



Medium - Term Plan 2020-2025

SCIENCE FOR DEVELOPMENT

Organized by



Cornell University

With the support of





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FONTAGRO

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About FONTAGRO

FONTAGRO is a unique worldwide mechanism for the sustainable financing of agricultural R & D & I in Latin America and the Caribbean, and constitutes a forum for the discussion of priority issues in technological innovation¹. Its purpose is to increase the competitiveness of the agri-food sector and reduce poverty through sustainable management of natural resources.

FONTAGRO is made up of 15 member countries: Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Nicaragua, Panama, Paraguay, Peru, Spain, Uruguay, and Venezuela. Each country is represented by the highest authority of its national agricultural research institute (INIA), who leads national policies on the matter and is a member of FONTAGRO's Board of Directors. The Inter-American Development Bank (IDB) is its legal representative and sponsor.

FONTAGRO was created in 1998 in an effort to promote agricultural research and development and to compensate for declining investments in the sector in recent decades. Member countries have contributed US\$83 million in capital; as of 31 December 2019 FONTAGRO holds an investment portfolio worth US\$102 million.

Its governance structure includes the Board of Directors, the Executive Committee, the Financial Committee, and the Technical-Administrative Secretariat managed by an Executive Secretary. Its institutional documents are the Articles of Agreement, the Operations Manual, and the Medium-Term Plans (MTP). Also issued are annual external audit reports and publications on the analysis of FONTAGRO's results and impact.

Its co-financed projects are regional platforms comprising at least two member countries of FONTAGRO, although other, non-member countries may also participate, in this case contributing their own funds. To date, 159 regional multi-stakeholder platforms have been co-financed for a total US\$119.5 million, to which FONTAGRO has contributed US\$24.2 million (20%); other agencies, US\$16.7

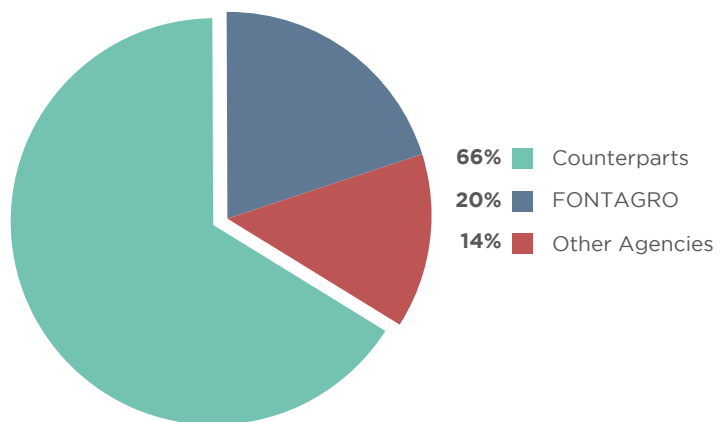
million (14%); and the participating institutions (counterparts), US\$78.6 million (66%). In other words, for every dollar invested by FONTAGRO between 1998 and 2019, the organization has succeeded in obtaining up to four dollars from other parties, while supporting operations that encompass 33 countries with the participation of 531 public and private institutions, including national research institutes, universities, businesses, NGOs and regional and international organizations.

FONTAGRO is sponsored by the Inter-American Institute for Cooperation on Agriculture (IICA) and has established strategic alliances with, among others, the Food and Agriculture Organization of the United Nations, the Alliance of Biodiversity International and CIAT, and the Global Research Alliance in New Zealand, represented in that country by its Ministry for Primary Industry.

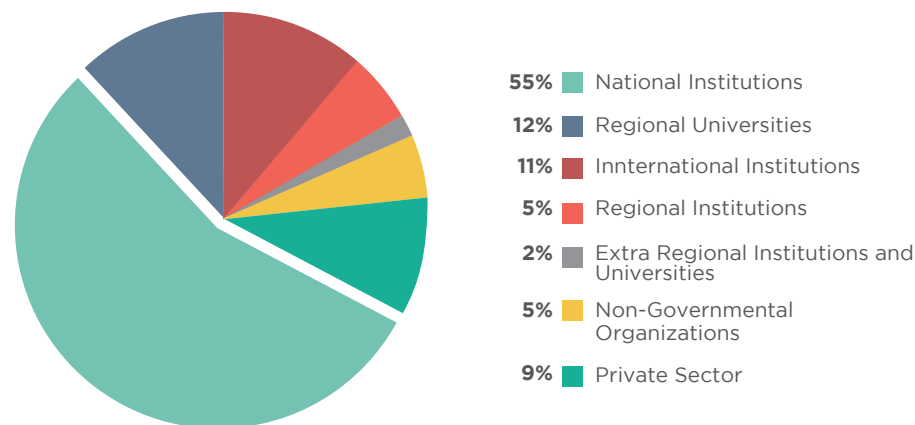
As a result, a unique organizational and institutional model was built, a model of inclusion where researchers, innovators and agents of agriculture and food development converge. Over the years, outcome research and impact studies have highlighted outstanding achievements not only in technical aspects but also in the creation of networks, spillovers and spin-offs, and, especially, in strengthening the capacities of all stakeholders in the value chains.

