



# Climate-Smart Agriculture in Argentina

## Climate-smart agriculture (CSA) considerations

**A** Argentina is a **regional leader in agricultural research and development (R&D)**, and a model for South-South cooperation in agriculture. This strength offers a valuable entry point for mainstreaming CSA in agricultural development, especially if strategies that target small-scale producers and marginal agricultural regions are strengthened and if efforts are systematic.

**A** **No-tillage techniques**, adopted widely for cereals and oilseeds around the country, have improved water use efficiency and reduced soil erosion. These benefits can be maximized if complemented with diversification, adequate fertilization and rotations.

**A** **Enhanced nutrient and fertilizer recycling practices**, for export-oriented crops along with **precise application of fertilizers** based on cultivars and soil type, would allow for the maintenance and regeneration of soil natural capital in key agricultural regions.

**M** The promotion of a **low-emissions agricultural sector** could be achieved via improvements in practices for livestock production, such as: crop and pasture rotation, controlled grazing, precise management of pastures, and certification schemes.

**I** The development of **National Adaptation Programs of Action (NAPAs)** and **Nationally Appropriate Mitigation Actions (NAMAs)** can increase CSA

uptake. Likewise, strengthening small-scale farmers' access to credit and existing insurance schemes can catalyze the adoption and out scaling of existing on-farm CSA initiatives.

**A** Identification of suitable CSA options that maintain and/or boost productivity can be enhanced by the development and open access to **Decision-Support Systems** that compile and analyze weather, agronomic, and market information and deliver results to a range of stakeholders and decision makers.

**A** Changes in land use in the past decades and competition over resources require a **holistic approach to manage farmland, rangeland and natural ecosystems**. Decisions at farm and policy level need to be oriented towards short-, medium-, and long-term horizons and to address interactions between forest, cropland and livestock.

**\$** While **national public finance** is critical for the sustainable implementation of CSA policies and on-farm activities, **international cooperation** can stimulate mainstreaming CSA and help reduce barriers to implementation. This can be achieved via strengthening existing cooperation with international institutions focused on either climate change or agriculture-related topics and/or by fostering cooperation with new international partners.

**A** Adaptation

**M** Mitigation

**P** Productivity

**I** Institutions

**\$** Finance

The climate-smart agriculture (CSA) concept reflects an ambition to improve the integration of agriculture development and climate responsiveness. It aims to achieve food security and broader development goals under a changing climate and increasing food demand. CSA initiatives sustainably increase productivity, enhance resilience, and reduce/remove greenhouse gases (GHGs), and require planning to address tradeoffs and synergies between these three pillars: **productivity, adaptation, and mitigation** [1]. The priorities of different countries and stakeholders are reflected to achieve more efficient, effective, and equitable food

systems that address challenges in environmental, social, and economic dimensions across productive landscapes. While the concept is new, and still evolving, many of the practices that make up CSA already exist worldwide and are used by farmers to cope with various production risks. Mainstreaming CSA requires critical stocktaking of ongoing and promising practices for the future, and of institutional and financial enablers for CSA adoption. This country profile provides a snapshot of a developing baseline created to initiate discussion, both within countries and globally, about entry points for investing in CSA at scale.

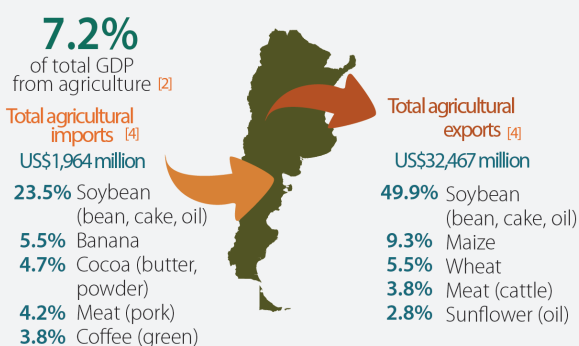
## National context:

### Key facts on agriculture and climate change

#### Economic relevance of agriculture

Argentina's agricultural sector contributes 7.2% to the gross domestic product (GDP), high in comparison to the 5.2% average in the rest of the Latin America and the Caribbean (LAC) region [2]. National agriculture provides key staple foods for the nation's 41 million inhabitants, such as bread, beef, and milk [3]. Agricultural exports account for 58% of national exports and feed around 450 million people around the world. High-value imports include unprocessed soybean (to meet the high demand for biofuel production and animal food), banana, cocoa, meat (pork), and coffee.<sup>1</sup>

#### Economic Relevance of Agriculture



#### People and Agriculture



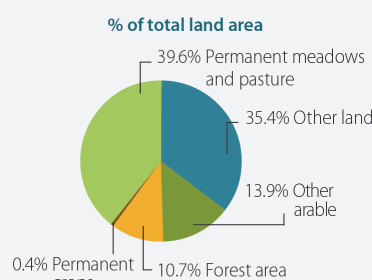
\* The maximum land area (cropland and pastures) for small-scale production units is region specific, depending on agro-environmental, climatic, social and economic conditions: up to 500 ha in the humid Northeast, up to 1000 ha in Pampa, Cuyo and Gran Chaco regions; up to 2500 ha in the Northwest and up to 5000 ha in Patagonia provinces.

1 However, the value of soybean imports decreased significantly in the last years, from US\$1,343,440,000 in 2008 to US\$554,000 in 2010, due to Government's regulations regarding imports of genetically-modified soybean.

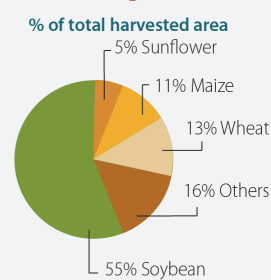
#### Land use

Agricultural production occupies approximately 53% of the land area (148 million hectares) [9] and is concentrated in the Central region, Pampa<sup>2</sup>, Northeast<sup>3</sup>, and Northwest<sup>4</sup> regional economy areas. Land is dedicated to annual crops, pastures, native grasslands, and forests. Cereals and oilseeds are mostly cultivated in rain-fed farming systems (Pampa), while production of fruits, grapevines, and olives occurs in irrigated systems and outside the Pampa region. Recent trends show an overall increase in cropland area in contrast with diminished pastureland [10].

