenges / Recommended Policy Options**	Overall Economic Impact	Overall Environmental Impact	Timeframe For Implementation	Timeframe For Impact	Short-term Fiscal Impact	Long-term Fiscal Impact	Primary Implementing Agency/Agencies	
IMPROVING COMPETITIVENESS								
(i) Options for Strengthening the Institutional Framework								
National policy fails to recognize the importance of the agrifood sector, so it contributes far less than potential to economic, social and environmental objectives								
- Develop a common vision for the environmentally and climatically sustainable, inclusive development of the agrifood sector	+++	+++	S	M	0	++	MECON	
(ii) Options for Strengthening the Policy Framework								
Argentina's trade policy creates large relative price distortions and a strong bias against the agrifood sector								
- Avoid import restrictions.	+++	++	S	S	+	+++	MECON	
- Progressively phase out export taxes	+++	++	S/ M	S/ M	--	+++	Congress, MECON, SAGyP	
- Reduce import duties on key inputs and capital goods	++	+	S/ M	S/ M	-	++	MECON	
International trade has become more complex and challenging, with increasing trade barriers for agrifood products								
- Implement mechanisms to improve monitoring and traceability in deforestation-free value chains, and promote certification schemes to differentiate products with quality attributes and environmental performance, in accordance with international standards	++	+++	M	M	0	+	SAGyP, Environmental Undersecretary (SSA), SENASA	
Some domestic consumers cannot afford nutritious diets								

- Strengthen targeted programs for vulnerable urban and rural populations (Argentina against Hunger, PROHUERTA, Programa Social Agropecuario)	++	+	S/M	S/M	-	-	MECON, Human Capital Ministry (MCH), SAGyP	
(iii) Options for Strengthening the Investment Framework								
Investment in agrifood value chains is limited by a lack of access to finance and risk management tools								
- Eliminate restrictions on access to institutional financing for producers who have grain stocks that could be used as collateral, and eliminate constraints with regard to financing schemes for small- and medium-sized farm units.	++	+	S	S	0	+	MECON, BCRA, BNA, National Securities Commission	
- Develop and promote innovative financing tools, risk management mechanisms, and guarantee mechanisms for investments, such as mutual guarantee associations, trusts, warrants, negotiable obligations, green bonds	+	+	S/ M	S/M	0	+	MECON, BCRA, BNA, National Securities Commission	
TOWARDS A MORE SOCIALLY INCLUSIVE RURAL ECONOMY								
(i) Options for Strengthening Family Farms and MSMEs as Important Actors in the Argentine Economy								
Small farmers play an important role in the food system but current policies do not sufficiently reduce their vulnerability or favor their social inclusion								
- Improve the articulation of registries and data covering family farms and rural workers, via data cross-checking, harmonization of definitions and registration parameters, joint gathering and processing of information, to ensure full coverage of small-scale agrifood producers	+	+	S/M	S/ M	-	+	INDEC, SAGyP, SAFCI, AFIP, INAES, MCH, SENASA, MTEySS	
- Design and execute targeted policies in support of family agriculture and small farmers that would facilitate land titling,	++	++	M	M	-	-	SAGyP, SAFCI, INAI	

formation and strengthening of rural producer organizations, access to credit, technology transfer, and technical assistance								
The importance of the role of agrifood MSMEs is not recognized sufficiently in national policies, limiting their potential contributions to achieving economic, social and environmental objectives								
- Consider topics relevant to agrifood MSMEs operating in all stages of the value chains when prioritizing technology transfers by public research and development (R&D) institutions.	++	++	S/M	M	-	++	SAGyP, INTA, INTI, SICyT	
(ii) Strengthening Support for AgriFood Producers Transitioning to Commercial Production								
National policy fails to support transition farmers to be more competitive and link more effectively with commercial markets								
- Boost support for transitioning family farms via a large productive alliances program that promotes associativity among transitioning farmers and develops business plans that link them to input suppliers, buyers, creditors, TA providers and matching grants, while promoting climate-smart technologies	+++	++	S/M	S/M	-	+	SAGyP, BNA, INTA, Business chambers, RPOs	
(iii) Increasing Opportunities for Women Farmers and Indigenous Producers								
There are major gender gaps in terms of opportunities for women as opposed to men in the rural economy, with implications for agricultural productivity								
- Incorporate a gender perspective in national, provincial and municipal government programs through targeted capacity building and an emphasis on women's voice and agency in the design and implementation of programs	++	++	S	S/M	0	+	SAGyP, SAFCI, INAI, Provinces	
Indigenous people are among the largest and most vulnerable groups of rural poor in Argentina								
- Further strengthen communal property rights and access to basic services and infrastructure for	+	+++	S/M	S/M	-	+	INAI, SAGyP, SAFCI	