Of the results achieved by FONTAGRO projects, 77% are part of the scientific heritage of national agricultural research systems, 69% are being used by end beneficiaries, and 74% are regional public goods. A study carried out in 2020 on a group of eight projects showed that the total benefit, expressed as Net Present Value (NPV), was US\$83,753,240, far exceeding the US\$ 8,112,422 investment².

Source of funds to finance projects 1998 - 2020(*)



Projects led by organization type 1998 - 2020(*)



(*) As of September 2020.

Main Technical Indicators 1998 - 2019

Environmental

13 mitigation Technologies generates

7 Climate, satellite and soil database

Socioeconomics

39,678 beneficiaries of the technologies

3,716,502 hectares intervened

Agro-productive

203,568 genotypes generated by crossing

20 new varieties released

31% average increase in yield

Capacity Building

58,261 people trained

4,681 publications and presentations

2,180 training events

248 digital platforms or websites

Message from the Executive Committee of FONTAGRO

We are undergoing times of great, challenging transformations that have an impact on investment in R & D & I in the agriculture and food sector.

Global society is facing technological, social, economic, environmental and political changes that directly affect its well-being and its ability to feed a growing population sustainably.

The year 2020 has faced us with the Covid-19 pandemic, a challenge imaginable only in science fiction books and movies. This new scenario, which many call the “new normal”, teaches us that environmental impact due to climate change can inexorably affect everyone on this planet and that, to find alternative solutions to these problems, collaborative and cooperative work between people, institutions and governments is essential.

The 2020-2025 MTP is the result of the participatory work of the representatives of the Board of Directors; the sponsors, IDB and IICA; the Technical Administrative Secretariat; the strategic partners; and other individual actors from the public and private sector at the national, regional and international levels that have collaborated in the preparation of this document.

The plan highlights, a priori, three crucial strategies to be implemented. The first, at the farm level, is a call to re-examine every aspect that needs to be improved to increase farms productivity and efficiency, while generating positive environmental, social and economic impact. The second has a larger scope, beyond the farm

yet including it, and encompasses the territory, with an emphasis on sustainability. The COVID-19 scenario has exposed the ties between the environment, agriculture, food and health. It is precisely for this reason that the third strategy focuses specifically on food, nutrition and health.

Adding to the challenges presented in this MTP, the results of the new co-financed initiatives should generate high-impact regional public goods that can be used by the member countries of FONTAGRO and beyond. We intend to generate far-reaching knowledge spillovers, that is to say, spillovers and spin-offs of greater scope, with direct effects on the beneficiaries. We are committed to producing results and impacts that will contribute to the fulfilment of the Sustainable Development Goals and the Paris Agreement regarding climate change, yet responding to the particular demands of the region, countries and communities. The challenges are many and can be addressed efficiently only by working as a team.

In this sense, the 2020-2025 MTP aims to promote multi-stakeholder platforms whose participants, both from the public and private sectors, demonstrate the strengths needed to support the research, development and innovation processes that Latin America, the Caribbean and Spain require.

Finally, we the Executive Committee of FONTAGRO wish to thank all those who have accompanied us during the last 22 years on the path to improving the lives of the families in our region.

Pedro Bustos Valdivia
National Director of INIA Chile
President of FONTAGRO

Arnulfo Gutiérrez
Director General of IDIAP of Panama
Vice President of FONTAGRO

Eugenia Saini
Executive Secretary
FONTAGRO

Acknowledgements

FONTAGRO thanks all the experts and organizations that have provided their knowledge and efforts to create this plan for the future of the LAC Region.

In particular, we would like to thank our Board of Directors; our legal representative, the Inter-American Development Bank (IDB); and our strategic partners: the Inter-American Institute for Cooperation on Agriculture (IICA); the Food and Agriculture Organization of the United Nations (FAO); the International Food Policy Research Institute (IFPRI); the Alliance of Bioversity International and CIAT; and, especially, the research team of Cornell University's College of Agriculture and Life Sciences, who supported this endeavour, as well as other international agencies.

We extend our gratitude to all those who participated in the survey sent to almost 10,000 members of the FONTAGRO network, and particularly to the 130 specialists from public and private organizations at the national, regional and international levels who completed the surveys thoroughly and provided information, opinions and suggestions to our work team.

We are indebted to the 84 researchers working at the 15 INIAs in member countries and at five international agencies with impact on LAC and worldwide, who contributed their opinions in individual interviews carried out between April and July, 2020.

Our special recognition goes to Cornell University experts, particularly to Dr. Prabhu Pingali, who encouraged our initiative from the beginning, and to Drs. Miguel Gómez, Leslie Verteramo and Duncan Duke, for their support to this document, their assistance in matters of strategy and their input in weekly progress meetings.

We thank the members of the Technical and Administrative Secretariat for the design of the work plan and for the monitoring, follow-up and preparation of this document, which is based on the contributions of experts and the results of surveys and interviews.

Introduction

The role of agri-food innovation in the face of global challenges

Over 22 years, FONTAGRO has established itself as a unique cooperation mechanism for the sustainable co-financing of R & D & I in agriculture in LAC, thanks to the contribution of member countries, the support of strategic partners and the collaboration of its sponsors, IDB and IICA.

