



# Water & Agriculture

# HEMISPHERIC INITIATIVE ON WATER AND AGRICULTURE

Executive report  
September 2023

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### WHY ARE WATER AND AGRICULTURE SO IMPORTANT?

#### 1.1 WATER AND FOOD PRODUCTION

The scarcity of water, its improper use and the impact of climate change are seriously threatening agrifood systems and food security in the Americas and the rest of the world. Therefore, agriculture must develop and implement innovative production systems that prioritize efficient water use. If we do not act immediately, food production could decline by more than 25% by 2050.

By then, the world population will have climbed to between 9.3 to 10.6 billion. This upsurge alone will substantially increase society's water needs, not only for direct human consumption, but also for food production, energy, services and industrial purposes. For many countries, water security<sup>1</sup> has become an issue of national security.

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<sup>1</sup>There is no universally accepted definition for water security. However, there are aspects that are common to all definitions: water security means having access to enough water of sufficient quality for personal, social, production

The main factors that create or increase these risks to water security are demographic processes, the growing demand for food due to population growth and changing consumption habits, the demand for water for energy production, the effects of climate change and inefficient water management.

Approximately 97.5% of the Earth's water is salt water and only 1 of the remaining 2.5% that constitutes fresh water is available for consumption. Agriculture uses 70% of that amount. It is estimated that more than 390 million hectares of land in the Americas are cultivated using rainfed agriculture, which results in lower productivity than irrigation agriculture<sup>2</sup>. Approximately 44 million hectares are cultivated using irrigation agriculture, representing 13% of the total cultivated area in the region. Therefore, it is imperative that the region increase its irrigated areas and improve the efficiency of agricultural water use, in order to boost productivity.

Each individual needs only 2.5 liters of drinking water each day. However, between 3,000 and 5,000 liters are needed to produce the food consumed daily by one person. Not surprisingly therefore, agriculture is the largest water consumer. Given the previously mentioned demographic processes, future agricultural water use faces major challenges. Food demand is expected to double by 2050. Within the short period leading up to the year 2030, we will need to increase food production by 50%. It is estimated that 55% of the world's population will depend on imported food by that time, given the shortage of water in various countries, and in a climate of greater price volatility.

If substantial changes are not made in agriculture, the demand for water for agricultural use will increase between 70 and 90% by 2050. Fortunately, there are solutions, primarily by increasing water productivity, that is increasing the level of production in tons for every unit of water used. This is already taking place in many regions of the world. However, it is not an automatic process. It requires specific policies and incentives. In contrast, some regions will experience greater water shortages.

A significant portion of the water extracted for agriculture is lost during the process of distribution and irrigation. Water-use efficiency is very low at the global level, usually below 50%. Thus, the modernization of irrigation systems, to improve pipeline and distribution networks and water use on farms, is one of the priorities to ensure proper water management. This will depend on strengthening the technical, administrative and entrepreneurial capacities of farmers.

## **1.2 WITHOUT WATER THERE CAN BE NO AGRICULTURE AND WITHOUT AGRICULTURE THERE IS NO FOOD SECURITY**





In 1996, the United Nations established the World Water Council, a global organization tasked with developing and issuing recommendations at the highest level on the topic of water, with the participation of governments, specific companies and non-

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and environmental uses, while also limiting the risks of its destructive impacts—such as drought, flooding, landslides and water-borne illnesses—to a reasonable level.

<sup>2</sup> Like the rest of the world, most agricultural land in the Americas is rainfed. Approximately 87% of the region's agricultural land is cultivated using that system. For example, in Canada, it represents 98% and in Paraguay 87%. In 24 countries of the Americas, that system is used on more than 80% of the cultivated land area. It is estimated that the production output of grains cultivated with the rainfed system is only 65% of the output of the same crops cultivated using irrigation.

governmental organizations (NGOs). During the Sixth Global Water Forum<sup>3</sup>, countries committed to contributing to economic development, by promoting a green economy and enhancing water's strategic role in achieving food security. Thus, they issued the following recommendations:

-  Water is essential for agriculture, rural development, the food industry and nutrition.
-  Without water there can be no food security. Water and food security policies should be integrated, in order to guarantee efficient water use and protection and to meet the needs of the most vulnerable communities.
-  Solutions should include: a) the use of water saving and storage technologies and practices in rainfed and irrigated areas; b) reduction of water and food losses and waste; c) safe re-use of wastewater in agriculture and industry; d) intensified cultivation of traditional and new water-stress tolerant plant varieties; and e) the inclusion of farmers in the development of water policies.
-  The success of these measures will depend on good governance, financing and on creating an enabling environment for water policies.