indigenous communities, respecting their cultural practices and world view.								
MAXIMIZING RESILIENCE AND SUSTAINABILITY								
(i) Options for Strengthening Sustainable Intensification and Bolstering Mitigation Efforts								
Since agrifood value chains are important contributors to GHGs in Argentina, more efforts are required to reduce GHG emissions and implement GAPs								
- Implement economic incentive program to promote Good Agricultural Practices at the national level, similar to Cordoba's GAP program	++	+++	M	M	--	++	SAGyP	
Focus research by the national R&D system on the emissions and carbon sequestration impacts of productive management practices adopted in Argentina, so that national emission metrics are developed that reflect the unique features of Argentine production systems	++	+++	S/M	M	-	++	SAGyP, INTA	
- Alongside a fossil fuel subsidy reform, consider a higher carbon tax to strengthen signals on decarbonization goals and trigger investments in decarbonization, including in agrifood value chains, and ensure that higher carbon taxes revenues are recycled by targeting them to the bottom 40 percent of the income distribution and to increased public investment	+++	+++	S/M	M	--	++	MECON, Congress, MCH	
(ii) Options for Promoting Adaptation and Strengthening Natural Resources Management and Risk Management								
Argentina continues to face soil and water resources management challenges								
- Promote increased irrigation and drainage coverage for crop areas that are currently rainfed, while adopting	++	++	M	M	--	+	SAGyP, INTA, Provinces	

precision agricultural practices and reinforcing related training, TA, and innovative financing mechanisms								
Argentina needs to strengthen its natural resources management framework and increase protection for its forests								
- Building on the experience of the Forest Law, strengthen the regulatory framework for the use and protection of resources and ecosystems throughout the territory, drawing on strong scientific information and careful land use planning, and monitor/evaluate scientifically the response to the new regulations and land management	++	+++	S/M	M	-	+	SAGyP, SSA, Provinces	
(iii) Options for Addressing Risks Associated with the Environment								
Increasing institutional, climate and market risks affect the sustainability of agricultural enterprises								
- Develop a comprehensive agricultural risk management policy, and adopt a comprehensive program for agricultural risk management, which includes a regime for the promotion of agricultural insurance and derivatives and the use of futures markets	++	+	M	M	-	-	SAGyP	
Improve Argentina's ability to meet increasingly demanding standards in international markets								
- Provide policy, technical and financial support to promote the development and use of certification schemes, eco-labeling, country seals, denominations of origin, carbon footprint certifications, and sustainable forestry labelling, in line with international standards and regulations	++	+++	S/M	S/M	-	++	SAGyP, SSA	
(iv) Options for a Sustainable Innovation Ecosystem								
There is insufficient coordination and inadequate regulation to support the innovation ecosystem, and the public sector's role needs to adapt to new trends								

- refocus public R&D on areas of a public goods nature, i.e., better natural resources management, conservation, reduced carbon balances, climate change adaptation, and the development of new bio-based products and services	++	+++	M	M	0	++	MECON, SAGyP, MINCYT,INTA, CONICET	
- Update and implement the required regulatory framework for intellectual property rights, and registration of new biotech and biologicals developments	++	++	M	M	0	++	SAGyP, CONABIA, SENASA, Provinces	
Formulate clear policies for public S&T institutions to work with partners, including the objectives and types of partnerships, and the principles for decision making, communication, and sharing of costs and benefits	++	++	M	M/L	0	+	MECON, SAGyP, SCyT, INTA, INTI	
- Launch open innovation programs to address technological demands from agrifood value chain actors, and to achieve social inclusion and environmental sustainability objectives in the value chain	++	++	M	M	--	--	SAGyP new Innovation Unit, Innovation Fund	