#### Land Use [9]



#### Main Crops [9]



#### Agricultural production systems

More than 200,000 small-scale (family) farmers cultivate 14% of the total agricultural land area, accounting for 66% of total agricultural outputs and 20% of total production value. Small-scale farmers mainly grow vegetables (70 to 80% of total production of vegetables is small scale), tobacco, cotton, mate herb, sugarcane, wheat, maize, soybean, and sunflower [7]. Monocropping on marginal agricultural areas is common of small-scale production units, resulting in low yields due to poor soils and inadequate access to water, fertilizers, pesticides, tools and even technical assistance. It is usually women, representing 11% of the total population active in agriculture [6], that experience the highest rates of unsatisfied basic needs and lack of land titles, especially in the Northeast and the Northwest. Family farming has been slowly replaced with large-scale operations,<sup>5</sup> especially in

2 The Pampa region includes the provinces of Buenos Aires, Santa Fe, Córdoba, Entre Ríos, and La Pampa.

3 The Northeast region includes the provinces of Misiones, Corrientes, Chaco, and Formosa.

4 The Northwest region includes the provinces of Jujuy, Salta, Tucumán, Santiago del Estero, Catamarca, and La Rioja.

5 This phenomenon has been linked with the establishment of 'sowing pools,' which are investor groups that lease land from small- and medium-scale producers for periods of up to three cropping seasons, in order to produce higher yields and economies of scale. This land tenure model has become very popular in the Pampa region, especially for cereals and oilseeds.

regions such as Pampa (decreases of up to 23% between 1988 and 2020), the Humid Chaco (decrease of up to 18%), and Patagonia (decreases of up to 14%) [7]. Small-scale farmers are also more exposed to health risks (skin and respiratory diseases) due to proximity to areas where agrochemicals are used intensively and extensively.

## Agricultural GHG emissions

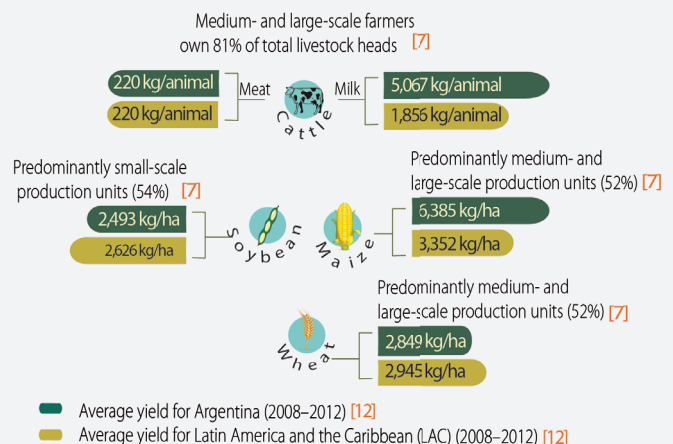
Agriculture accounts for 44.3% of total GHG emissions in Argentina, whereas energy contributes 46.8%, waste management 5%, and industrial processes 3.9%. Main sources of GHG emissions from crop production relate to the use of agricultural land (98.7%), rice cultivation (1%), and the burning of crop residues in the field (e.g., cotton, and sugar cane) (0.3%). High emissions levels from livestock production activities are the result of enteric fermentation (97.7%)<sup>6</sup> and manure management (2.3%) [16].

## Challenges to the agricultural sector

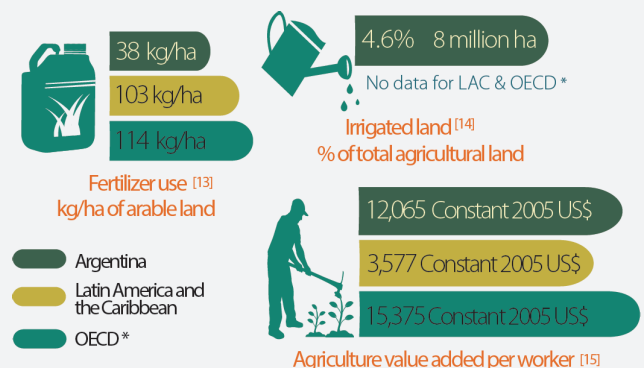
Argentina's agricultural sector has experienced profound changes in land use in the past few decades, including:

- Increases in cropland area (2x) and crop production (5x between 1970 and 2012).
- Expansion of cropland at the expense of natural ecosystems (North) and livestock activities (Pampa).
- Displacement of livestock production (mainly cattle) from the Pampa to new areas (Northwest and Northeast).
- Expansion of monoculture, especially the replacement of wheat by soybean, among others, as a response to global markets demand and national fiscal policies (restrictions and distortions).

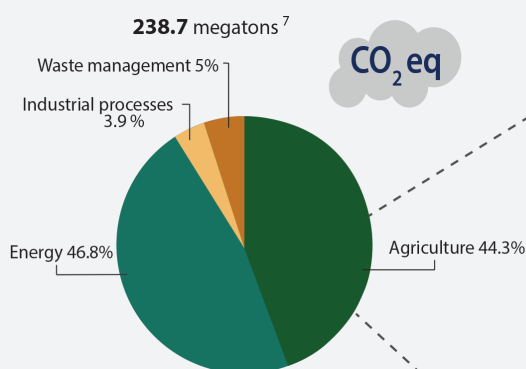
## Important Agricultural Production Systems



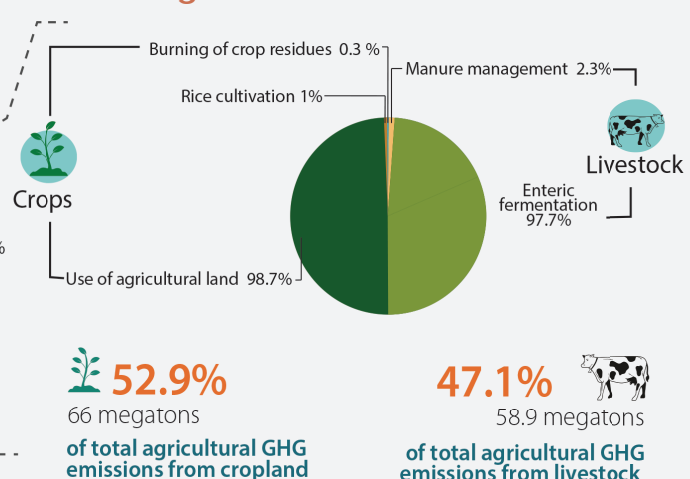
## Productivity Indicators



## GHG Emissions [16]



## Agriculture GHG Emissions [16]



<sup>6</sup> Enteric fermentation is a process that takes place in animals' digestive systems.