### 1.3 ADDRESSING THE AGRICULTURAL CRISIS DUE TO THE IMPACT OF CLIMATE CHANGE IS A MATTER OF URGENCY.

The countries of the Americas are fundamental to the world's food systems and global food security. Yet, they are experiencing severe drought and increasing desertification<sup>4</sup>, which limits the water available for human consumption<sup>5</sup>. A water crisis will inevitably affect the supply and price of food.

On the other hand, there are regions, such as the Caribbean, that have multidimensional vulnerabilities, stemming from climate change and exacerbated by the natural and economic characteristics of small-island developing states (SIDS), which are extremely vulnerable to climate-induced events.

Consequently, stakeholders in the sector have a major ethical and technical responsibility to use water more efficiently and to contribute to ensuring a more sustainable agriculture sector. In the 2010-2022 period, the Inter-American Institute for Cooperation on Agriculture (IICA) supported its member countries by implementing

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<sup>3</sup> Held in Marseilles (2012), with 173 countries, 15 heads of State and 112 ministers, deputy ministers and secretaries of State in attendance.

<sup>4</sup> **Desertification** is defined as «land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities». On the other hand, **drought** means «the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems». (Article 1 of the United Nations Convention to Combat Desertification, UNCCD).

<sup>5</sup> Two-thirds of the hemisphere consists of arid and semi-arid terrain, where rain is primarily seasonal. Thus, there is excessive rain during some periods of the year and limited rainfall in others. Added to these naturally occurring contrasts are the poor agricultural practices and deforestation that have reduced water levels in aquifers and the impact of climate change.

more than 70 cooperation actions for agriculture, most notably in Brazil (35), Argentina (14), Chile (10) and Mexico (8).

The countries of the Americas account for a significant share of global food production. However, the United States (especially the state of California), as well as the South American countries of Argentina, Brazil, Paraguay and Uruguay are experiencing a severe drought. For the third consecutive year, these four countries have been hit by the worst drought recorded since 1944, partially due to the La Niña phenomenon that has persisted since 2020. These countries were responsible for approximately 13% of global food and fiber exports in 2021.

They are market leaders in soybeans, soybean flour and pellets, soybean oil, frozen beef, cellulose, sugarcane, poultry and coffee. They also supply a significant share of the world's wheat, fish fillet, pork, refrigerated beef, wine, fruits and fruit juice. As such, production losses in the region as a result of the climate crisis have a direct effect on global food markets and food security.

It is estimated that losses resulting from the drought in Argentina, Paraguay and Uruguay in the 2021-2022 period amount to USD 30.04 billion.

## 2

# HEMISPHERIC INITIATIVE ON WATER AND AGRICULTURE

This initiative seeks to find solutions through innovative approaches that address various problems affecting water and soil availability and quality, in relation to agricultural infrastructure development, exposure to drought and flooding, the sustainable use of underground water and the institutional capacity of the relevant stakeholders. The success of these solutions will depend on good governance, funding and the creation of an enabling environment for water policies.

## 2.1 OBJECTIVES

To strengthen capacities and foster strategic public-private partnerships in IICA member countries, by providing support to ministries of Agriculture and lead agencies, in a bid to improve the integrated management and efficient use of water in agriculture<sup>6</sup>.

<sup>6</sup> This will require the forging of partnerships and working relationships with institutions that are not within the purview of ministries of Agriculture, but that are involved in water collection, storage and distribution.

## 2.2 STRATEGIC PILLARS

This initiative is based on four strategic pillars that provide a roadmap to guide activities and tasks:

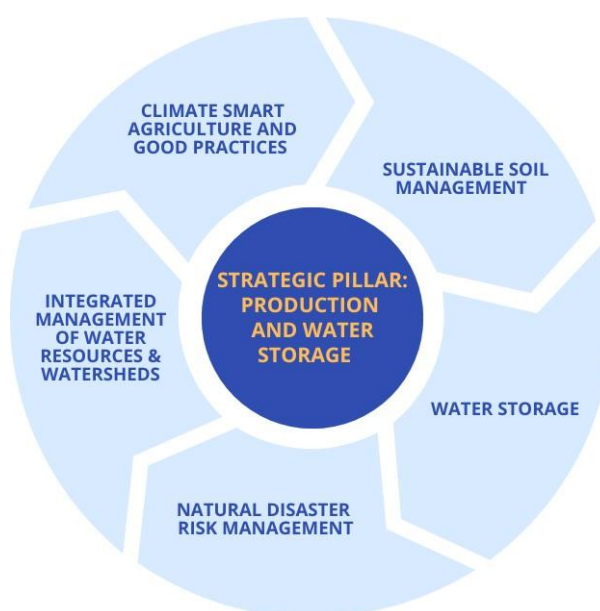
### STRATEGIC PILLAR 1: PRODUCTION AND WATER STORAGE (SEE DIAGRAM)

The aim is to strengthen countries' capacities to design and implement production and water storage plans, programs and projects for agriculture, through the integrated management of water resources in watersheds, nature-based solutions (NBSs) and good agricultural practices (GAPs).

Watersheds are the natural units that are most suitable for integrated water resource management, in other words, for managing the interventions of multiple parties within a shared water system, in order to derive benefits, without affecting each other within the short and long term and without impacting the environment. Watersheds are used as a territorial reference point for the management of water resources and the environment. They also provide the basis for regional development<sup>7</sup>.

NBSs and GAPs include climate-smart agriculture, integrated water resource management in watersheds, sustainable soil management, water storage and natural disaster risk management. Bear in mind that NBSs are viewed favorably for obtaining funding from multilateral banks, in particular via financial instruments such as green funds and water funds.

#### Strategic pillar 1: Production and water storage in agriculture



<sup>7</sup> Among other things, these actions include infrastructure development (collection, storage and distribution to the farm); the introduction of support services and incentive programs; the capacity development of irrigation farmers and their organizations; water management and state-of-the-art technologies; water quality interventions; production diversification and innovation and other related measures.

## STRATEGIC PILLAR 2: EFFICIENT WATER USE

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The aim is to increase water-use efficiency in agriculture, through technology innovation, with an emphasis on the dissemination and application of innovation in on-farm water collection, storage, distribution and use of mechanized irrigation, as well as the intensified use of water stress-resistant crops.

All food system stakeholders have an immense responsibility to use water efficiently, with a view to developing a sustainable and resilient agriculture sector, by implementing solutions such as: a) water collection, storage and saving in irrigated and rainfed (non-irrigated) areas; b) reduction of losses and waste when using water; c) recharging of aquifers; d) safe reuse of waste water for agriculture and industry; and e) intensified cultivation of both traditional and new plant varieties that are resistant to water stress, among other practices.

This strategic pillar will promote the dissemination and application of technological innovations in on-farm water collection, storage, distribution and use of mechanized irrigation and will hinge on forging strategic partnerships with universities, research institutes, private companies and cooperation and funding agencies. Some tools that will be used for this purpose include: a) digital platforms with catalogues of innovative, ready-for-transfer technologies; b) platforms of online courses on mechanized irrigation for farmers, extension officers, consultants and other stakeholders; b) the hosting of webinars; and d) direct technical cooperation actions. The area will also promote the creation and development of service organizations that provide support to farmers to foster and expand mechanized irrigation.

## STRATEGIC PILLAR 3: WATER GOVERNANCE FOR AGRICULTURE

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The aim is to strengthen the mechanisms, tools and capacities of water ministries and lead agencies with respect to water governance in agriculture.

To this end, actions will focus on strengthening the water governance-related institutional structures in the agriculture sector, enhancing inter-institutional collaboration for integrated water management, promoting innovative regulatory frameworks and their effective application; and encouraging participation and the forging of partnerships, particularly with public and private stakeholders, for water management at the watershed level.

These actions aim to provide these stakeholders with an essential regulatory framework for water management and use in irrigation, thereby equipping them to tackle current challenges in agriculture, to build capacities, develop updated policies and bolster the capacities of irrigation users to ensure integrated water management in agriculture.

## STRATEGIC PILLAR 4: INVESTMENT PROMOTION FOR ON-FARM WATER COLLECTION, STORAGE, DISTRIBUTION AND IRRIGATION

The aim is to improve planning, allocation and the pooling of public-private pre-investment and investment resources in the countries, as a means of contributing to improvements in integrated water management initiatives, programs and projects and efficient water use in agriculture.