Drawing on the proposals and the consensus created by its network of participants and according to the evolution of the global and regional contexts, in particular the agri-food sector, FONTAGRO adjusts its objectives every five years and turns them into a Mid-Term Plan (MTP), which guides the strategies and actions to be implemented and sets priorities in resource allocation.

The complexity of the global scenario entails great challenges for the 2020-2025 period and demands that we analyze and understand the main trends in agriculture in order to design effective responses. For this, an exhaustive review of the projections to 2050 has been carried out using two leading studies on the subject: *The Future of Food and Agriculture: Trends and Challenges*³; and *Agriculture & Food Systems to 2050: Global Trends, Challenges and Opportunities*⁴.

Agriculture is faced with two daunting challenges. One is creating tools that societies can use to meet the growing demand for food in ways that are more sustainable and resilient for farming systems and value chains; the other and no less important challenge is improving people's nutrition. Simultaneously, the availability of water, energy and arable land varies from region to region, and the effects of climate change will make competition for their use increasingly severe. In this sense, agri-food systems will face extreme events, such as heat waves, droughts and floods, which will affect their potential for food production and distribution and have an impact even on the amount of food waste they generate, which has currently reached alarming figures between 30% and 50% along the value chains.

The migration of the young population from rural to urban areas poses another problem as it will limit the supply of rural workers and impair farm productivity. At the same time, value chains will have to meet the growing demands of urban populations, whose diets include more animal protein and processed foods.

Another challenge lies in halting the processes that lead to increased malnutrition in many countries. Although famines have decreased in recent decades because of the improvement in agricultural productivity derived from the Green Revolution, some populations are affected by chronic vitamin and mineral deficiencies which lead to stunting, while others suffer from obesity, a serious public health hazard.

These strains on the agri-food system have created new, complex, interconnected issues. Indeed, diversifying crops and developing varieties with higher yields and micronutrient content can lead to food and nutritional security, but this must not be achieved without managing water sustainably, preserving biodiversity, and protecting and restoring territorial ecosystems.

The development of new technologies and disruptive innovations will play a vital role in the production, distribution and consumption of food, thus establishing the agenda for the implementation of public policies at global, regional and national levels.

This is the comprehensive context within which FONTAGRO will address the role of R & D & I in providing successful solutions to the complex challenges posed by the United Nations 2030 Agenda for Sustainable Development, the Paris Agreement and so many other commitments that seek the reduction of poverty and the improvement of food and nutritional security, within a framework of equity, inclusion and sustainability.

Executive Summary

FONTAGRO, science for development

The challenging scenario envisaged for the global agri-food sector has been validated at the regional level by researchers and R & D & I leaders working in member countries; at IDB and IICA, our sponsors, and with strategic partners. This vision emphasizes the urgent need for a paradigm shift that will guarantee nutrition for a growing population in a sustainable, resilient and equitable way; this state of affairs also defines FONTAGRO's positioning for the coming years.

The opinions and analyses produced by this corporate critical mass were the starting point to agree on the new mission, vision and objectives presented in this 2020-2025 MTP. Accordingly, the philosophy that underlies FONTAGRO's purpose for the years ahead is eloquently expressed in the statements "to transform agri-food systems through the use of knowledge so that they will be more inclusive and sustainable for the environment and society ", and "to lead regional cooperation and dialogue through the co-financing of public goods initiatives that will contribute to the innovation of the agri-food systems and to the improvement of the quality of life".

In this respect, the members have concurred on three main strategies at (1) the farm; (2) the territory; and (3) the food, nutrition and health levels. This vision has nurtured objectives such as boosting the resilience and sustainability of farms through the generation of added value; increasing the number of technologies with high potential for adoption and impact on farming systems, agroecosystems and territories; and enhancing innovations that can positively affect food security, nutrition and health. This MTP presents these objectives alongside FONTAGRO's prospective areas of intervention and associated actions, which are described throughout this document and constitute a roadmap for all the actors in the field of regional and global agriculture.

We have also identified cross-cutting issues that will encompass all initiatives co-financed in the 2020-2025 MTP. Among them are

efficient management of farms and land-use planning to increase resilience and reduce risks posed by natural and public health crises or disasters. Other topics include the development of digital information systems that can support smart agriculture, rural work automation and connections with markets; these outcomes will promote higher productivity, decrease the use of supplies, cut transaction costs and help farmers respond to consumer preferences. In this sense, the MTP will sponsor only competitive value chains and agribusinesses that guarantee gender, youth and indigenous inclusiveness through capacity-building processes.

FONTAGRO's role as a forum, embodied in its Articles of Agreement, deserves special mention. The organization will intensify its influence to promote convergence and collaboration among regional and international, public and private organizations with common objectives, and the discussion of priority issues in LAC agriculture, thus expanding the innovations achieved through co-financing.

The MTP includes FONTAGRO's philosophy towards developing new alliances and memberships, seeking a win-win cooperation that can enhance an innovative mechanism in which the beneficiaries themselves compete for funds and share the knowledge and public goods generated, scalable at the regional and global levels.

These are some of the proposals in this MTP, points that call for thorough analysis so that they can guide investments in LAC agriculture. The paradigm shift for the 2020-2025 period ultimately seeks to improve agri-food competitiveness, within a framework of equity, inclusion and sustainability. We believe that this shift stands as a guideline for the decisions that policy makers, scientific leaders and donors will have to make in years to come.