<sup>7</sup> As of the GHG inventory in 2000, if Land-Use Change and Forestry (LUCF) sector is taken into account, emissions would equal 238.7 megatons due to the sector's potential to sequester CO<sub>2</sub>. For the present calculations of absolute values (megatons) and relative values (%), LUCF is not taken into account, and so total GHG emissions equal 282 megatons.

Enablers of these changes include: mechanization of the agricultural sector, adoption of new farming techniques and development of farmers networks aimed at improving efficiency of large-scale producers, in the context of increased international demand for oilseeds and biofuels [3, 7, and 17]. In general, these new production models have boosted yields and overall efficiency of the sector [7] but also negatively affected natural ecosystems, advancing deforestation<sup>8</sup> and decreasing soil health. Desertification and degradation (physical, chemical, or biological) processes have occurred on 60 million hectares of land that produce 50% of crops and 47% of livestock, with expected continued losses of up to 650,000 ha/year [18, 19].<sup>9</sup>

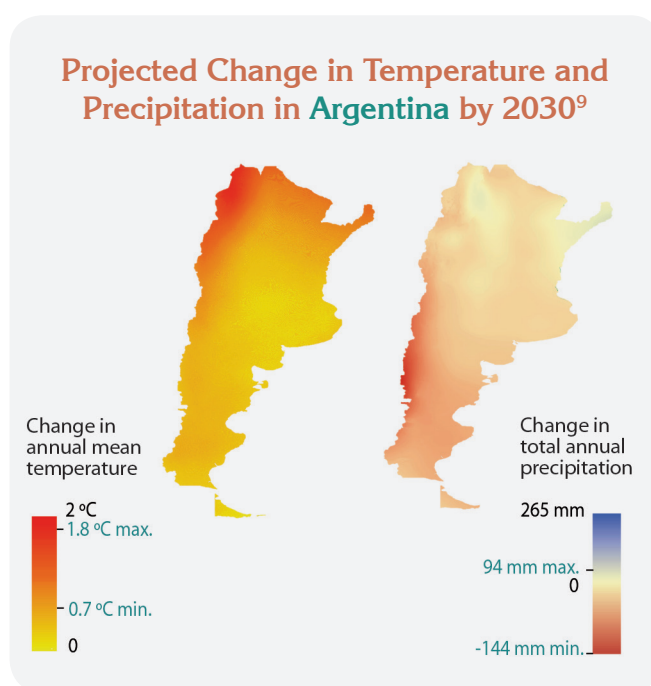
## Agriculture and climate change

Agricultural producers are already experiencing climate change and variability, and threats to production are expected to multiply in the short, medium, and long term. Climate scenarios for 2030 indicate a general increase in temperature in the entire country (though less so in the South), which will likely lead to glacial retreat and water deficits for agricultural production. Average annual precipitation rates are expected to increase mainly in the North and Northeast and decrease in the West, while mean temperatures are projected to be higher in the North and Northwest [16].

Increased frequency of extreme climate events (severe storms, cyclic droughts, and floods) is expected to advance wind and water erosion, soil compaction, salinization, and ultimately desertification. These events can bring about significant changes in maize, wheat and soybean yields, depending on CO<sub>2</sub> effects (16, 22, 23). However, increases in yields due to increases in CO<sub>2</sub> need to be analyzed in a larger context of impacts on soil quality and water availability and use.<sup>10</sup>

## Climate-smart technologies and practices

CSA technologies and practices present opportunities for addressing climate change challenges, as well as for economic growth and development of agriculture sectors. For this profile, practices are considered CSA if they



maintain or achieve increases in productivity as well as at least one of the other objectives of CSA (adaptation and/or mitigation). Hundreds of technologies and approaches around the world fall under the heading of CSA.

Many farmers in Argentina have traditionally utilized techniques considered climate smart, in their attempt to adapt their production patterns to constantly changing market, climate, and political-institutional conditions. In many cases, their strategies have been embedded in holistic landscape approaches to manage farmlands, rangelands and forests, aimed at improving livelihoods, promoting sustainable agricultural intensification, while recognizing the value of natural ecosystems. Such practices refer to conservation agriculture (including precision agriculture techniques).<sup>11</sup>

Table 1 lists a selection of CSA practices that ranked high in climate smartness for prioritized production systems and for applicability to multiple crops.<sup>12</sup> The majority of the agricultural practices identified for soybean, maize, wheat, and cattle (meat, milk) are characteristic of large-scale producers. While it is recognized that these practices have important benefits for adaptation, mitigation, and

<sup>8</sup> In the last 75 years, 66% of the natural forested area has been lost, due to overexploitation of forest resources for timber production, wood or charcoal, overgrazing, and the expansion of the agricultural frontier [19].