This area will seek to identify and develop portfolios of investment projects at various stages (idea, profile, pre-feasibility, feasibility), aimed at expanding the use of mechanized irrigation, in order to organize and prioritize the allocation of pre-investment and investment resources. This will enable countries and bilateral and multilateral funding agencies (CAF-Development Bank of Latin America; Central American Bank of Economic Integration, CABEL; Inter-American Development Bank, IDB; the World Bank; the International Fund for Agricultural Development, IFAD; FONPLATA Development Bank, among others) to negotiate for project resources in the following areas: a) water collection and storage (for small-, medium- and large-scale projects); water distribution (for example, projects that assist in significantly upgrading water distribution systems, including through telemetry, rehabilitation and lining of irrigation canals, improvements in the layout of canals and water injection systems to recharge groundwater) and c) on-farm application of water, via mechanized irrigation, inter alia.

It will support efforts to identify funding, in particular with respect to NBSs, for example, from climate funds or green funds (Green Climate Fund, GCF; the World Environment Fund, WEF; and others) that provide low-interest concessional loans, non-reimbursable funding and grants, and from water funds (that are commonly used to protect water resources at the watershed level to ensure the water supply). Moreover, it will foster the design and application of instruments (competitive funds, grant funds, etc.) that help to expand the use of mechanized irrigation in agriculture in a competitive, sustainable and inclusive way.




### Hemispheric Initiative on Water and Agriculture





## 2.3 OPERATIONAL STRUCTURE FOR THE INITIATIVE

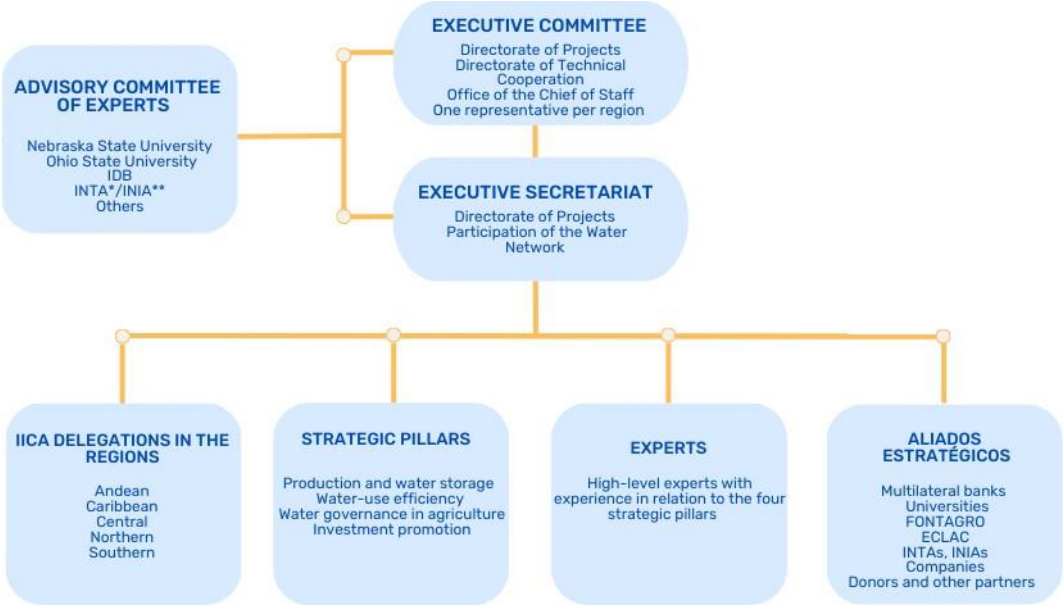
An Executive Committee, Advisory Committee of Experts and an Executive Secretariat will be appointed to oversee the initiative:

-  The Executive Committee will consist of the Director of Technical Cooperation or his representative, the Chief of Staff or his representative, the Director of Projects or his representative, as well as a representative from each of the five regions. This Committee will maintain strict oversight of the operations and activities of the initiative and will provide guidance to the Technical Secretariat.
-  The Advisory Committee of Experts will consist of five high-level experts with experience in governance, integrated water resource management and innovation, as well as pre-investment and investment processes in relation to water in agriculture. It will serve as a strategic and operational advisory body to the Executive Committee and the Executive Secretariat, with respect to managing the initiative and its related aspects.
-  The Executive Secretariat will be managed by IICA's Directorate of Projects and its functions will include: a) spearheading and executing the activities of the initiative; b) serving as Technical Secretariat in the meetings requested by the Executive Committee and the Advisory Committee of Experts; c) coordinating relationships with other partners and ongoing initiatives; d) coordinating relationships with the delegations and the IICA Water Network, and e) co-managing actions in the countries.