Our Philosophy

FONTAGRO has renewed its philosophy as a response to the shifts that challenge agriculture and nutrition everywhere. In doing so, it has redefined its mission, vision and values to strengthen its role as a mechanism for sustainable co-financing of R & D & I and enhance its actions as a forum for the discussion of priority issues in agri-food innovation. This philosophy comprises a set of principles that correlate what we are with what we intend to achieve and, at the same time, constitutes a consistent work space which aligns FONTAGRO with all the actors participating in the initiatives to be promoted in the medium term.

FONTAGRO's **Vision:**

“Transforming agri-food systems through the use of knowledge so that they will be more inclusive and sustainable for the environment and society”.

FONTAGRO's **Mission:**

“Leading regional articulation, cooperation and dialogue through the sustainable co-financing of public goods initiatives that will contribute to the knowledge and innovation of agri-food systems and to the improvement of the population's quality of life”.

Our Values

Integrity, Solidarity, Efficiency, Transparency and Respect.

Our Beneficiaries

“FONTAGRO considers its beneficiaries to be the farmers, consumers, individuals, families, communities, or organizations that have direct or indirect access to the knowledge generated by the initiatives it co-finances”.

FONTAGRO’s actions reach two types of beneficiaries: direct and indirect⁵. Direct beneficiaries are part of the R & D & I initiatives co-financed through FONTAGRO’s management mechanisms (calls, seed funds, consensual projects, and others). Indirect beneficiaries are all the potential users of the knowledge, technologies and innovations generated through the initiatives mentioned above.

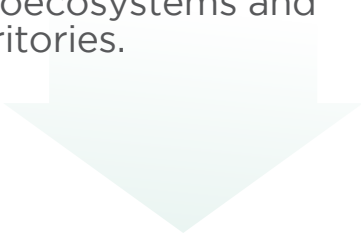
The Three 2020-2025 Strategies



Strategy I: Resilient and sustainable farm network.



Strategy II: Sustainable production systems, agroecosystems and territories.



Strategy III: Food, nutrition and health.



Strategy I: Resilient and sustainable farm network

OBJECTIVE

Increase resilience and sustainability through knowledge and innovation.

Challenge 2020-2025

Globally, and especially in LAC, large productivity gaps still exist in the agricultural and agri-food systems. These differences arise from asymmetries in the generation and adoption of technologies appropriate to the systems' scales and capable of allowing systems to adapt to and mitigate the effects of climate change⁶, take advantage of available financing, and customize their activities to market demands. This context will imminently require knowledge and innovations that can facilitate technological change on farms of all scales, with an emphasis on specialization, diversification and sustainable intensification. A systemic approach and the cooperation of local institutions (universities, private sector, and non-governmental organizations) are necessary to facilitate these changes⁷. With this in view, it is essential to promote alliances that will connect producers with public and private research and extension agencies, especially when producers do not have access to information on the benefits of technologies or to the organizational capacity to take advantage of them⁸.

FONTAGRO will support co-financing initiatives that promote increases in farm productivity and efficiency in a sustainable way, thus improving the producer's income and profitability; these initiatives are to have low use of supplies and environmental impact and positive effects at the territorial level. The focus will be on proposals that are appropriate to the producer's scale and social and economic characteristics⁹ and that include effective extension and transfer processes to improve adoption rates¹⁰. Likewise, productive diversification will be encouraged, favouring the consumption of balanced diets¹¹.

Potential intervention areas

• Genetic improvement and healthy seed systems

The effects of climate variability and change, along with changes in consumer preferences, have evinced the strategic importance of investments in seed and animal genetics. Knowledge in genomics and bioinformatics will be required to accelerate the development of new varieties of crops and trees and improve livestock and fish to make them more resistant to climatic challenges, increasing plants' tolerance to weeds, pests and diseases and enhancing the nutritional value of food sources. Developing efficient seed production systems and ensuring that healthy vegetative material is available to producers will prove essential. Hence, the creation of local germplasm banks will be crucial in preserving genetic diversity, which is the basis for the development of new cultivars. Equally necessary will be making headway on issues that, although outside the scope of this area of intervention, affect its dynamics, such as regulations on intellectual property, registration of varieties and exchanges of genetic materials.

• Crop protection and environmentally friendly practices

Climate change and some agricultural practices have caused pests, diseases and weeds that were previously under control or absent to affect crops and even spread with greater intensity. Furthermore, agricultural intensification has brought about the overuse of agrochemicals, with an impact on the environment and human health. Indeed, food-importing countries have increased restrictions on contaminants, rejecting consignments on account of small traces of residues. Furthermore, plastic containers used for agrochemicals leave their mark on the environment because not all countries can

perform triple washing processes or send materials to collection centres. An alternative solution to this problem is the development of technologies based on biological control and bio-inputs, as well as the dissemination of good agricultural practices such as crop rotation; crop-livestock synergy; integrated pest, disease and weed control; early warning systems; and identification of resistance to active ingredients, among others.