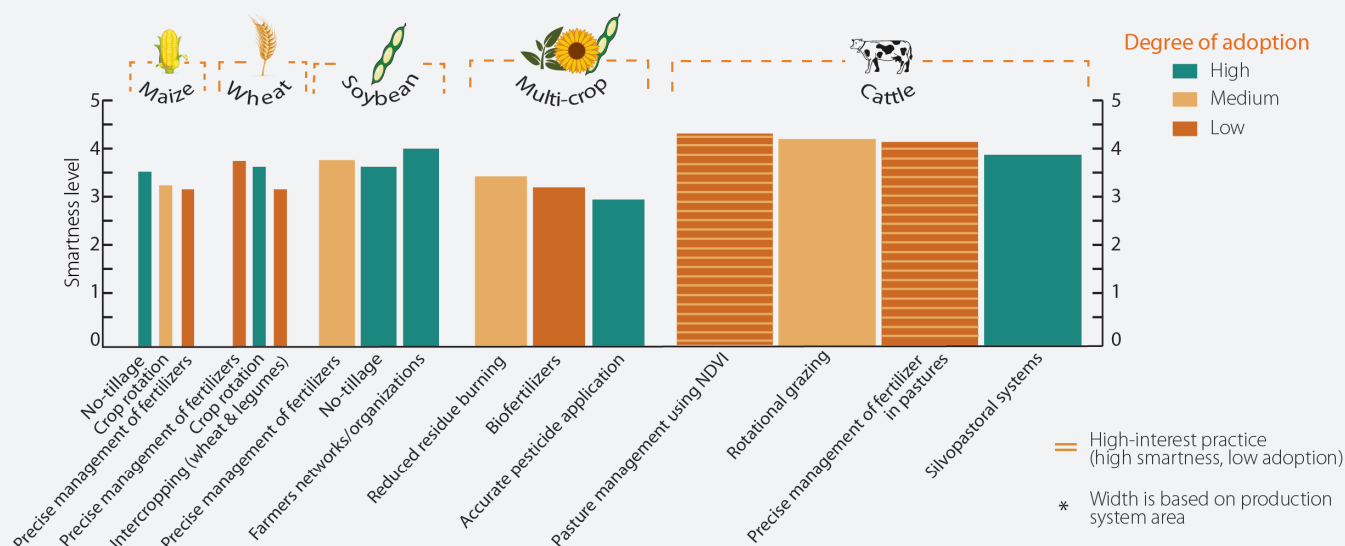
<sup>9</sup> Arid, semi-arid, and sub-humid dry zones occupy 75% of the country's land area, which represents more than 200 million hectares.

<sup>10</sup> Projections based on RCP 4.5 emissions scenario [20] and downscaled data using Delta Method [21]. Please refer to Annex VI for information on expected impacts of climate change on crop yields.

<sup>11</sup> Silvopastoral systems, rangeland management, among others.

<sup>12</sup> Climate smartness reflects the performance of a practice regarding: Carbon stocks and emissions (Carbon smartness), Nitrogen stocks and emissions (nitrogen smartness), energy use efficiency (Energy smartness), weather-related risk reduction (Weather smartness), water use efficiency (Water smartness) and local knowledge promotion (Knowledge smartness). For more information see the Methodological guidelines.

## Selected Practices for each Production System with high Climate Smartness



The graph above displays the smartest CSA practices for each of the key production systems in Argentina. Both ongoing and potentially applicable practices are displayed, and practices of high interest for further investigation or scaling out are visualized. Climate smartness is ranked from 1 (very low positive impact in category) to 5 (very high positive impact in category).<sup>13</sup>

productivity goals, in most cases the effectiveness of a practice depends on the adoption of other complementary practices that help conserve the quality and quantity of

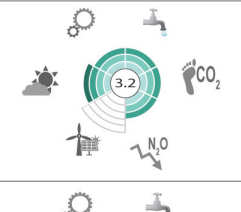
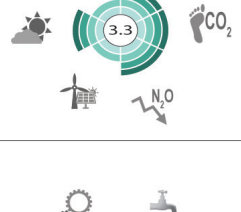
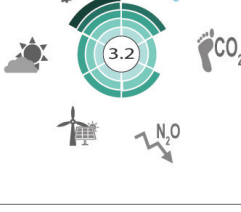
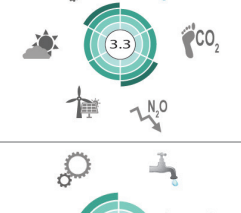
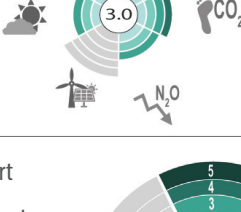
natural resources, such as soil and water. Synergies between production systems and between different management techniques need to be considered when practicing CSA.

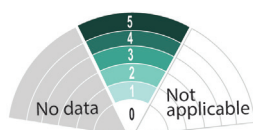
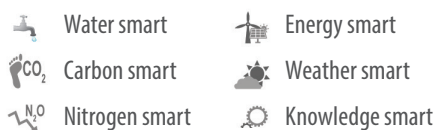
**Table 1. Detailed smartness assessment for top ongoing CSA practices by production system as implemented in Argentina**

The assessment of a practice's climate smartness uses the average of the rankings for each of six smartness categories: weather, water, carbon, nitrogen, energy, and knowledge. Categories emphasize the integrated components related to achieving increased adaptation, mitigation, and productivity.

|                                                                     | CSA Practice                                                                                                                                        | Climate Smartness | Adaptation                                                                                                                       | Mitigation                                                                                                                                 | Productivity                                                                                                                        |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Cattle<br>40% of total agricultural area dedicated to all livestock | Pasture management based on Normalized Green Vegetation Index (Precision agriculture)<br>■ Low adoption (<30%), mainly in the Buenos Aires Province |                   | Better pasture management can increase grazing efficiency, ensuring more available forage during periods of climate variability. | In cases where a good pasture management is performed, cattle's diets can be enhanced and thus reduce emissions from enteric fermentation. | Normalized Green Vegetation Index (NDVI) and estimates of biomass derived from NDVI can be good indicators of pasture productivity. |
|                                                                     | Silvopastoral systems<br>■ High adoption (>60%), mainly in the Northeast and Northwest                                                              |                   | Bolsters resilience of cattle production systems to climate variability, reduces heat stress on animals.                         | Significant above- and below-ground carbon sequestration, reduced nitrogen application.                                                    | When accompanied with rotation, it can significantly increase stocking rates and milk/meat production.                              |

<sup>13</sup> Four production systems were chosen for in-depth study: maize, soybean, wheat, and cattle (for milk and meat), taking into account their role in national and global food security and their importance for national economy. See Annex IV for production system selection methodology.