ANNEX B: THE BEEF INDUSTRY ILLUSTRATES AGRIFOOD'S ECONOMIC, SOCIAL AND ENVIRONMENTAL CHALLENGES AND OPPORTUNITIES

A. The beef industry is one of the three most important agrifood value chain in Argentina.

98. The beef industry generated a gross value of over US$16 billion in 2022, second only to soybeans and wheat. This includes almost US$12 billion from livestock production and over US$4 billion in value added via processing and retail. There are 128,000 farms in Argentina that breed and/or fatten 54.3 million heads of cattle across the country. Around 31,200 farms raise cattle for own-consumption, accounting for 3.7 percent of the total heads of cattle (Figure 10). Some 50,500 farms operate cow-calf systems, accounting for 32.2 percent of total heads of cattle, supplying the weaned calves to 5,900 grass-fed fattening operations or to 1,100 grain-fed fattening operations. Whole cycle livestock systems account for another 35,700 farms and just over half (50.5 percent) of all heads of cattle. Most cattle are reared for beef, with the country's 3,700 dairy operations accounting for only 4.1 percent of all heads of cattle. These livestock operations sell their cattle either via direct sales to processors, via traders, or via auctions. Three-quarters of Argentine beef is consumed domestically while 25 percent is exported. The beef industry (livestock rearing plus processing) employs more than a quarter of a million people across the country.[62]

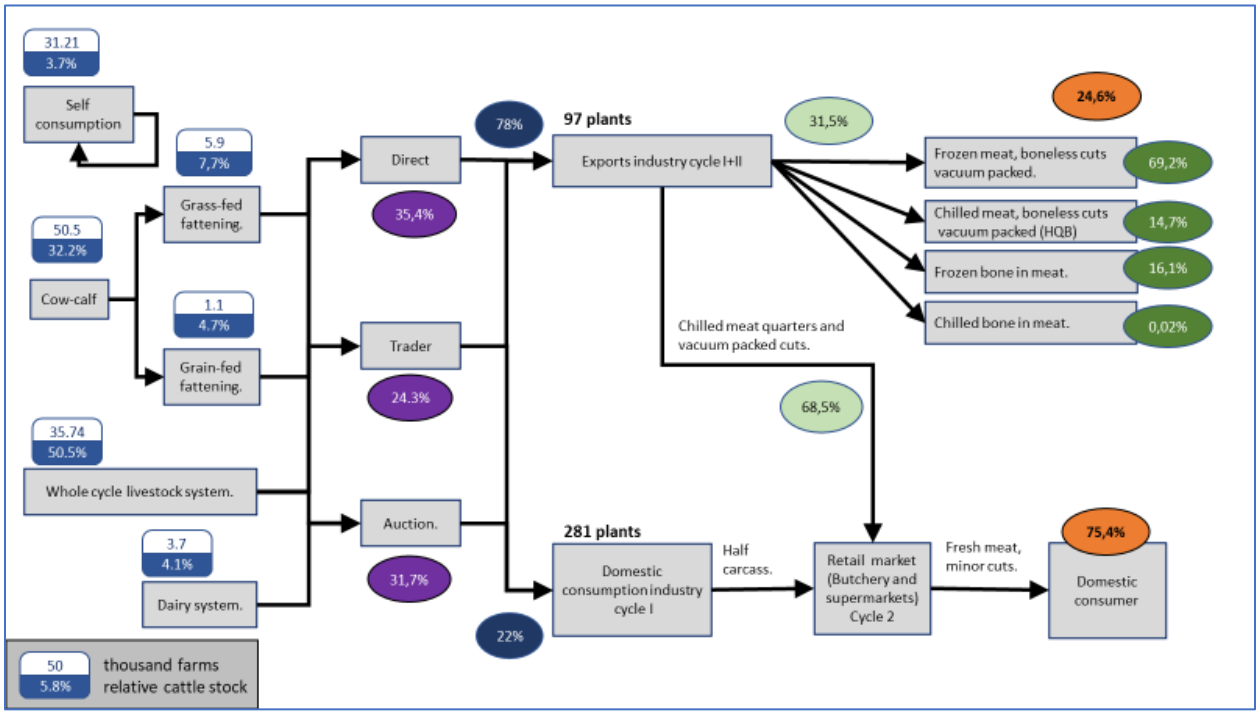

Figure 10. Argentina's beef industry comprises 128,000 producers and around 380 processing plants.