- **Sustainable management of natural resources**

Although LAC has a large amount of land suitable for agricultural activities, a significant part of the region comprises grassland, savannah and forest systems, which are great carbon-capturing mechanisms and, therefore, strategic to balance the impact of climate change. This feature highlights the need for farms to improve the use of natural resources through knowledge and technologies that promote sustainable management. Consequently, the MTP will support initiatives that include land use planning designed according to the land's agronomic aptitude and that embrace environmentally friendly practices such as minimum tillage, direct sowing, and cover crops, among other measures. As to water preservation, the Plan will foster the development of high-efficiency, low-energy management systems for water resources and irrigation. With regard to biodiversity, it is important that farms can incorporate mechanisms for its use in harmony with production. No less relevant is generating knowledge and innovations that make it possible to recover areas and systems that have been degraded through the use of unsustainable practices.

- **Good agricultural practices for resilient and sustainable intensification .**

Good agricultural practices (GAPs) are essential for the efficient management of farms inasmuch as they contribute to the achievement of higher productivity and profitability. The implementation of GAPs requires protocols adapted to the scale of the producer and geared to better management of soil, water and biodiversity as well as improved handling of crops and livestock in mixed and dual-purpose agricultural systems. GAPs also facilitate external certification processes, often indispensable conditions to gain access to attractive market niches. Moreover, the design and implementation of carbon-neutral practices will be essential for intensive and sustainable agricultural production.

- **Efficient economic-financial management of the farm**

Farms need to improve their planning according to their comparative and competitive advantages, taking into account the relationship between the prices of inputs and products, the likelihood of access to credit and markets, and the potential for added value, among other variables. Producers should be trained in risk management and in the use of tools to protect themselves from potential production losses and price reductions. Likewise, they should be encouraged to develop financial products, including payment systems, as these instruments are main tools for rural development, especially among low-income farmers. The bioeconomy and the circular economy may also provide new sources of income, be it by adding value, reducing waste or transforming products and/or by-products into energy or new products.

Strategy II: Sustainable farming systems, agroecosystems and territories

OBJECTIVE

Increase the number of technologies and innovations with high potential for adoption and for impact on farming systems, agroecosystems and territories.

Challenge 2020-2025

The problems associated with the progressive intensification of agriculture have shown the urgent need to use natural resources sustainably and protect ecosystem services, while allowing for the increasing consumption needs of a growing population. Soil degradation is 40 times faster than its regeneration¹². Competition for water may lead to social unrest and the rationalization of its use for agriculture and other activities¹³. All the knowledge and innovations generated must reconcile simultaneous compliance with the Sustainable Development Goals (SDG), the Convention to Combat Desertification, and the Paris Agreement, although some of these goals may not be compatible with one another. For example, attempting to reduce some environmental footprints may increase others, so solutions must minimize these imbalances¹⁴. In this framework, it is necessary to promote farming systems, such as conservation agriculture¹⁵, that decrease GHG emissions and increase carbon sequestration in soils. Using science and innovation to create regional public goods that fulfil SDGs and provide evidence of progress is a fundamental goal. Applying payment models for the use of ecosystem services¹⁶ may supply an alternative way to protect natural resources. Additionally, agribusiness should be developed with a view to market and consumer preferences yet remain based on environmentally friendly practices.

Potential intervention areas

• Farming systems, agroecosystems, and natural ecosystems

In a broad sense, agriculture can be defined as the farming of crops and livestock. Farmers base their work on the knowledge they have acquired from practice and culture and through the use of technological skills to obtain production. In doing their job, producers create a particular system or agroecosystem¹⁷, the functioning of which the producers themselves help define. This phenomenon bears out the difference between an agroecosystem and a natural ecosystem, as the former is manmade. In this sense, farming systems can be understood as the pursuit of greater agroecosystem productivity through the use of inputs such as improved varieties and good agronomic practices. Agroecosystems, unlike natural ecosystems, lack natural regulatory mechanisms; therefore, they are more vulnerable to extreme weather events and more dependent on farmers to overcome such disruptions. Agroecosystems, in addition, can be complementary; for example, one can generate products that serve as inputs in another; conversely, poor handling practices in one agroecosystem, such as the overuse of agrochemicals, can cause contamination in another. Farming systems include not only agroecosystems but also necessary resources such as labour, capital and management. In the farming system, the producer or manager organizes resources according to objectives conditioned by internal and external factors, such as the socioeconomic framework.

Within the scope of these concepts and definitions, for the period 2020-2025 FONTAGRO will support the generation of knowledge and innovations that will render farming and agro-ecological systems more resilient and sustainable against internal and external environmental factors that may affect them.

- **Sustainable management of agroecosystems to preserve natural capital**

It is important to promote innovations that embrace farming systems on a larger scale, including all the actors in the value chain. A factor fundamentally contributing to this goal is better land-use planning, which calls for a systemic approach that takes into account climate risk and food security. We need to encourage the adoption of sustainable management practices of agroecosystems and the restoration of degraded environments in order to conserve natural capital and increase genetic diversity, with beneficial effects on agriculture. In this respect, we find that promoting technologies for efficient water use and soil regeneration will become as increasingly vital in the coming years as encouraging farming systems that boost agroecosystem resilience, especially in family farming. It is also essential that we support technologies for vertical and urban farming and strengthen the link between producers and consumers, promoting harmonious rural and metropolitan development.