|                                                                    | CSA Practice                                                                                                                                                                         | Climate Smartness                                                                   | Adaptation                                                                                                                              | Mitigation                                                                                                                                                                                                                     | Productivity                                                                            |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Soybean<br>55% of total harvested area                             | Farmers networks<br>■ High adoption (>60%), especially in the Pampa region, Northeast and Northwest                                                                                  |    | Farmers networks provide access to information and technology that help increase farmers' resilience to climate variability and change. | Farmer networks can facilitate access to alternative energies or energy-efficient technologies.                                                                                                                                | Information and knowledge exchange has been key to increasing efficiency in production. |
|                                                                    | No-tillage<br>■ High adoption (>60%), especially in the Pampa region                                                                                                                 |    | Improved soil quality can increase moisture retention.                                                                                  | Recent studies show that no-tillage alone does not contribute significantly to carbon capture, compared to traditional tillage practices. Practices that accompany no-tillage are essential for obtaining mitigation benefits. | In specific contexts, increases crop productivity.                                      |
| Wheat<br>13% of total harvested area                               | Precise management of fertilizers (Nitrogen, Phosphorus, Sulfur)<br>■ Low adoption (<30%), mainly in the Western Buenos Aires and Eastern La Pampa Provinces                         |    | Improved management may increase resilience during periods of climate variability, but adaptation benefits are limited.                 | Precision application of chemical fertilizers can reduce fertilizer use, improving emissions intensity levels.                                                                                                                 | Demonstrated increase in productivity in specific contexts.                             |
|                                                                    | Intercropping (wheat-legumes)<br>■ Low adoption (<30%), mainly in the South-East of the Buenos Aires Province                                                                        |   | Reduced yield loss due to sterility from high temperatures during flowering.                                                            | Improved emissions intensity due to productivity increases.                                                                                                                                                                    | Reduced yield gap.                                                                      |
| Maize<br>11% of total harvested area                               | Crop rotation (soybean-maize)<br>■ Low adoption (<30%), mainly in the Pampa region, Northeast and Northwest                                                                          |  | Has the potential to prevent soil erosion. Improved soil quality can increase moisture retention.                                       | In some cases, it can contribute to CO <sub>2</sub> fixation and sequester carbon in soils, and reduce nitrogen fertilizer use.                                                                                                | In certain contexts, it increases productivity.                                         |
|                                                                    | Precise management of fertilizer (Precision agriculture)<br>■ Low adoption (<30%), mainly in Provinces of Buenos Aires, Córdoba, Santa Fe, La Pampa, San Luis, Salta, Tucumán, Jujuy |  | Improved management may increase resilience during periods of climate variability, but adaptation benefits are limited.                 | Precision application of chemical fertilizers can reduce fertilizer use, improving emissions intensity levels.                                                                                                                 | Demonstrated increase in productivity in specific contexts.                             |
| Multiple crops<br>(barley, maize, soybean, sunflower, wheat, etc.) | Biofertilizers<br>■ Low adoption (<30%), mainly in the Pampa region                                                                                                                  |  | Improves soil organic carbon and soil nutrients and can help in disease biocontrol.                                                     | Reduces the need of chemical fertilizers that generally contribute with high GHG emissions.                                                                                                                                    | Improved soil fertility favors crop productivity.                                       |
|                                                                    | Precise application of pesticides (Precision agriculture)<br>■ High adoption (>60%), mainly in the Pampa region and the Northwest                                                    |  | Improved management may increase resilience during periods of climate variability, but adaptation benefits are limited.                 | Some reduction in carbon footprint for pesticide production, though less energy use than in fertilizer.                                                                                                                        | Reduced crop losses.                                                                    |



Calculations based on qualitative ranking, where positive change was noted as 5=very high; 4=high; 3=moderate; 2=low; 1=very low; 0=no change; N/A=not applicable, and N/D=no data. Additional analysis – where no change, not applicable, and no data are all treated at 0 – and an alternative list of high-interest practices are available in supplemental materials.

No-tillage is practiced on around 80% of the country's cropland area (more than 25 million hectares in 2009) and is particularly associated with soybean (80% of cultivated area), maize (72%), and wheat (60%) [23]. No-tillage has been highly promoted by the Argentine Association of No-Till Producers, and mainly adopted by large-scale commercial producers that use heavy machinery, have the capacity to invest in seeds and herbicides and can support the high upfront expenses (equipment for sowing, herbicides, labor for hand-weeding, etc.). Even though the practice improves soil's physical, chemical, and biological characteristics,<sup>14</sup> no-tillage should be accompanied by diversification, an adequate use of fertilizers and correct rotation of low-stubble crops (soybean) with high-stubble crops (wheat, maize), in order to maximize its climate smartness potential.

Other CSA practices adopted to lesser extents (and mainly in the Pampa region) refer to: precise management of fertilizers, integrated pest management (pest-resistant varieties, pest control and minimum use of chemicals and pesticides), management of pastures using NDVI<sup>15</sup> rotational grazing, silvopastoral systems, silages and nutritional blocks, among others (Table 1).

In general, adoption rates of CSA practices depend on: *farm location* (exposure to climate extremes and/or degraded soils increases adoption), *scale* (large-scale mechanized producers have more resources to invest in CSA technology), *extension services* and *participation in farmers networks* (producers engaged in associations, such as the Argentine Association of Regional Consortiums for Agricultural Experimentation (AACREA) or AAPRESID, have better access to information on practices), *education* (the ability to interpret and use climate data for implementing practices on the field), and *availability and access to inputs* (seeds and seeding equipment, herbicides, fertilizers, credits, etc.) among others.

CSA practices have generally taken the form of spontaneous and autonomous coping strategies or measures to increase efficiency in production, rather than representing efforts to adapt to future climate uncertainties. A competitive climate smart agricultural sector requires state-led programs that combine short-term visioning (responses to extreme climate impacts via compensations, tax exemptions, index-based insurances [IBIs]) with long-term planning (investments in irrigation, rural infrastructure, etc.). This shift is needed to control the unsustainable expansion of the agricultural frontier or the gradual disappearance of small-scale farmers.

## Case study: Market incentives for conserving Patagonia's grasslands

Farmers in Patagonia now use rotational grazing as a strategy to avoid soil erosion and desertification, processes driven by over 100 years of unsustainable management of more than 100 million hectares of pasture. Rotational grazing places livestock (sheep) in paddocks, allowing animals to graze for several days at a time before moving them



Grazing in Patagonia in wintertime Photo: A. Nowak

to a different paddock. This process ensures sustainable pasture regeneration, a larger diversity of native grass species, and more vegetation cover throughout the year. The initiative, commonly called GRASS (Grassland Regeneration and Sustainability Standard), has been promoted through a collaboration between Patagonia Inc. (an outdoor clothing company), The Nature Conservancy (TNC), and Ovis XXI, a regional sheep farmers association. Fifty-two large-scale sheep farmers have committed, with support of technical experts, to develop management and conservation plans that minimize

the impacts of grazing on soil, water quality, and wildlife. Through ground truthing and satellite imagery, pastures are monitored yearly by project experts and external evaluators to ensure that farmers comply with protocols for wool certification and subsequent international sale. Launched in 2011, GRASS aims to certify 6 million hectares of pastures (10% of Patagonia's total

pastureland) by 2018. This is an illustrative example of a CSA practice that suggests a holistic management scheme, allowing key market players and consumers to be engaged in a market-based conservation process that is in line with climate-smart principles. The challenge ahead lies in exploring ways of guaranteeing systematic public sector support for the scheme throughout the process and in transferring lessons learned from this CSA practice to cattle production systems in other parts of the country (Northwest, Northeast, and the Pampa).