Source: Own compilation based on INDEC (2022), INDEC (2018), and MAGyP (2022b)

[62] Ministerio de Agricultura Ganadería y Pesca de la Nación (MAGyP) (2022).

99. Argentina is highly competitive in global markets for beef, even though its beef industry is not particularly efficient. Argentina's beef competitiveness index[63] has generally ranged between 5 and 15 over the past three decades, pointing to very strong competitiveness. Indeed, Argentina's index values underestimate the true comparative advantage because beef exports are artificially constrained by export banning policies. Even in the current policy context, Argentina is the fifth largest beef exporter in the world, with 6 percent of the global market. However, even with its natural comparative advantages, Argentina's beef industry is not particularly efficient, with two key indicators (weaning rate and stock efficiency) at levels that are average relative to international comparators, and that have remained stable for decades, while other countries have shown considerable improvements over time (Figure 11).[64] This is partially due to poor management of grazing lands which has caused them to be less productive, which in turn is due in large measure to the policy environment.

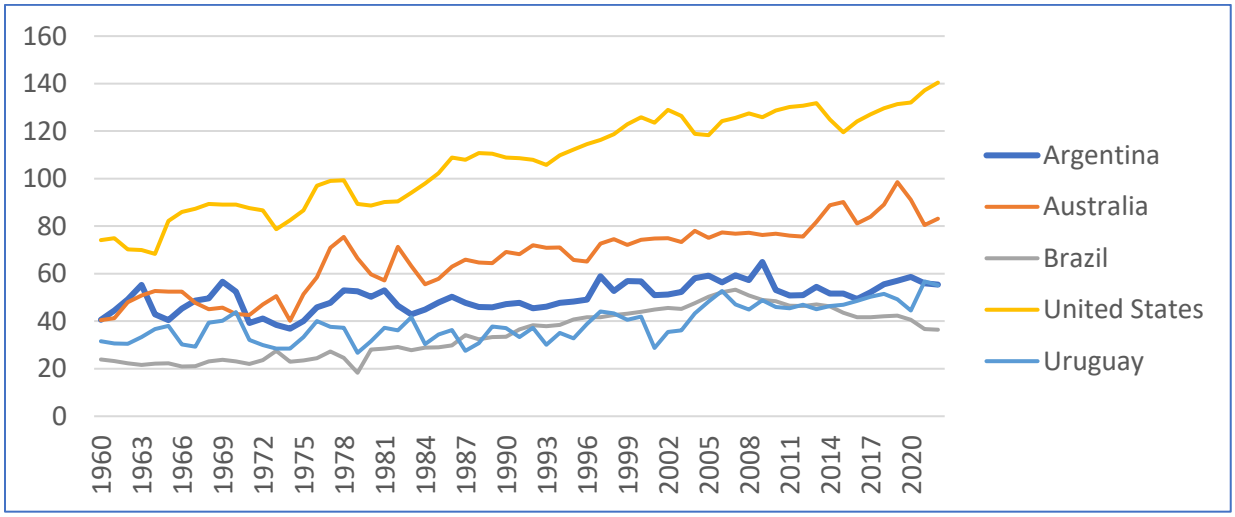

Figure 11. Argentina's livestock efficiency is average and has not improved significantly over time.

(Kilograms of carcass weight equivalent per head of cattle)

Source: Own compilation based on data from US Department of Agriculture - Foreign Agricultural Service (2022)

B. The beef industry exemplifies the economic, social inclusion and environmental challenges faced by the agrifood sector.

100. While the Argentine agrifood sector as a whole has been heavily taxed and constrained, one of the most heavily constrained value chains, in terms of its ability to export, is the beef industry. Current policies have adverse impacts on both producers and domestic consumers. The adverse policies include export taxes, export quotas and even outright prohibitions, heavy import duties on inputs, and differential exchange rates from market exchange rates that implicitly tax exporters heavily. The beef industry case study perfect illustrates the adverse policy environment. During the last 20 years, the agrifood sector as a whole has transferred the equivalent of 2.5 percent of national GDP to support domestic consumption and inefficiencies in other sectors. The transfers represent 25-50 percent of total gross farm incomes. In the case of the beef industry, the transfers in 2022 amounted to US$1.7 billion, equivalent to 49 percent

[63] The competitiveness index is the ratio of the share of a product in each country's exports to the share of that product's exports in total global exports. A value over 1 indicates that the country is internationally competitive in that product.