Strategic partnerships will be forged with institutions that are working in the areas covered by the four strategic pillars: (Production and water storage; Innovation; Governance; Investment promotion), while ensuring that the relationship is mutually beneficial. Actions have already been initiated with the Regional Fund for Agricultural Technology (FONTAGRO), the Economic Commission for Latin America and the Caribbean (ECLAC), and with multilateral banks and universities (Ohio State University, New Mexico State University, Nebraska State University). The initiative will also promote South-South, North-South and triangular cooperation to combine the capacities and experiences of the countries, their institutions and their public and private organizations, not to mention their resources and the resources of donors and other entities.

To ensure the sustainability of the initiative beyond the period of implementation, agreements, as well as management and support service contracts will be established with public and private stakeholders, cooperation and funding agencies, academia, beneficiaries and participating organizations.

## Governance of the Hemispheric Initiative on Water and Agriculture



\*National Agricultural Technology Institutes

\*\*National Agricultural Research Institutes

### 2.4 BENEFICIARIES

The Initiative will target a diverse group of beneficiaries: agricultural organizations and farmers, technical officers from ministries of Agriculture and other entities within their purview, local governments and technical service agencies, among others.

### 2.5 EXPECTED RESULTS

#### STRATEGIC PILLAR 1: PRODUCTION AND WATER STORAGE IN AGRICULTURE

- ▶ Countries will have created and expanded their information systems, as well as improved the integrated management of water resources in agriculture, while prioritizing actions at the watershed level, nature-based solutions (NBSs) and good agricultural practices (GAPs).
- ▶ Technical officers in the public and private sectors, farmers and farmer organizations will have acquired the capacity, technical tools, financial instruments and technical assistance to design and implement production and water storage plans, programs and projects for agriculture.

## STRATEGIC PILLAR 2: WATER-USE EFFICIENCY IN AGRICULTURE

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- ▶ National agricultural research and innovation systems will be equipped to provide innovative technological solutions to improve water-use efficiency in agriculture (SNIAs<sup>8</sup> and INIAs).
- ▶ National agricultural research and innovation systems will promote the dissemination and application of technology innovations in water collection, storage, distribution and the use of mechanized irrigation on the farm, through strategic partnerships with universities, research institutes, private companies, and cooperation and funding agencies, using digital platforms and direct technical assistance.
- ▶ National agricultural research and innovation systems will share technology solutions that seek to rehabilitate degraded soils to increase their water retention capacity, in line with the IICA Living Soils of the Americas initiative.
- ▶ Countries will promote the creation and development of companies that provide support services to farmers to foster and expand the use of mechanized irrigation.

## STRATEGIC PILLAR 3: WATER GOVERNANCE IN AGRICULTURE

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- ▶ Countries will have introduced regulatory frameworks, good practices and strategic indicators in relation to water in agriculture, identifying and systematizing them in shareable digital platforms.
- ▶ Ministries of agriculture and national lead agencies will be actively participating in the design and execution of plans and programs for integrated water management in agriculture, prioritizing work at the watershed level.
- ▶ Countries will have introduced regulatory frameworks, innovative policies and updated national plans for water use in agriculture, thereby improving their positioning and their negotiating capacity with respect to integrated water management and water use in agriculture.

## STRATEGIC PILLAR 4: INVESTMENT PROMOTION FOR ON-FARM WATER COLLECTION, STORAGE, DISTRIBUTION AND IRRIGATION

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- ▶ Ministries of agriculture and national lead agencies will have the requisite information on technical, institutional, financial, economic and environmental aspects for the analysis and allocation of pre-investment and investment funds for water resources.

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<sup>8</sup> SNIA: National agricultural innovation systems.

- ▶ Three countries will have developed project portfolios that structure and prioritize the allocation of pre-investment and investment resources for on-farm water collection, storage, distribution and use of mechanized irrigation, in support of negotiations with bilateral and multilateral cooperation and development funding agencies.
- ▶ Countries will have access to development funding (competitive funds, grant funds or other types of funding) that will assist in expanding the use of mechanized irrigation in agriculture in a competitive, sustainable and inclusive manner.