<sup>14</sup> This is done by not removing the soil and by leaving stubble of previous crops on the soil surface.

<sup>15</sup> Remote sensing is used as a grazing management tool. It involves monitoring the phenological stages of grasslands, informing about the forage availability and stocking rates, among others.

## Institutions and policies for CSA

Argentina ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1994 (Law 24295) and the Kyoto Protocol in 2001 (Law 2348). To date, the government has submitted two National Communications to the UNFCCC (1997 and 1999 revision, 2006). and is now preparing the Third one. At the regional level, the country is part of the Southern Agricultural Council (CAS) and its Inter-Governmental Working Group on Public Policies on Climate Change, as well as of the Cooperative Program for the Development of Agricultural Technology in the Southern Cone (PROCISUR), where climate change adaptation and mitigation in agriculture is a key priority.

At the national level, the Governmental Committee on Climate Change (GCCC), part of the Secretariat of the Environment and Sustainable Development (SAyDS), formulates the country's standpoint on climate change in international fora. CNACC convenes provincial and national governmental actors, academia, technical experts from the National Institute for Agricultural Technology (INTA), and private-sector institutions. The Climate Change Directorate (DCC) coordinates the Third National Communication and assists the Argentine Office for the Clean Development Mechanism (OA-MDL) in its activities. The Ministry of Agriculture, Livestock and Fisheries (MAGyP) also coordinates activities related to climate change and agriculture, mainly through the National Directorate of Livestock (DNG), the Office for Agricultural Risk (ORA), the Unit for Rural Change (UCAR), and INTA.

At the sub-national level, the Argentine Network of Municipalities to Confront Climate Change (RAMCC) is formed of over 30 small- and medium-sized municipalities that jointly develop policies and actions for climate change adaptation and mitigation. However, RAMCC has yet to develop an initiative related to climate change in agriculture.

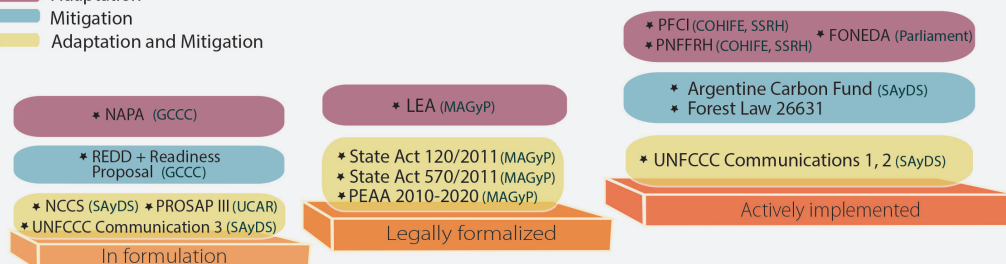
Key actions led by the Argentinian government in matters of climate change and agriculture include:

- **The National Climate Change Strategy (NCCS).** (In formulation, led by GCCC). Six of the 14 main lines of action for mitigation and adaptation are related to agriculture and natural resources [24].
- **The National Program on Smart Agriculture** led by (SAGyP, State Act 120/2011). It aims to strengthen a competitive and efficient agricultural sector, to achieve national and global food security and environmental sustainability.<sup>16</sup>
- **The Strategic Agrifood and Agro Industrial Plan 2010-2020 (PEEA)** (MAGyP, 2011).
- **The National Program on Sustainable Agricultural Practices** (SAGyP, State Act 570/2011) [25].
- **The Third National Communication to the UNFCCC** (In preparation, led by the SAyDS). Compared to previous efforts, this Communication offers more weight to adaptation, increased climate change resilience of small-scale farmers in marginal agricultural areas, and the promotion of good agricultural practices.
- **The Agricultural Emergency Act (LEA)** (2009) created the National System of Prevention and Mitigation of Farming Emergencies and Disasters (SNPMEAD) to prevent and mitigate climate-related damages. It created a regulatory framework for post-disaster agricultural financing, including credit refinancing, tax postponement, and subsidies.
- **The Law on Minimum Standards for Environmental Protection of Native Forests No. 26331** (2006) regulates the uses of native forested lands and gives provinces the mandate to develop territorial development plans.

### Enabling Policy Environment for CSA

Policies listed are related to enhancing agricultural productivity and:

- Adaptation
- Mitigation
- Adaptation and Mitigation



**GCCC** Governmental Committee on Climate Change **COHIFE** Federal Water Council **FONEDA** National Fund for the Mitigation of Agricultural Emergencies and Disasters **LEA** Agricultural Emergency Act **MAGyP** Ministry of Agriculture, Livestock and Fisheries **NAPA** National Adaptation Plan on Agriculture **NCCS** National Climate Change Strategy **PEEA** Strategic Agrifood and Agro-Industrial Plan 2010-2020 **PFCI** National Federal Plan for Flood Control **PNFFRH** National Federal Plan for Water Resources **PROSAP III** Provincial Agricultural Services Programme Third Phase **SAyDS** Secretariat for Environment and Sustainable Development **SSRH** Sub-Secretariat for Water Resources **UCAR** Unit for Rural Change **UNFCCC** United Nations Framework Convention on Climate Change.