- **Land-use planning**

It is a priority to promote land-use planning with productive, social and ecological criteria, as well as appropriate and agile legal frameworks for the use of natural resources and the payment for environmental services. Applying economic incentives based on ecosystem mapping and cost-benefit analysis¹⁸ will persuade land users to adopt these services. Another decisive driver of territorial development is legal tenure security, which encourages the producer to protect natural resources and adopt new technologies¹⁹. Progressively, multidisciplinary research projects will become more crucial in addressing the issues of land-use planning and natural resource management²⁰.

- **Production linkages, competitive and inclusive value chains**

Competitive yet gender-, youth- and indigenous-inclusive value chains and agribusinesses will receive our support. Encouragement will be given to family farming that creates businesses with safety and traceability assurance systems, product certification²¹, use of financial services and risk management²². It is necessary to improve transportation and food preservation technologies to minimize the losses and environmental impact produced by hazards such as GHG, solid waste and non-recyclable materials. Likewise, the Plan will foster access to markets in transparent and equitable conditions and the connection between the producer and the end consumer. Just as important will be developing agritourism²³, among other business models that generate new and better job opportunities.

- **Bioeconomy, circular economy.**

The Plan will promote the design of investment policies and programs that use sustainable biological processes²⁴ and substitute synthetic agro-inputs for others that are quickly recaptured by nature. The use of biomass will be fostered for non-food purposes such as biofuels²⁵, biological materials for new technologies²⁶ and biodegradable packaging for food²⁷.

- **Risk and disaster management.**

We will enable the creation of systems for the prediction and detection of early systemic risks for agricultural production, such as pests, diseases and adverse climatic events²⁸. These systems will be expected to contribute to risk management at a territorial scale, integrating tools such as agricultural insurance and food storage. Moreover, we will encourage the design of models for the detection of structural changes in the agricultural market that may trigger public policy reevaluation²⁹, and prepare action plan manuals for government officials and civil society to face such disruptions. In addition, we will develop effective risk communication systems for vulnerable populations³⁰.

Strategy III: Food, Nutrition and Health

OBJECTIVE

Increase the application of technologies and innovations that have potential for positive results and impact on food security, nutrition and health.

Challenge 2020-2025

Food security means availability and ready access to a stable supply of healthy food. Research, development and innovation have achieved increases in agricultural productivity and, therefore, in the supply of raw materials. Their nutrient content and the strategies to diversify the diet of the population, however, are still underdeveloped. The existence of the “Triple Burden” (undernutrition, overweight and obesity, and micronutrient deficiencies) is a problem both in developed countries and in low-income areas. It is estimated that around 9% of the world population suffers from some form of malnutrition. In the case of LAC the figure is 7.4%, and in the Caribbean, 16.6%³¹. Moderate or severe food insecurity affects 31.6% of the people in LAC, a much higher figure than the average 7.6% in Europe and North America. We find it vital to connect consumers with producers, educators and health agents in order to publicize the nutritional content of available foods and the benefits of a balanced diet. What is more, the current COVID-19 pandemic, and its connection with zoonoses, highlights the magnitude of food safety. We endorse the “One Health” initiative³², in other words, cross-sectoral and interdisciplinary collaborations, at the national, regional and international levels, to pursue a holistic health vision, recognizing the interrelations between people, animals, plants and the environment. To achieve these goals, FONTAGRO will seek new key strategic alliances with other key public and private stakeholders.

Potential intervention areas

• Food safety.

FONTAGRO will promote the production of safe, high-quality food at accessible prices; the use of new packaging technologies and materials that help to preserve them; improvement in the value chain to minimize waste and ensure safety³³; transport and storage sanitation, and better health management among those who handle raw materials and food. In a similar vein, we will adopt a One Health approach to foster efficient monitoring of infectious disease outbreaks in animals, so that the information can be shared by the relevant actors, according to the guidelines of the World Organization for Animal Health (OIE). We will make it a priority to educate producers, consumers and technicians about the excessive use of antibiotics in food production and endorse control models and alternative production systems³⁴. FONTAGRO will facilitate the implementation of good agricultural and agro-industrial practices (GAPs and GMPs) and traceability control systems, as well as other certifications that result in easier market access.

• Nutrition and health

FONTAGRO will support agriculture that contributes to diet diversification and will promote technologies, such as biofortification, that increase micronutrient contents most frequently low or absent in crops worldwide (vitamin A, iron and zinc), especially in grains and cereals³⁵. Along this line, we

consider it necessary to identify vulnerable populations where we can promote biofortification and analyse consumer preferences in order to increase demand for biofortified³⁶ and functional foods. We will assist in the creation of public-private programs for the adoption of this type of crops³⁷ and raise consumer awareness of the nutritional quality of foods available in the market, in line with the implementation of labelling and certifications³⁸.

- **New foods and active substances obtained from biodiversity**

FONTAGRO will support studies on new foods obtained from natural capital and biodiversity, including data on consumer acceptance³⁹. We will also promote commercial opportunities for nutritious native products and consumer education about their benefits. To this end, we will encourage bioprospecting⁴⁰ in the food and pharmaceutical industries, establishing policies for benefit sharing with the original population⁴¹. We will also encourage the analysis of properties of non-conventional foods and the dissemination of results among the scientific community and consumers.