[64] Livestock producers and processors aim for greater efficiency with regard to *weaning rates*, i.e., achieving a large number of calves weaned from their mother's milk relative to the number of cows exposed to a steer; and *stocking rates*, i.e. a high number of heads of cattle relative to the grazing area (without exceeding the grazing area's carrying capacity).

of the gross value of beef exports, down slightly from 57 percent in 2021 and over 50 percent in 2020. Argentina is unique in taxing its agrifood sector and its beef industry in particular so heavily, both as a share of gross farm receipts and as a share of GDP.[65] The export taxes and restrictions have depressed meat and cattle prices and thus returns to rural livestock producers, most of whom have relatively small stocks of cattle. This in turn has depressed investment in improving livestock and forage, leading to overstocking and pasture degradation, higher methane emissions from the sector, and conversion of grazing lands (that have an important potential as carbon sinks) into other uses. These adverse policies have also made beef supplies more precarious, accentuated cycles of herd exhaustion and re-stocking, and increased the volatility of beef prices for urban consumers.

101. The beef industry is important from a social perspective, as livestock production depends heavily on a large number of small producers. Almost 70 percent of Argentine livestock producers have a maximum stock of 500 heads of cattle, with half of those farms operating with a maximum stock of 100 heads of cattle, and indeed almost one-quarter of livestock producers (31,200 out of 128,000) produce for own consumption (subsistence). At the same time, the sector is a major source of employment, accounting for one in five jobs in the agrifood sector and five percent of all private employment in the country. The livestock sector is one of the most widely distributed economic activities across the country, with beef industry employment spread across both rural areas (57 percent in livestock production) and urban areas (43 percent in input supply, processing and retail segments of the value chain). Thus, a more favorable policy environment for the beef industry, together with increased technical and financial support, can contribute to enhancing social inclusion, employment and food security in Argentina. This can include social assistance for subsistence operations and increased access to financing and markets for transitioning small livestock operations, including via productive alliances, so as to boost productivity and expand the use of more sustainable, climate-smart practices and technologies in the beef industry.

102. Since Argentina's livestock sector accounts for 24 percent of the country's GHG emissions, it has a key role to play in climate change mitigation. Methane is the main GHG emitted in livestock production and is produced by the cattle's enteric fermentation of forage. Methane emissions are negatively correlated with the digestibility of the diets that cattle feed on, so that improved pasture management (to reduce overstocking and pasture degradation) as well as nutritional supplements have an important potential to reduce methane emissions and improve animal performance.[66] Other potential actions include increasing productivity along livestock value chains to reduce emissions per kilogram of product, and reducing livestock-driven deforestation, particularly in the Gran Chaco region.[67] Moreover, if properly managed, the pastures themselves can constitute important carbon sinks. In addition to challenges regarding mitigation, livestock production faces challenges with regard to adaptation to climate change, notably due to flooding, extreme heat waves, and cold waves. Climate change and variability results in losses for livestock producers and in scarcity and higher prices of beef for consumers.[68] More than capital intensive investments, these solutions typically require technical assistance to producers.

[65] Lema et al. (2018), Nogués (2015), and Reca (2006).

[66] Arrieta et al. (2020), National Research Council (2016), and FAO and New Zealand Agricultural Greenhouse Gas Research Centre (2017). Beyond Argentina, nutritional additives have been developed to reduce methane emissions in ruminants, based on red seaweed or 3-Nitrooxypropanol (3-NOP), which can reduce methane emissions by 30 to 90 percent in intensive dairy and beef systems. Hristov et al. (2015); Machado et al. (2016); Roque et al. (2021), and World Bank (2021).

[67] Steinfeld & Gerber (2010); Gerber et al. (2013); Mottet et al. (2017) and Minx et al. (2021).

[68] Singh et al. (2012), Rosen et al. (1994), and Campbell et al. (2006).

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