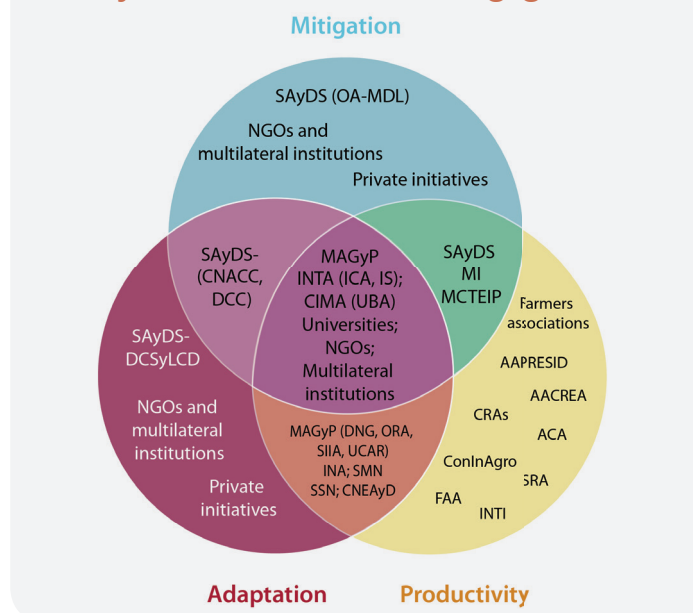
16 See Annex IX.

Principles for natural resource management are the responsibility of the national government, while regulating power belongs to the provinces. This fact can explain the slow adoption of a climate strategy at the national level. The Federal Environmental Council (COFEMA) is in charge of ensuring policy coordination among provinces and of developing a shared national vision on environmental management.

The graphic on the right represents the main thematic foci of public and private institutions related to the three pillars of CSA: adaptation, mitigation, and productivity. Efficiency and increases in agricultural productivity is a key pillar of the country's development, according to the Strategic Agri-Food and Agro-Industrial Program (PEAA). Institutions, such as AACREA, AAPRESID, the Argentine Co-operatives Association (ACA), the Argentine Rural Confederations (CRA), the Argentine Rural Society (SAR), the Argentine Agricultural Federation (FAA), and the Inter-Cooperative Agricultural Confederation (Coninagro), have been working intensively on promoting agricultural productivity through R&D, extension services, dissemination of best practices manuals, and new technologies and machinery. These farmers networks have a long history of influencing the country's agricultural development, representing all categories of farmers and working closely with public institutions, such as MAGyP and INTA.

The elaboration of a NAPA is currently in discussion in Argentina. MAGyP and INTA have been supporting resilience building of family farmers and rural populations through various initiatives, such as rural development programs for the Northeast and the Northwest (PRODERNEA and PRODERNOA), the Social Agricultural Program (PSA), ProHuerta and the Institute for Research and technological Development of Family Farming (IPAF), among others. Moreover, since 2012, UCAR has been the national implementing entity for climate resilience projects financed through the Adaptation Fund (AF), and has been leading the implementation of the Provincial Agricultural Services Programme (PROSAP).<sup>17</sup> The National Insurance Superintendence (SSN) supervises insurance entities to ensure a stable and efficient market. ORA creates and disseminates analyses of agriculture-related climate and

## Primary Focus of Institutions Engaged in CSA



market risks to producers, monitors water reserves for main crops, and supports decision makers (producers, investors, insurers) in implementing strategies for risk reduction and transfer. The National Weather Forecasting Service (SMN), the National Water Resource Institute (INA), and INTA (Climate and Water Institute [ICA] and Soils Institute [IS])<sup>18</sup> produce and deliver updated climate and hydrological information to producers.

In terms of mitigation action in agriculture, the Third National Communication includes a new inventory of GHG emissions from agriculture, using sector-specific indicators and the 1996 revised IPCC (Intergovernmental Panel on Climate Change) Guidelines and the Best Practice Guidelines of 2000 and 2003 for National GHG Emissions. It also seeks to identify potential NAMAs for agriculture and deliver concrete options and instruments to decision-making, such as inventories and indicators disaggregated at the provincial level. The government created the Argentine Carbon Fund to offer technical support and encourage the submission of proposals to the Clean Development Mechanism (CDM). At this point, none of the projects presented to the OA-MDL corresponds to the agriculture

<sup>17</sup> The program is developed via loans from the IDB and the WB, and since 1992 has sought to improve infrastructure and services for agricultural production, strengthen rural public and private institutions, and promote competitiveness of the agricultural sector at national and provincial levels. The new phase of PROSAP will include activities on building resilience to climate change and better understanding of impacts in the sector. For more information, please see the Project website.

<sup>18</sup> INTA is a MAGyP decentralized body and has played a critical role in the mechanization of the sector and enhancement of rural life in the country. In 2012, it managed operations and projects of around US\$1.6 billion, and its regional centers, experimental fields (50), research centers, and extension units (300) are present in all of Argentina's eco-regions. Since the beginning of the 21<sup>st</sup> century, INTA has been engaged in transferring practices for extensive agriculture (no-tillage, use of adequate machinery and phytosanitary products, silo bags, etc.), both nationally and internationally, fomenting South-South cooperation [24].

sector.<sup>19</sup> Additionally, the SAYDS, the Ministry of Industry (MI) and the Ministry of Foreign Relations and Cult (MREC) are implementing the Low-Emissions Capacity Building Project (LECB)<sup>20</sup> (2012–2015), attempting to create a GHG inventory management system, develop NAMAs for key industries, and create monitoring, reporting, and verification systems for NAMAs. Moreover, Argentina is preparing REDD+<sup>21</sup> strategies that includes agriculture (the Readiness Preparation Proposal [R-PP] was approved in 2010), with funds from the World Bank and UN-REDD.

Synergies across the three CSA pillars are mostly addressed through R&D, promoted by MAGyP, INTA, and the academia. In the framework of global food security, these institutions are also engaged in South-South cooperation, especially countries in Sub-Saharan Africa,<sup>22</sup> via technical assistance and technology transfer in agriculture (precision agriculture and no-tillage).

## Financing CSA

### National finance

MAGyP and SAYDS finance many of the national initiatives related to CSA. The *Smart-Agriculture Programme*, launched by MAGyP in 2011 with 100 percent public financing, together with the funds directed to provincial governments and R&D agencies, such as INTA, are illustrative examples of the country's direct financial support for CSA.