Cross-cutting issues

(i) FONTAGRO as a forum

The implementation of some global strategic goals requires the coordinated action of national, regional, international, public and private agencies. Among these initiatives are the United Nations Sustainable Development Goals (SDGs)⁴², FAO Programs⁴³, IUCN's Bonn Challenge on Landscape Restoration⁴⁴ and the Aichi Targets included in the Convention on Biodiversity⁴⁵. The challenge for the 2020-2025 period is to promote joint projects based on innovations co-financed by FONTAGRO and aligned with these objectives. In turn, according to its Articles of Agreement, FONTAGRO plays the role of a forum for the discussion of priority innovation issues in LAC (Article I, Section 1, Articles of Agreement), so it will seek more active participation in all areas of the main agriculture and food scenarios. Moreover, FONTAGRO will emphasise the promotion of regional cooperation projects where researchers from different scientific, social, economic, financial, and, especially, entrepreneurship areas converge.

(ii) Natural and public health crises or disasters

The emergence of the Covid-19 pandemic, at a time when the world is struggling for growth and development, forces us to rethink agricultural activities. Other pandemics such as Ebola (in Guinea, Liberia and Sierra Leone in 2014), SARs (Severe Acute Respiratory Syndrome) and MERS (Middle East Respiratory Syndrome) have had a strong impact on nutrition and food security, especially for the most vulnerable populations; for example, during the Ebola crisis, the price of rice increased by 30% and that of cassava by 150%. The impact of the current pandemic, however, is yet to be assessed. According to IFPRI⁴⁶, poverty and food insecurity may increase, although the prices of grains, the basis of the Latin and Caribbean diet, have still not been affected. However, if production is impaired in the next

seasons and stocks prove insufficient, the scenario could change. While previous pandemics damaged cattle, poultry and swine, the current one is taking a toll on the workforce. Although rural labour and some tasks in the sector, such as the provision of inputs and services, distribution and industrialization, and even research and development, have not been totally restricted by quarantines, value chains have slowed down because of workers' health problems. This highlights the importance of supporting new forms of rural work and science management, which can be automated and/or systematized to reduce these risks. Just as important is promoting smart digital tools, both for farm management and for the development of traceability and market access systems (e-commerce, e-logistics). Besides, the spread of new pests and diseases as a consequence of climate change makes it necessary to implement risk and disaster management studies, especially when these situations can lead to major humanitarian crises.

(iii) Institutions and procedures

The initiatives FONTAGRO plans to co-finance will require great cooperation and inter-institutional collaboration to achieve impact. To this end, we will strengthen effective coordination and negotiation with and among the institutions participating in multi-agency platforms in legal, administrative and financial matters, among others. Similarly, it will be necessary to adjust the procedures needed to develop alliances and new membership models.

(iv) Capacity building

During the 2015-2020 MTP period, FONTAGRO financed several studies on institutional strengthening and human capital capacity building. These actions respond to the challenges posed to the agricultural, agri-food and agro-industrial sectors by changes of

a. Fortalecimiento del capital humano. Lineamientos de una estrategia para el fortalecimiento de capacidades en países miembros de FONTAGRO (2017) y Gobernanza del sistema de conocimiento e innovación en agricultura de los países de Iberoamérica. Presente y Futuro (2019).

economic, political, social, technological or environmental nature. Implementing the necessary organizational, technological and institutional solutions has demanded fresh skills. Two examples of these new developments are the increasing frequency with which private-sector innovation systems incorporate the academia in their work, and the new role consumers have acquired in seeking solutions to the “triple burden of malnutrition” (undernutrition, obesity and micronutrient deficiency). In short, addressing this new scenario requires systemic and multidisciplinary approaches.

(v) Adaptation to, and mitigation of, climate change

According to the IPCC, anthropogenic GHG levels are at their highest historical level, with agriculture as one of the top carbon-intensive industries. Increased global average temperature and climate unpredictability are expected, as well as great variability between seasons and years. Depending on the region, excesses or deficiencies in precipitation and anomalies in water courses will occur, among other events, along with the appearance of new pests and diseases or modifications of their seasonality⁴⁷. The varieties grown in a region may have to be replaced by others adapted to the new environment. In addition, the impact of climate change will be greater in the proximity of the Equator, where millions of people dependent on agriculture and, therefore, more vulnerable to the effects of climate change, live in low- and middle-income countries. This situation may negatively affect the nutrition of the population, especially children. With these prospects, new initiatives will be necessary to model the impact of climate change and variability and manage risk information systems, as well as to provide society with open access to the information these systems produce. Smart agriculture practices such as the use of new hybrids, dwarf varieties, bioenergy-based machinery, water management, and livestock food stock systems should be considered for co-financing, provided they are accompanied by transfer strategies that ensure producer adoption.