Agricultural insurance in Argentina comes from the private sector and has increased by almost 60% between 2000 and 2010, complementing farmers' coping strategies, such as techniques related to crop/livestock management (e.g. crop diversification), soil and water conservation. Most private companies (25 of 28) offer insurances against hail for cereals and oilseeds (98% of total production systems insured) in the Pampa.<sup>23</sup>

Nationally, in the 2009–2010 campaign, 28 companies emitted 156,190 policies with a value of US\$204 million, covering 18.9 million ha of agricultural land (approximately 11% of total agricultural land). In the case of emergencies and natural disasters, if more than 50% and 80% respectively of agricultural production is affected in a given area, producers benefit from compensation (refinancing, tax schedule postponement, subsidy grant) from FONEDA, regulated by the Agricultural Emergency Act.

Small-scale farmers usually rely on catastrophe funds that require strong intervention by the State, via the provision of policy frameworks and the supervision of insurance activities. Examples of such initiatives can be found in Mendoza, Rio Negro, Chubut, and Chaco, where provincial governments, with support from ORA, have piloted instruments to subsidize the insurance premium. A recent initiative led by ORA, with finances from the Adaptation Fund, is planned to expand the coverage of multi-risk insurances (currently covering 5% of total insurances) in the northeastern provinces (Chaco,

### Funds for Agriculture and Climate Change

**AECID** Spanish Agency for International Development Cooperation  
**AF** Adaptation Fund **BCFISFL** Bio Carbon Fund Initiative for Sustainable Forest Landscapes **BMGF** Bill and Melinda Gates Foundation **CDCF** Community Development Carbon Fund **CDM** Clean Development Mechanism **CEPF** Critical Ecosystem Partnership Fund **CLUA** Climate and Land-Use Alliance **CTF** Clean Technology Fund **ECLAC** Economic Commission for Latin America and the Caribbean **FAO** United Nations Food and Agriculture Organization **FCFP** Forest Carbon Partnership Facility **GEF** Global Environment Facility **GIZ** German Development Agency **IAI** Inter-American Institute for Global Change Research **IFC** International Finance Corporation **IDB** Inter-American Development Bank **IFAD** International Fund for Agricultural Development **JICA** Japan International Cooperation Agency **MAGyP** Ministry of Agriculture, Livestock and Fisheries **NDF** Nordic Development Fund **OPIC** Overseas Private Investment Corporation **PMR** Partnership for Market Readiness **PPCR** Pilot Program for Climate Resilience **SAYDS** Secretariat of the Environment and Sustainable Development **SAIP** Sustainable Agriculture Initiative Platform **SCCF** Special Climate Change Fund **SRELIC** Scaling-Up Renewable Energy in Low-income Countries **SCF** Spanish Carbon Fund **UK-ICF** United Kingdom International Climate Fund **UNDP** United Nations Development Programme **UNEP** United Nations Environment Programme **VCS** Verified Carbon Standard **WB** The World Bank



National Funds



International Funds

★ Accessed Funds ★ Financing opportunities

<sup>19</sup> More information: <http://www.ambiente.gob.ar/?idarticulo=11310>

<sup>20</sup> The initiative is financed by the European Union (EU), Germany and the Australian Agency for International Development (AusAid).

<sup>21</sup> REDD+ refers to the United Nations Programme for Reducing Emissions from Deforestation and Forest Degradation, that also aims at conservation and sustainable management of forests and enhancement of forest carbon stocks.

<sup>22</sup> Ghana, Kenya, Nigeria, South Africa, Zimbabwe, Democratic Republic of the Congo, Tanzania, Namibia, Angola, Botswana, Uganda, and Mozambique.

<sup>23</sup> Insurances are less common for horticulture, cotton and livestock despite their importance to regional economies. For more information, please refer to Annex X.

Santa Fe, Corrientes, Santiago del Estero) for small-scale cereals, oilseeds, cotton and horticulture producers.<sup>24</sup>

## International finance

Argentina has been cooperating with various bilateral, multilateral, UN-patronized, inter-governmental, and private institutions on climate-change-related initiatives. Most cooperation is focused on climate change adaptation (targeting small-scale producers in the Northwest and Northeast) and biodiversity conservation. Agriculture and climate change is an underfinanced topic in the country, when it comes to international cooperation funds. The most common funding sources for CSA-related activities come from the Adaptation Fund (AF) and the Global Environment Facility (GEF), **multilateral agencies**, such as the IDB, the International Finance Corporation (IFC), and the Inter-American Institute for Agricultural Cooperation (IICA), recent **bilateral agreements** with the Governments of Germany and Spain, **NGOs**, and **private sector actors** (TNC, the Inter-American Institute for Global Change Research [IAI], the Overseas Private Investment Corporation [OPIC]). These funds have been directed towards institutional strengthening (e.g., creation of the NCCS, the REDD+ Readiness Proposal [R-RP], etc.), knowledge and information dissemination (e.g. vulnerability studies), development of rural infrastructure (PROSAP), and capacity building for producers.

## Potential finance

Most farm-level CSA activities in Argentina are financed by producers themselves. In the case of emergencies or disasters, the state may intervene with compensation schemes, provided that the damage reaches at least 50%

and 80% respectively from total production. On the other hand, agricultural insurance hardly reaches small-scale farmers and does not account always for multiple risks. Complementing national public and private funding with international funds aimed at increasing farmers' resilience to climate variability and change can be an answer to the challenge of CSA underfunding in the country. Possible pathways include strengthening already existing cooperation with institutions focused on either climate change or agriculture-related topics in the country, or fostering cooperation with new partners. Moreover, the development of the country's REDD+ strategy offers an opportunity to design market-based schemes for agricultural activities that promote conservation efforts, supported both by public and private national and international institutions, such as CDM, Verified Carbon Standard (VCS), and Partnership for Market Readiness (PMR).

## Outlook

Argentina is a major agricultural producer, both for national and global food markets, investing heavily in increasing production efficiency. CSA reinforces this objective, while also creating opportunities for boosting resilience and reducing sector's GHG emissions. Nevertheless, mainstreaming CSA into agricultural development requires holistic landscape approaches that improve the livelihoods of small-scale farmers (with a closer attention to gender inequities), promote the sustainable intensification of a low-emissions agricultural sector, while recognizing the value of natural ecosystems. Scaling out CSA will also require more integration across sectors and scales, as well as strengthened cooperation with international climate-related institutions.

<sup>24</sup> See Annex X.

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**For further information and online versions of the Annexes, visit <http://dapa.ciat.cgiar.org/CSA-profiles/>**

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