(vi) Gender, youth and indigenous inclusion

The social and economic inclusion of vulnerable groups is part of several global development plans, such as the 2030 Agenda for Sustainable Development of the United Nations. In this sense, the empowerment of women and indigenous peoples, marginalized

because of a lack of appropriate policies, is essential. Inequality of opportunities, the impact of climate change, and difficulties in gaining access to land are leading to the abandonment of rural areas, especially by young people, and to the overpopulation of cities; it is estimated that 66% of the world population will live in urban areas in 2050. Within this framework, policies for regional development should include sections to support underserved groups, giving preference to projects with direct benefits for them.

(vii) Knowledge and communication management

The projects co-financed by FONTAGRO have generated successful technologies and innovations for family farming, adaptation to climate change and food security. Knowledge, however, does not reach potential users en masse, which makes it necessary to disseminate it more efficiently with the use of digital technologies.

(viii) Intellectual Property

Given the need to promote public-private investment in research, development and innovation, FONTAGRO will call for updated, flexibly designed intellectual property regimes in which private companies play a prominent role.

(ix) New alliances and memberships

Achieving technological change in farms and territories requires cooperation and collaboration with other national, regional and international actors. For this reason, the initiatives co-financed by FONTAGRO are implemented as multi-stakeholder platforms, including producer associations, NGOs, academia, other regional and international programs with similar purposes, the private sector, and, especially, entrepreneurs. In this way, collective action is fostered to make better use of financing, avoid duplication of investments, reduce transaction costs, achieve sustainability in innovations and facilitate scaling. In the 2020-2025 period, FONTAGRO will continue exploring win-win cooperation through new alliances and memberships, seeking to generate and articulate synergies with strategic public-private partners with common mission and objectives.

(x) Digitization, automation, precision and smart agriculture

In recent years, we have witnessed an explosion of digital tools and potential solutions based on information and communication

technologies that contribute to efficiency and productivity in agriculture. At the end of 2019, there were more than 450 Agtech-based enterprises⁴⁸ in LAC.

In order to facilitate real-time decision-making and control on farms, FONTAGRO will continue endorsing smart solutions to issues in agricultural technologies and practices, including the design of effective information systems that facilitate data capture and analysis and risk management. We will encourage the shift towards a data-driven agriculture supported by extension systems and digital training. This change will require adopting tools such as sensors, drones, artificial intelligence, the Internet of things, satellite information, traceability and blockchain technology. As an additional benefit, these innovations will provide better technical, economic and financial analysis at different levels (land lot, activity, farm), and the potential to be included in other digital systems of the value chain.

Regarding territory, FONTAGRO will facilitate the development of information systems and digital applications (such as the use of digital banking, remote assistance and smart phones) that improve connections between actors, so that market signals and data that contribute to regional decision-making (for example, those retrieved by climate and health alert systems) can be transmitted accurately and fast to all. As to food safety, nutrition and health, we will promote applications that help consumers acquire information on a variety of foods validated by labelling systems⁴⁹, including native products that are not traditionally marketed⁵⁰.

Glossary

Added value: Additional benefit that the market perceives as valuable for the purchase of a product or service.

Competitiveness: “Competitiveness is the ability to place produced goods in the markets, under fair conditions of competition, in such a way that well-being for the population is achieved⁵¹.”

Entrepreneur: Agents capable of identifying scientific knowledge and transforming it into an innovation that provides a solution to a user or beneficiary; in addition, entrepreneurs are able to assess the potential for scaling a solution using its own complementary financing and services.

Farm: Across the LAC region, the word for “farm” takes a variety of vernacular forms that resonate with each culture. For statistical purposes and homogeneity, FONTAGRO applies the term farm to an agricultural holding that meets FAO’s definition: an economic unit of agricultural production under single management.

Innovation: Innovation is a participatory process by which individuals or organizations generate and/or use technological, organizational and institutional knowledge that is translated into new goods and services, and that, once appropriated by society, generates a social, economic, environmental and/or cultural benefit.

Institutional innovation: Changes in the rules that govern the relationships and interactions of agents in the chain and other public actors. Example: new norms, regulations, policies and public-private relations that facilitate the adoption of knowledge and technologies in a given context.

Multidimensional approach: Multiple-criterion methodology for analysing a topic. These criteria may be social, economic, technological, or environmental or any other factors related to the issue under study.

Organizational innovation: In organizations, transformational changes that entail the use of knowledge and jointly develop or improve economic or social products or processes. Example: inclusive, competitive and sustainable associations; small-scale producers’ commercial organizations.

Participatory research: Research and/or extension method in which users participate in the definition of priorities, actively contribute throughout the process, and ultimately gain empowerment and ownership of the knowledge generated. Examples: farmer field schools; local innovation committees; farmers’ research groups.

Resilience: “The ability to prevent disasters and crises as well as to anticipate, absorb, accommodate or recover from them in a timely, efficient and sustainable manner. This includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety⁵²”.

Sustainable development: “The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable⁵³.”

Technological innovation: Changes in practices and processes required to increase efficiency or quality in production and transformation in response to market demand. Example: introducing previously unknown water and soil management practices; obtaining new varieties or more productive breeds; using seed production techniques; employing machinery adapted to specific conditions.

Value chain: Set of relationships between different productive and organizational units with a common purpose and focus on the market. Value chains are subject to design and management practices based on organization, strategy, marketing, logistics, performance, innovation and culture, all of which define the chain’s degree of competitiveness.

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